



 Please call 911 if you think you have a medical emergency.

Treatment of Asthma

The goals of asthma therapy are to prevent your child from having chronic and troublesome symptoms, to maintain your child's lung function as close to normal as possible, to allow your child to maintain normal physical activity levels (including exercise), to prevent recurrent asthma attacks and to reduce the need for emergency department visits or hospitalizations, and to provide medicines to your child that give the best results with the fewest side effects.

Medicines that are available fall into two general categories. One category includes medications that are meant to control asthma in the long term and are used daily to prevent asthma attacks (controller medications). These can include inhaled corticosteroids, inhaled cromolyn or nedocromil, long-acting bronchodilators, theophylline, and leukotriene antagonists. The other category is medications that provide instant relief from symptoms (rescue medications). These include short-acting bronchodilators and systemic corticosteroids. Inhaled ipratropium may be used in addition to inhaled bronchodilators following asthma attacks or when asthma worsens.

In general, doctors start with a high level of therapy following an asthma attack and then decrease treatment to the lowest possible level that still prevents asthma attacks and allows your child to have a normal life. Every child needs to follow a customized asthma management plan to control asthma symptoms. The severity of a child's asthma can both worsen and improve over time, so the type (category) of your child's asthma can change, which means different treatment can be required over time. Treatment should be reviewed every 1-6 months, and the choices for long- and short-term therapy are based on how severe the asthma is.

Talk to your doctor about the various medications available to treat asthma.

Severity of Asthma	Long-Term Control	Quick Relief
Mild intermittent asthma	Usually none	Inhaled beta-2 agonist (short-acting bronchodilator) If your child uses the short-acting inhaler more than 2 times per week, long-term control therapy may be necessary.
Mild persistent asthma	Daily use of low-dose inhaled corticosteroids or nonsteroidal agents such as cromolyn and nedocromil (anti-inflammatory treatment), leukotriene antagonists (such as montelukast)	Inhaled beta-2 agonist (short-acting bronchodilator) If your child uses the short-acting inhaler everyday or starts using it more and more frequently, additional long-term therapy may be needed.
Moderate persistent asthma	Daily use of medium-dose inhaled corticosteroids (anti-inflammatory treatment) or low- or medium-dose inhaled corticosteroids combined with a long-acting bronchodilator or leukotriene antagonist	Inhaled beta-2 agonist (short-acting bronchodilator) If your child uses the short-acting inhaler everyday or starts using it with increasing frequency, additional long-term therapy may be needed.
Severe persistent asthma	Daily use of high-dose inhaled corticosteroids (anti-inflammatory treatment), long-acting bronchodilator, leukotriene antagonist, theophylline, omalizumab (for patients with moderate-to-severe asthma brought on by seasonal allergens despite inhaled corticosteroids)	Inhaled beta-2 agonist (short-acting bronchodilator) If your child uses the short-acting inhaler everyday or starts using it with increasing frequency, additional long-term therapy may be needed.
Acute severe asthmatic episode (status asthmaticus)	This is severe asthma that often requires admission to the emergency department or hospital.	Repeated doses of inhaled beta-2 agonist (short-acting bronchodilator) **Seek medical help

Acute severe asthmatic episode (status asthmaticus) often requires medical attention. It is treated by providing oxygen or even mechanical ventilation in severe cases. Repeat or continuous doses from an inhaler (beta-2 agonist) reverse airway obstruction. If the asthma isn't corrected using the inhaled bronchodilator, injectable epinephrine and/or systemic corticosteroids are given to reduce inflammation.

Fortunately, for most children, asthma can be well controlled. For many families, the learning process is the hardest part of controlling asthma. A child might have flares

(asthma attacks) while learning to control asthma, but don't be surprised or discouraged. Asthma control can take a little time and energy to master, but it's worth the effort!

How long it takes to get asthma under control depends on the child's age, the severity of symptoms, how frequently flares occur, and how willing and able the family is to follow a doctor's prescribed treatment plan. Every child with asthma needs a doctor-prescribed individualized asthma management plan to control symptoms and flares. This plan usually has 5 parts.

The Five Parts to an Asthma Treatment Plan

Step 1 - Identifying and controlling asthma triggers

Children with asthma have different sets of triggers. Triggers are the factors that irritate the airways and cause asthma symptoms. Triggers can change seasonally and as a child grows older. Some common triggers are allergens, viral infections, irritants, exercise, breathing cold air, and weather changes.

Identifying triggers and symptoms can take time. Keep a record of when symptoms occur and how long they last. Once patterns are discovered, some of the triggers can be avoided through environmental control measures, which are steps to reduce exposure to a child's allergy triggers. Talk with your doctor about starting with environmental control measures that will limit those allergens and irritants causing immediate problems for a child. Remember that allergies develop over time with continued exposure to allergens, so a child's asthma triggers may change over time. Others who provide care for your child, such as babysitters, daycare providers, or teachers must be informed and knowledgeable regarding your child's asthma treatment plan. Many schools have initiated programs for their staff to be educated about asthma and recognize severe asthma symptoms.

The following are suggested environmental control measures for different allergens and irritants:

- Indoor controls
 - To control dust mites:
 - Use only polyester-filled pillows and comforters (never feather or down). Use mite-proof covers (available at allergy

- supply stores) over pillows and mattresses. Keep covers clean by vacuuming or wiping them down once a week.
 - Wash your child's sheets and blankets once a week in very hot water (130 degrees Fahrenheit or higher) to kill dust mites.
 - Keep upholstered furniture, window mini-blinds, and carpeting out of a child's bedroom and playroom because they can collect dust and dust mites (especially carpets). Use washable throw rugs and curtains and wash them in hot water weekly. Vinyl window shades that can be wiped down can also be used.
 - Dust and vacuum weekly. If possible, use a vacuum specially designed to collect and trap dust mites (with a HEPA filter).
 - Reduce the number of dust-collecting houseplants, books, knickknacks, and nonwashable stuffed animals in your home.
 - Avoid humidifiers when possible because moist air promotes dust mite infestation.
- To control pollens and molds:
 - Avoid humidifiers because humidity promotes mold growth. If you must use a humidifier, keep it very clean to prevent mold from growing in the machine.
 - Ventilate bathrooms, basements, and other damp places where mold can grow. Consider keeping a light on in closets and using a dehumidifier in basements to remove air moisture.
 - Use air conditioning because it removes excess air moisture, filters out pollens from the outside, and provides air circulation throughout your home. Filters should be changed once a month.
 - Avoid wallpaper and carpets in bathrooms because mold can grow under them.
 - Use bleach to kill mold in bathrooms.
 - Keep windows and doors shut during pollen season.
 - To control irritants:
 - Do not smoke (or allow others to smoke) at home, even when a child is not present.
 - Do not burn wood fires in fireplaces or wood stoves.

- Avoid strong odors from paint, perfume, hair spray, disinfectants, chemical cleaners, air fresheners, and glues.
- To control animal dander:
 - If your child is allergic to a pet, you may have to consider finding a new home for the animal or keeping the pet outside at all times.
 - It may (but does not always) help to wash the animal at least once a week to remove excess dander and collected pollens.
 - Never allow the pet into the allergic child's bedroom.
 - If you don't already own a pet and a child has asthma, don't acquire one. Even if a child isn't allergic to the animal now, he or she can become allergic with continued exposure.
- Outdoor controls
 - When mold or pollen counts are high, give your child medications recommended by your doctor (usually an antihistamine) before going outdoors.
 - After playing outdoors, the child should bathe and change clothes.
 - Drive with the car windows shut and air conditioning on during mold and pollen seasons.
 - Don't let a child mow the grass or rake leaves.

In some cases, the doctor may recommend immunotherapy when control measures and medications are not effective. Speak with your child's doctor about these options.

Step 2 - Anticipating and preventing asthma flares

Patients with asthma have chronic inflammation of their airways. Inflamed airways are twitchy and tend to narrow (constrict) whenever they are exposed to any trigger (such as infection or an allergen). Some children with asthma may have increased inflammation in the lungs and airways everyday without knowing it. Their breathing may sound normal and wheeze-free when their airways are actually narrowing and becoming inflamed, making them prone to a flare. To better assess a child's breathing and determine risk for an asthma attack (or flare), breathing tests may be helpful. Breathing tests measure the volume and speed of air as it is exhaled from the lungs. Asthma specialists make several measurements with a spirometer, a computerized machine that takes detailed measurements of breathing ability.

At home, a peak flow meter (a hand-held tool that measures breathing ability) can be used to measure airflow. When peak flow readings drop, airway inflammation may be increasing. The peak flow meter can detect even subtle airway inflammation and obstruction, even when your child feels fine. In some cases, it can detect drops in peak flow readings 2-3 days before a flare occurs, providing plenty of time to treat and prevent it.

Another way to know when a flare is brewing is to look for early warning signs. These signs are little changes in a child that signal medication adjustments may be needed (as directed in a child's individual asthma management plan) to prevent a flare. Early warning signs may indicate a flare hours or even a day before the appearance of obvious flare symptoms (such as wheezing and coughing). Children can develop changes in appearance, mood, or breathing, or they may say they "feel funny" in some way. Early warning signs are not always definite proof that a flare is coming, but they are signals to plan ahead, just in case. It can take some time to learn to recognize these little changes, but over time, recognizing them becomes easier. Parents with very young children who can't talk or use a peak flow meter often find early warning signs very helpful in predicting and preventing attacks. And early warning signs can be helpful for older children and even teenagers because they can learn to sense little changes in themselves. If they are old enough, they can adjust medication by themselves according to the asthma management plan, and if not, they can ask for help.

Step 3 - Taking medications as prescribed

Developing an effective medication plan to control a child's asthma can take a little time and trial and error. Different medications work more or less effectively for different kinds of asthma, and some medication combinations work well for some children but not for others.

There are two main categories of asthma medications: quick-relief medications (rescue medications) and long-term preventive medications (controller medications) (see Treatment of Asthma). Asthma medications treat both symptoms and causes, so they effectively control asthma for nearly every child. Over-the-counter medications, home remedies, and herbal combinations are not substitutes for prescription asthma medication because they cannot reverse airway obstruction and they do not address the cause of many asthma flares. As a result, asthma is not controlled by these nonprescription medicines, and it may even become worse with their usage.

Step 4 - Controlling flares by following the doctor's written step-by-step plan

When you follow the first 3 steps of asthma control, your child will have fewer asthma symptoms and flares. Remember that any child with asthma can still have an occasional flare (asthma attack), particularly during the learning period (between diagnosis and control) or after exposure to a very strong or new trigger. With the proper patient education, having medications on hand, and keen observation, families can learn to control nearly every asthma flare by starting treatment early, which will mean less emergency room visits and fewer admissions, if any, to the hospital. Your doctor should provide a written step-by-step plan outlining exactly what to do if a child has a flare. The plan is different for each child. Over time, families learn to recognize when to start treatment early and when to call the doctor for help.

Step 5 - Learning more about asthma, new medications, and treatments

Learning more about asthma and asthma treatment is the secret to successful asthma control. There are several organizations you can contact for information, videos, books, educational video games, and pamphlets.

For more information, read the complete article, Asthma in Children

(<http://www.emedicinehealth.com/script/main/art.asp?articlekey=59201>) on <http://www.emedicinehealth.com>.

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