



Pediatric Clinic

ASTHMA

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Patient information: Asthma symptoms and diagnosis in children (Beyond the Basics)

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ASTHMA OVERVIEW — Asthma is a chronic condition with symptoms of cough, wheezing, chest tightness or pain, and/or difficulty breathing. These symptoms occur periodically, usually related to specific triggering events. People with asthma have narrowed small airways during these episodes; the narrowing is partially or completely reversible with asthma treatments. In addition, the airways of children with asthma react to a variety of stimuli, which may include viral illnesses (eg, the common cold), exercise, pollen, foods to which the child is allergic, or environmental conditions.

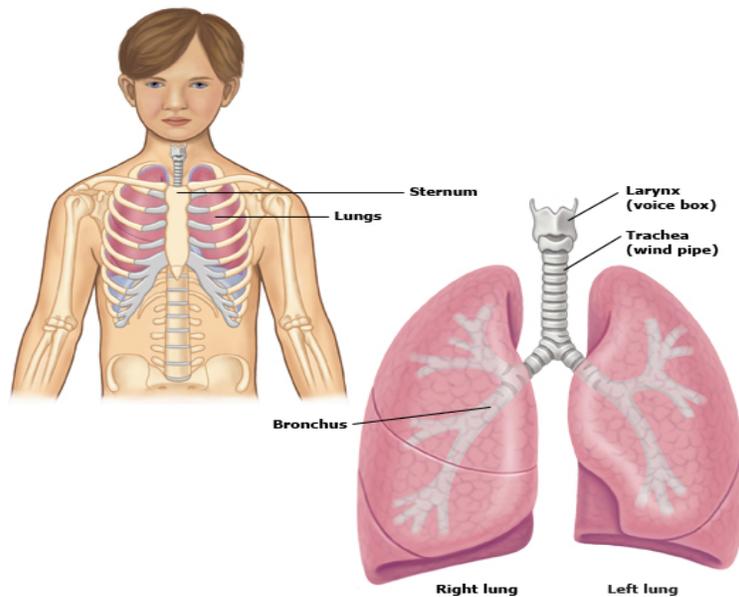
Asthma is the most common chronic disease in children in developed countries, affecting about 12 percent of children who are less than 18 years. It is more common in males than females under the age of 15 years.

This topic review discusses the risk factors, symptoms, and diagnosis of asthma in children.

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Lungs in a healthy child: FIGURE 1



This is what the lungs of a healthy child look like. They sit on the left and right sides of the upper chest, inside the ribcage. When a child takes a breath, air comes in through the nose and mouth, goes down the throat, and into the main airway leading to the lungs called the "trachea". The trachea branches into the left and right bronchus, which carry air to each lung.

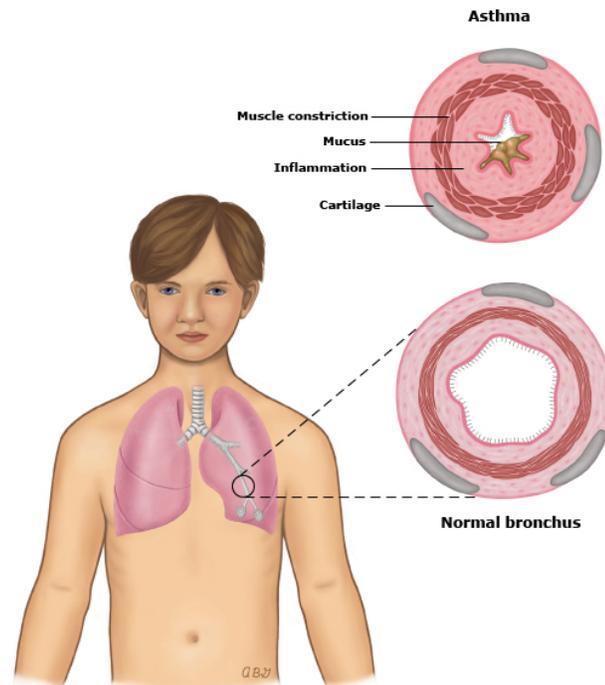
ASTHMA RISK FACTORS — Asthma occurs when the small airways (bronchi) in the lungs become inflamed and narrowed, which limits the flow of air out of the lungs ([figure 1](#) and [figure 2](#)).

This narrowing is almost always reversible in children with treatment. Many different genetic, infectious, and environmental factors may increase the risk of developing asthma (see "[Risk factors for asthma](#)"), a few of which include:

- **Viral infections** — Children who have wheezing with respiratory syncytial virus or rhinovirus seem to be at increased risk for developing asthma.
- **Pollution** — Increased exposure to indoor and outdoor pollution may increase the risk of developing asthma.
- **Exposure to tobacco smoke** — Exposure to tobacco smoke during pregnancy and throughout childhood increase the risk of developing asthma.
- **Family history** — Children with a personal or family history of certain medical problems, such as asthma, allergies, or eczema, are at increased risk of developing asthma.

GO TO THE NEXT PAGE FOR FURTHER PICTURES AND EXPLANATIONS

Asthma and its treatment: FIGURE 2



- When asthma flares, the muscles around the airways tighten (constrict), and the lining of the airways gets inflamed. Then, mucus builds up. All of this makes it hard to breathe. Asthma medicines work in different ways. Short-acting beta agonists (SABAs) and long-acting beta agonists (LABAs) relax the muscle constriction around the airways. Steroids reduce inflammation in the airways. Leukotriene modifiers relax muscles and reduce inflammation and mucus buildup. Omalizumab lowers or stops the allergic reaction that starts inflammation. All these medicines make it easier to breathe and reduce the risk of asthma attacks.

However, not all children with asthma have known risk factors. In other words, even children who live in unpolluted areas and whose parents do not smoke or have asthma can develop asthma. It is not clear if there are ways to reduce a child's risk of developing asthma.

ASTHMA SYMPTOMS

Coughing and wheezing — Symptoms of asthma in children include coughing and wheezing. The cough is usually dry and hacking and is most noticeable while the child sleeps and during early morning hours. It may also be triggered by exercise or cold air exposure. Wheezing is a high-pitched musical noise that is usually heard when the child breathes out. It can generally only be heard with a stethoscope.

Coughing and wheezing tends to come and go during the day or night, depending upon the degree of airway narrowing in the lungs. Breathlessness, chest tightness or pressure, and chest pain may also occur. In addition to coughing or wheezing, a child may report that their chest or stomach hurts.

Asthma symptoms often develop in children before five years of age, although it is sometimes difficult to diagnose asthma in infants and toddlers.

Asthma triggers — Wheezing and coughing may occur at any time, but certain triggers are known to worsen asthma in many children.

Environmental conditions — Cold air, changes in barometric pressure, rain, or wind may cause increased asthma symptoms in certain people. Pollution, including exhaust fumes and particulate matter may also induce symptoms.

Upper respiratory infections — Viral upper respiratory infections (head and chest colds) are a common trigger of asthma in infants and young children. The most common viral infections include rhinovirus (the virus that causes most colds), respiratory syncytial virus, and influenza virus. (See "[Patient information: The common cold in children \(Beyond the Basics\)](#)" and "[Patient information: Bronchiolitis \(and RSV\) in infants and children \(Beyond the Basics\)](#)".)

Children with asthma should use their asthma treatments for cough and chest congestion rather than over-the-counter cold remedies.

Exercise — Narrowing of the airways can be triggered by exercise. This is called exercise-induced asthma (also called exercise-induced bronchoconstriction or EIB). Breathlessness, wheeze, and/or cough usually occur within 5 to 10 minutes of the cool-down period after vigorous exercise. These symptoms tend to disappear after 20 to 45 minutes. Certain types of exercise (eg, swimming) are less likely to cause exercise-induced asthma than others (eg, running, skating), probably because they produce less airway cooling and drying. Short bursts of activity tend to be better tolerated than prolonged exercise. (See "[Patient information: Exercise-induced asthma \(Beyond the Basics\)](#)".)

Allergens and irritants — Indoor and outdoor allergens are an important trigger of childhood asthma, particularly for children older than three years of age. In children with seasonal allergies, asthma symptoms may worsen during certain pollen seasons. Symptoms can also flare as a result of mold exposure (eg, during rainy seasons or in damp areas). Indoor pollutants can act as irritants and also trigger asthma symptoms. Irritants and allergens include:

- **House dust (ie, dust mites, cockroaches, mice droppings), particularly during vacuuming**
- **Animal exposures; cats and dogs are especially provocative but other furry animals (gerbils, rabbits, hamsters, etc) may be suspect, particularly if symptoms only occur in settings where these animals reside**
- **Pollens (the pollen season and types of pollen vary depending upon the region and climate)**
- **Molds**
- **Indoor pollutants (eg, paint, perfume, cleaning products, space heaters, gas stoves, room deodorizers)**

If allergies are a possible cause of symptoms, skin or blood testing may be recommended. This can help to both identify triggers and determine the necessity of avoiding these triggers at home.

Symptom patterns — Children with chronic asthma may have one of several distinct patterns of symptoms, and the asthma pattern may change over time:

- Intermittent asthma attacks with no symptoms between attacks
- Chronic symptoms with intermittent worsening
- Attacks that become more severe or frequent over time
- Morning "dipping", when symptoms worsen in the morning and improve as the day progresses
- Symptoms that begin during upper respiratory tract infections (eg, colds) and linger for several weeks after, with resolution during warmer weather.

Most asthma attacks develop slowly over a period of several days. Uncommonly, a severe attack can occur suddenly, even in someone with intermittent asthma, and with minimal warning.

ASTHMA DIAGNOSIS — The diagnosis of asthma in children requires a careful review of a child's current and past medical history, family history, and a physical examination. Specialized testing is sometimes needed to diagnose asthma and to rule out other possible causes of symptoms. Many children with asthma appear and sound completely normal.

Spirometry testing — Spirometry measures the flow and volume of air generated after a child takes a very deep breath and then forcefully tries to blow the air out of his/her lungs. If airflow obstruction is present, the test may be repeated after the child uses an asthma inhaler or nebulizer (bronchodilator) to confirm that the obstruction is reversible (a feature of asthma).

Children younger than six years sometimes have a hard time following the instructions to perform spirometry. Testing of younger children and infants is described below (see '[Testing for young children](#)' below).

Challenge testing — A bronchial challenge test may be recommended to diagnose asthma. This testing is designed to cause the airways to narrow in children with asthma. The most common challenge tests include inhaling an agent that causes bronchoconstriction, exercise by running on a treadmill or using an exercise cycle, or breathing cold air. Testing is done in a specialized asthma testing center that is capable of providing emergency asthma care if needed. (See "[Bronchoprovocation testing](#)".)

Additional testing — Other tests may be recommended to ensure that another condition is not the cause of a child's coughing or wheezing. This may include a chest radiograph, sweat chloride test (for cystic fibrosis), [barium](#) swallow (for gastroesophageal reflux), modified barium swallow (for aspiration), or skin or blood testing (for allergies or immune problems).

Testing for young children — Infants and children younger than six years are usually not able to reliably perform spirometry or peak expiratory flow rate testing. In some cases, a healthcare provider may recommend a trial of asthma medication to confirm the diagnosis.

ASTHMA IN ADULTHOOD — Many parents wonder if their child will "outgrow" their asthma over time. Some children do experience complete remission, but many continue to have asthma that can be controlled with appropriate medications.

Having asthma does not typically affect the length of a person's life. With appropriate therapy, children with asthma can participate in all activities including sports at any level.

ASTHMA TREATMENT — The treatment of asthma in children is discussed in a separate topic review **BELOW.**

WHERE TO GET MORE INFORMATION — Your child's healthcare provider is the best source of information for questions and concerns related to your child's medical problem. Other topics about asthma in children are available separately. (See "[Patient information: Asthma treatment in children \(Beyond the Basics\)](#)" and "[Patient information: How to use a peak flow meter \(Beyond the Basics\)](#)" and "[Patient information: Asthma inhaler techniques in children \(Beyond the Basics\)](#)" and "[Patient information: Trigger avoidance in asthma \(Beyond the Basics\)](#)".) For other causes of wheezing: (See "[Wheezing illnesses other than asthma in children](#)" and "[Cystic fibrosis: Clinical manifestations and diagnosis](#)" and "[Clinical manifestations and diagnosis of gastroesophageal reflux disease in children and adolescents](#)" and "[Gastroesophageal reflux in infants](#)" and "[Aspiration due to swallowing dysfunction in infants and children](#)" and "[Overview of skin testing for allergic disease](#)" and "[Overview of in vitro allergy tests](#)".)

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TREATMENT

Patient information: Asthma treatment in children (Beyond the Basics)

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ASTHMA TREATMENT OVERVIEW — The optimal treatment of asthma depends upon a number of factors, including the child's age, the severity and frequency of asthma attacks, and proper use of prescribed medications. For most children, asthma treatment can control symptoms, allowing the child to participate fully in all activities including sports.

Successful treatment of asthma involves three components:

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- Controlling and avoiding asthma triggers
- Regularly monitoring asthma symptoms and lung function
- Understanding how and when to use medications to treat asthma

This article discusses the treatment of asthma in children younger than 12 years. Children with asthma who are 12 years and older are treated with medications and doses similar to that of adults.

Separate articles discuss the symptoms and diagnosis of asthma and use of asthma dose inhalers in children. (See "[Patient information: Asthma symptoms and diagnosis in children \(Beyond the Basics\)](#)" and "[Patient information: Asthma inhaler techniques in children \(Beyond the Basics\)](#)" and "[Patient information: Trigger avoidance in asthma \(Beyond the Basics\)](#)".)

A number of topics about asthma in adults are also available. (See "[Patient information: Asthma treatment in adolescents and adults \(Beyond the Basics\)](#)" and "[Patient information: How to use a peak flow meter \(Beyond the Basics\)](#)" and "[Patient information: Asthma inhaler techniques in adults \(Beyond the Basics\)](#)" and "[Patient information: Asthma and pregnancy \(Beyond the Basics\)](#)".)

CONTROLLING ASTHMA TRIGGERS — The factors that set off or worsen asthma symptoms are called triggers. Identifying and avoiding asthma triggers are essential in preventing asthma flare-ups. Trigger avoidance is discussed in detail in a separate article. (See "[Patient information: Trigger avoidance in asthma \(Beyond the Basics\)](#)".)

Common asthma triggers generally fall into several categories:

- Respiratory infections
- Allergens (including dust, pollens, and furred animals)
- Irritants (such as tobacco smoke, aerosol sprays, some cleaning products)
- Exercise
- Cold air

After identifying potential asthma triggers, the parent and healthcare provider should develop a plan to deal with the triggers. **If possible, the child should completely avoid or limit exposure to the trigger** (eg, eliminate exposure to cigarette smoke). Recommendations may be made about decreasing allergen exposure for those children with allergies (eg, removing carpets from bedrooms, not allow pets to sleep in the child's room). Children who have persistent problems despite efforts to avoid triggers may benefit from seeing an asthma specialist.

Exercise is an exception to the general rule about trigger avoidance. Exercise is encouraged for all children, including those with asthma. An asthma action plan should include steps to prevent and treat exercise-related symptoms. (See '[Exercise-induced asthma](#)' below.)

MONITORING ASTHMA SYMPTOMS AND LUNG FUNCTION — Successful management of asthma requires the parent and/or child to monitor their asthma regularly. This is primarily done by recording the frequency and severity of asthma symptoms (coughing, shortness of breath, and wheezing).

In addition, a healthcare provider may recommend that the child measure his or her lung function with a test known as a peak flow (peak expiratory flow rate [PEFR]).

Asthma questionnaires — A healthcare provider may recommend keeping a daily asthma diary when symptoms are not well controlled or when starting a new treatment. In the diary, asthma symptoms (eg, coughing, wheezing), and medications are recorded. The child's peak flow readings may also be included ([form 1](#)). A standardized questionnaire, such as the Asthma Control Test (ACT) [[1](#)] or Asthma Control Questionnaire (ACQ) [[2](#)], may be recommended to help track asthma symptoms.

A periodic diary may be recommended for children who have stable symptoms and whose medications have not changed recently. This type of diary can be completed before visiting the healthcare provider and helps the parent/child and healthcare provider to determine if the asthma treatment plan needs to be adjusted ([form 2](#)).

Lung function assessment — Children over the age of six years may have lung function testing (spirometry) performed during a visit with their healthcare provider. In addition, a healthcare provider may recommend measurements of peak expiratory flow rate (PEFR). PEFR measures the rate at which a person can exhale and depends upon the degree of airway narrowing and patient effort. PEFR monitoring can provide data that can be used to make treatment decisions. This is discussed in greater detail elsewhere. (See "[Patient information: How to use a peak flow meter \(Beyond the Basics\)](#)" and "[Patient information: Asthma symptoms and diagnosis in children \(Beyond the Basics\)](#)", section on 'Spirometry testing'.)

Review of asthma treatment — Routine follow-up appointments with a healthcare provider are recommended to review asthma symptom control and treatment plans. Children with asthma should see a healthcare provider every one to six months to monitor the child's symptom severity and frequency and response to treatment. The medications used to treat asthma in children vary according to a child's age, the severity of asthma, and the level of asthma symptom control. If control has been adequate for at least three months, the asthma medication dose may be decreased. If control is not adequate, the medication schedule, delivery technique, and trigger avoidance will be reviewed, and the medication dose may be increased or additional medication prescribed.

CATEGORIES OF ASTHMA SYMPTOMS

Intermittent asthma — A child is defined as having intermittent asthma if he or she has asthma with minimal symptoms and **infrequent** asthma flares. Specifically, children with intermittent asthma have the following characteristics ([table 1](#))

- Symptoms of asthma occur two or fewer times per week
- Asthma does not interfere with daily activities
- Awakenings during the night due to asthma symptoms occur two or fewer times per month
- Asthma flares require oral glucocorticoids (also called corticosteroids or steroids) no more than once per year

A child with asthma symptoms that are triggered only during exercise (exercise-induced bronchoconstriction) might fit into this category. However, symptoms during exercise may also indicate that the child may have persistent asthma. (See "[Patient information: Exercise-induced asthma \(Beyond the Basics\)](#)".)

TABLE 1: Classifying asthma severity in children 5 to 11 years of age

Components of severity		Classification of asthma severity (children 5 to 11 years of age)			
		Intermittent	Persistent		
			Mild	Moderate	Severe
Impairment	Symptoms	≤2 days/week	>2 days/week, but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3 to 4x/month	>1x/week, but not nightly	Often 7x/week
	Short-acting beta ₂ -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week, but not daily	Daily	Several times per day
	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung function	<ul style="list-style-type: none"> • Normal FEV₁ between exacerbations • FEV₁ >80 percent predicted • FEV₁/FVC >85 percent 	<ul style="list-style-type: none"> • FEV₁ = >80 percent predicted • FEV₁/FVC >80 percent 	<ul style="list-style-type: none"> • FEV₁ = 60 to 80 percent predicted • FEV₁/FVC = 75 to 80 percent 	<ul style="list-style-type: none"> • FEV₁ <60 percent predicted • FEV₁/FVC <75 percent
Risk	Exacerbations requiring oral systemic corticosteroids	0 to 1/year (see footnote)	≥2 in one year (see footnote)		
		Consider severity and interval since last exacerbation			
		Frequency and severity may fluctuate over time for patients in any severity category			
		Relative annual risk of exacerbations may be related to FEV ₁			

Classifying severity in children who are not currently taking long-term control medication. Level of severity is determined by both impairment and risk. Assess impairment domain by patient's/caregiver's recall of the previous two to four weeks and spirometry. Assign severity to the most severe category in which any feature occurs. At present, there are inadequate data to correspond frequencies of exacerbations with different levels of asthma severity. In general, more frequent and intense exacerbations (eg, requiring urgent, unscheduled care, hospitalization, or ICU admission) indicate greater underlying disease severity. For treatment purposes, patients who had ≥2 exacerbations requiring oral systemic corticosteroids in the past year may be considered the same as patients who have persistent asthma, even in the absence of impairment levels consistent with persistent asthma.

EIB: exercise-induced bronchoconstriction; ICU: intensive care unit.

Persistent asthma — Children with persistent asthma have symptoms **regularly**. There may be days when activities are limited due to asthma symptoms, and the child may be awakened from sleep. Lung function is usually normal between episodes, but becomes abnormal during an asthma attack. Persistent asthma can be mild, moderate, or severe.

The criteria that are used to determine a child's asthma severity include the number of days per week that a child has one or more of the following ([table 1](#)):

- Symptoms, such as cough, wheeze, or shortness of breath
- Awakenings during the night due to cough or wheeze
- Use of a bronchodilator (reliever medication)
- Symptoms that affect the child's ability to participate in normal activities

The number of flares per year that require treatment with oral glucocorticoids (also called “corticosteroids” or “steroids”) are also taken into consideration when determining asthma severity.

Consultation with an asthma specialist (a pulmonologist or allergist) is recommended for children who have moderate or severe persistent asthma, as well as those ages zero to four years who have any form of persistent asthma.

QUICK-RELIEF MEDICATIONS FOR ASTHMA

Bronchodilators — Short-acting bronchodilators (also called beta-2 agonists) relieve asthma symptoms rapidly by relaxing the muscles around narrowed airways. In the United States, [albuterol](#) (Ventolin, Proventil, ProAir, Xopenex, and others) is the most commonly used short-acting bronchodilator. These medications are sometimes referred to as “quick-acting relievers”. Children with intermittent asthma, the mildest form of asthma, will require these symptom-relieving medications only occasionally.

There is no benefit to using short-acting bronchodilators on a regular basis and there may be some harm. If asthma symptoms are occurring more than twice per week on a regular basis, the child should be evaluated by a healthcare provider. Other medications are recommended for persistent symptoms in this situation.

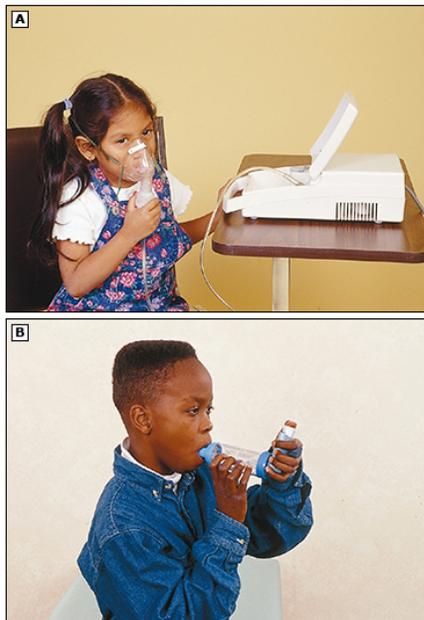
Metered-dose inhaler versus nebulizer — Short-acting bronchodilators can be delivered with a nebulizer or through a metered-dose inhaler with an attached spacer (valved holding device) device and an infant- or child-sized mask. (See [“Delivery of inhaled medication in children”](#).)

- Nebulizers use compressed air to change a medication from liquid form to a fine spray that can be inhaled through a mask or mouthpiece ([picture 1](#)). When a facemask is used, it should be placed snugly over the face; moving the mask just 1 centimeter away from the face reduces the dose of an

inhaled medication by up to 50 percent. Nebulizers may be preferred to metered-dose inhalers for children who are unable to use a handheld device. (See "[Use of medication nebulizers in children](#)".)

- Metered-dose inhalers dispense liquid or fine powder medications, which mix with the air that is breathed into the lungs. The spacer and face mask help to ensure that the greatest amount of medication is delivered to the lungs ([picture 1](#)). It is preferable to have the child use the inhaler when he or she is awake and not crying. (See "[Patient information: Asthma inhaler techniques in children \(Beyond the Basics\)](#)".)

▪ **PICTURE 1: Nebulizer and spacer use PI**



- (A) Girl using a nebulizer with a mask.
- (B) Boy using a metered-dose inhaler with spacer.
- *Reproduced with permission from: Klossner NJ, Hatfield NT. Introductory Maternity and Pediatric Nursing, 2nd Edition. Philadelphia: Lippincott Williams & Wilkins, 2009. Copyright © 2009 Lippincott Williams & Wilkins.*

Side effects of bronchodilators — Some children feel shaky, have an increased heart rate, or become hyperactive after using a short-acting bronchodilator. The side effects often decrease over time.

CONTROLLER MEDICATIONS FOR ASTHMA — Children with persistent asthma need to take medication on a daily basis to keep their asthma under control, even if there are no symptoms of active asthma on a given day. Medications taken daily for asthma are called "long-term controller" medicines and function to decrease inflammation (or swelling) of the small airways over time. (See "[Chronic asthma in children younger than 12 years: Controller medications](#)".)

Some controller medicines are delivered by inhaler or nebulizer, while others are taken as a pill or granules. The doses and types of controller medications prescribed to children with asthma depend on a child's asthma severity and level of symptom control.

Inhaled glucocorticoids — Inhaled glucocorticoids work by reducing swelling and sensitivity of the bronchial tubes, thereby reducing their exaggerated reaction to asthma triggers. These medications are the preferred

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treatment for persistent asthma. Regular treatment with an inhaled glucocorticoid medication can reduce the frequency of symptoms (and the need for inhaled bronchodilators), improve quality of life, and decrease the risk of a serious asthma attack.

Inhaled glucocorticoids may be taken by metered dose inhaler with a valved holding chamber (spacer) or by nebulizer. Chambers are available with different sized masks to fit younger children. These medications need to be taken on a daily basis to effectively control asthma symptoms. An inhaled bronchodilator is still used as needed to relieve symptoms and before exposure to asthma triggers. (See "[Patient information: Asthma inhaler techniques in children \(Beyond the Basics\)](#)".)

Side effects of glucocorticoids — Unlike glucocorticoids that are taken by mouth, very little of the inhaled glucocorticoid is absorbed into the bloodstream, and there are few side effects. As the dose of inhaled glucocorticoids is increased, more of the medication is absorbed into the bloodstream, and the risk of side effects increases.

The most common side effect of inhaled glucocorticoids is oral candidiasis (thrush). This can usually be prevented by taking inhaled glucocorticoids with a spacer with or without a face mask (which helps to deliver medication to the lungs rather than the mouth). The child should rinse his or her mouth or brush teeth and tongue immediately after inhalation. A hoarse voice and sore throat (without thrush) are less common side effects that are usually managed by changing to a different glucocorticoid preparation.

Inhaled glucocorticoids can lead to a modest (1.2 cm [0.47 inches]) reduction in height in children. This decrease in height persisted into adulthood. The decrease was neither progressive nor cumulative [3].

Although the side effects of glucocorticoids are of concern to many parents, it is important to remember that untreated asthma itself can prevent the child from participating in activities, influence the way a child perceives his or her well-being, and place the child at risk for an asthma exacerbation.

The goal of treatment is to use the lowest possible dose while maintaining good asthma control and minimizing the risk of serious asthma attacks. This usually means that treatment will be adjusted frequently, depending upon how well symptoms are controlled.

Leukotriene modifiers — A category of medications called leukotriene modifiers are sometimes used as an alternative to low-dose inhaled glucocorticoids in children who have mild persistent asthma. However, leukotriene modifiers are not quite as effective as inhaled glucocorticoids. The leukotriene modifier [montelukast](#) (Singulair) is taken by mouth once daily and is available as a chewable pill or granules that can be taken directly or mixed into certain soft foods.

Leukotriene modifiers can be used in addition to inhaled glucocorticoids in children who have more severe and/or difficult-to-control asthma.

There are worries that [montelukast](#) might be linked to an increase in side effects like mood changes and aggressive behavior. Parents should notify the child's healthcare provider if any changes in mood or behavior occur after starting this medication.

Long-acting bronchodilators — Long-acting bronchodilators (also called long-acting beta agonists, or LABA) are bronchodilators that have a longer-lasting effect (at least 12 hours) compared with the short-acting beta agonists that are used as reliever medications. (See '[Quick-relief medications for asthma](#)' above.)

These medications (LABA) should be used only in combination with an inhaled glucocorticoid; they should not be used alone. Combination therapy is used as step up therapy for children not well controlled on inhaled glucocorticoids or [montelukast](#) alone.

EXERCISE-INDUCED ASTHMA — An article that discusses exercise-induced asthma is available separately. If exercise is a trigger for asthma, the child can take an extra dose of bronchodilator medication or leukotriene modifier before exercise. (See "[Patient information: Exercise-induced asthma \(Beyond the Basics\)](#)".)

ASTHMA ATTACK TREATMENT — The term "asthma attack" is somewhat confusing because it does not distinguish between a mild increase in symptoms and a life-threatening episode. Asthma symptoms may be aggravated by changes in air quality, the common cold and other respiratory infections, and new or continued exposure to triggers. These triggers can cause mild, moderate, or severe asthma symptoms to develop. Any of these changes could be considered an asthma "attack."

Some children will have periodic, mild asthma attacks that never require emergency care, while others may have severe and sudden asthma attacks that require a call for emergency medical attention. Even children with mild asthma can have severe exacerbations.

Asthma action plan — The child and/or parent will work with their healthcare provider to develop tailored guidelines (also called an action plan) to follow when symptoms increase. Asthma action plans are available for children up to age five ([form 3](#)), for children five and older and adults ([form 4](#)), and for school ([form 5A-C](#)).

Asthma symptoms are divided into three zones, which are assigned colors similar to those of a traffic light. These zones can be used to make decisions about the need for treatment:

Green — Green signals that the lungs are functioning well. When asthma symptoms are not present or are well controlled, patients should continue their regular medicines and activities.

Yellow — Yellow is a sign that the airways in the lungs are somewhat narrowed, making it difficult to move air in and out; this occurs when there is an increase in asthma symptom frequency or severity. A short-term change or increase in medication is generally required. Patients should change or increase their asthma medication according to the plan that was discussed with their provider.

Red — Red is a sign that the airways are severely narrowed and requires immediate treatment; this occurs with a significant increase in asthma symptoms. The quick-acting reliever inhaler should be used according to the plan discussed with the provider and the child should be evaluated by a medical professional.

Emergency care plan — Parents should work with their child's healthcare provider to formulate an emergency care plan that explains specifically what to do if asthma symptoms worsen. This may include more frequent use of a reliever medication.

However, if asthma symptoms worsen or do not improve after use of a quick-acting reliever medication, the parent should immediately call for emergency medical assistance. Severe asthma attacks can be fatal if not treated promptly.

In most areas of the United States, emergency medical assistance is available by calling 911. Parents should **not** attempt to drive to the hospital and should not ask someone else to drive. Calling 911 is safer than driving for two reasons:

- From the moment EMS personnel arrive, they can begin evaluating and treating asthma. If a parent drives to the hospital, treatment cannot begin until the child arrives at the emergency department.
- If a dangerous complication of asthma occurs on the way to the hospital, EMS personnel may be able to treat the problem immediately.

Following an asthma attack, most children are given a 3- to 10-day course of an oral glucocorticoid medication (eg, [prednisone](#), [prednisolone](#)). This treatment helps to decrease the swelling and mucus production in the lungs and reduces the risk of a second asthma attack.

Wear medical identification — Many children with medical conditions wear a bracelet, necklace, or similar alert tag at all times. If an accident occurs and the child cannot explain his or her condition, this will help responders provide appropriate care.

The alert tag should include a list of major medical conditions and allergies, as well as the name and phone number of an emergency contact. One device, Medic Alert (www.medicalert.com), provides a toll-free number that emergency medical workers can call to find out a person's medical history, list of medications, family emergency contact numbers, and healthcare provider names and numbers.

WHERE TO GET MORE INFORMATION — Your child's healthcare provider is the best source of information for questions and concerns related to your child's medical problem.

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