MAYO CLINIC

Your Child's Asthma

Key Messages for Your Child's Asthma

Your child's asthma symptoms may change from day to day. But asthma should not regularly keep a child out of school or otherwise limit normal activities. Use the following as a guide to help you decide when your child's asthma needs attention from a health care provider.

"I feel good."

Your child:
- Has few daytime asthma symptoms.
- Is not troubled with asthma symptoms at night.
- Does not miss school due to asthma.
- Can engage in normal daily activities without being limited by asthma symptoms.
- Does not have any unplanned trips to the doctor.
- Has few asthma flares and those flares can be controlled with medicine.

Action: No need to contact your child's health care provider.

"I do not feel good."

Your child:
- Has frequent symptoms (daytime symptoms more than two days in one week or symptoms that affect sleep more than two nights in one month).
- Experiences an asthma flare without any known trigger.
- Experiences symptoms during daily activities that usually do not cause a flare.
- Does not get full relief from symptoms with quick-relief medication.
- Has to use quick-relief medication more than two times in one week (not including preventive use before exercise or active play.)

Action: Contact your child's health care provider.

"I feel awful."

Your child:
- Is still struggling to breathe several minutes after taking quick-relief medication.
- Suddenly begins wheezing.
- Is unable to cry or to speak more than three words in a row without coughing or struggling to breathe.
- Experiences increased wheezing or chest tightness that is not relieved by quick-relief medications.
- Has severe chest pain.
- Feels light-headed or faint.
- Has a bluish tint to the lips, face or fingernails.
- Has an alarmingly severe or intense asthma flare.

Action: If your child has any of these warning signs, seek emergency medical care immediately.

Children and adolescents with well-controlled asthma should be able to:
- Exercise.
- Sleep well.
- Attend school regularly.
- Play and work without asthma symptoms or serious side effects from medications.

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Introduction

This information is intended to help you become familiar with your child's asthma, its treatment and management. The more you know about asthma, the better you can manage your child's asthma. **Preventing asthma symptoms is much better than treating them after they begin, and symptoms are much easier to manage if you begin treatment early.** With good asthma management, your child should be able to live a normal, active life.

What is Asthma?

Asthma is a lung disease. When you have asthma, the airways (bronchial tubes) in your lungs narrow and swell. The airways produce extra mucus and breathing becomes difficult.

Normal breathing

Understanding the basics of breathing will help you understand asthma. Each time you breathe in (inhale), air moves down your windpipe (trachea) and through the bronchial tubes (bronchioles) in your lungs. These tubes, or airways, are vital to the breathing process. The bronchial tubes lead into tiny air sacs (alveoli). Oxygen passes through the thin walls of the alveoli into the blood vessels and is carried throughout your body. Blood vessels then carry carbon dioxide back to your lungs where it passes from the blood to the air sacs and is exhaled into the air (Figure 1).

How asthma affects the airways

Asthma is sometimes referred to as reactive airway disease, wheezy bronchitis or bronchial asthma. No matter what you call it, asthma is a lung disease that affects the bronchial tubes, restricting and sometimes blocking airflow. A person with asthma has airways that are overly sensitive to irritants — such as cold air or cigarette smoke — or triggers such as allergens or respiratory infections (see "Asthma Triggers" on page 10).

During an asthma flare (asthma attack), the bronchial tubes become inflamed and spasm. Air then has difficulty getting in and out of the lungs. Air can become trapped in the lungs causing them to overinflate. When this happens, your child may feel as if he or she can't breathe in fully or breathe out completely. Your child may also feel chest tightness. Young children sometimes say that their chest hurts during an asthma flare.

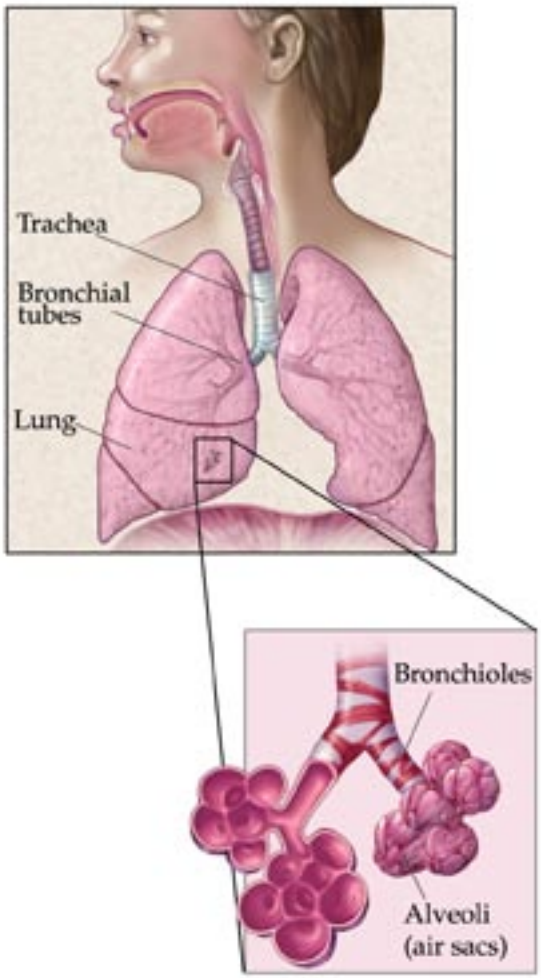


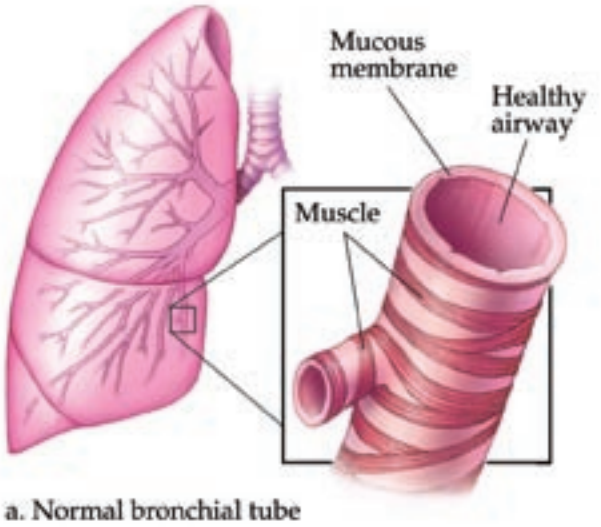
Figure 1. Respiratory system

Bronchial tubes may become narrowed or obstructed because of one or more changes (Figure 2):

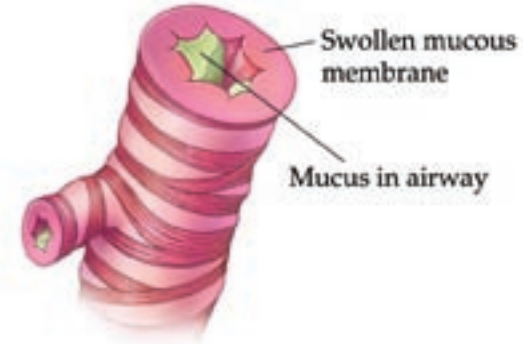
- **Inflammation.** When exposed to irritants or asthma triggers, the walls of the bronchial tubes become irritated (inflamed) and swollen (Figure 2b).

- **Mucus production.** When the membranes that line your child's bronchial tubes are irritated, congested and swollen, they produce extra mucus. Mucus then builds up in the tubes and sometimes plugs the tubes completely (Figure 2b).

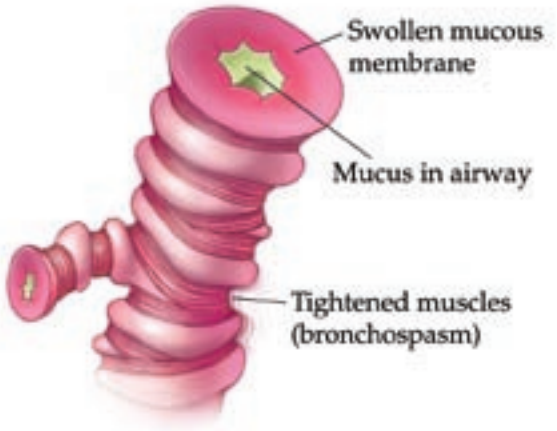
- **Bronchospasm.** Asthma triggers can cause bronchospasm — when smooth muscles surrounding the bronchial tubes tighten (constrict) and reduce airflow. Inflammation can also cause bronchospasm. (Figure 2c).



a. Normal bronchial tube



b. Inflamed bronchial tube with mucus production



c. Inflamed bronchial tube with bronchospasm

Figure 2. Asthma flare

Diagnosing Asthma

Diagnosing asthma can be difficult. Signs and symptoms — such as coughing, chest tightness, shortness of breath and wheezing — can range from mild to severe. Asthma symptoms are often similar to those of other conditions such as bronchitis, pneumonia or cystic fibrosis. Children may also develop temporary breathing conditions that have symptoms similar to asthma. If your health care provider thinks your child has asthma, he or she will determine what tests may be done to confirm the diagnosis and to gauge asthma severity.

Lung function test (spirometry)

A lung function test (spirometry) is one of the most important tests for asthma. This test can:

- Detect and measure airway narrowing.
- Help determine how severe your child's asthma is and how much medication is needed.
- Help measure the effectiveness of your child's treatment program.

This test requires children to breathe out as long and hard as they can until their lungs are almost empty.

Methacholine challenge test

During this test, your child will be asked to breathe in a chemical (methacholine) designed to temporarily produce asthma symptoms in people who have asthma. (Inhaling methacholine has no effect on people who don't have asthma.) Bronchodilator medication (albuterol) is then given to reverse the asthma symptoms. This test may be included as part of a lung function test.

X-rays

Chest X-rays usually do not help diagnose or treat asthma. However, X-rays may be helpful during an asthma flare to determine whether other factors, like pneumonia, may be contributing to the flare. X-rays can also identify signs of asthma, such as overinflation of the lungs that may be due to narrowed bronchial tubes or excessive mucus plugging an airway. X-rays may be helpful when a diagnosis of asthma is first being made to exclude other potential explanations for wheezing and coughing.

Exhaled nitric oxide test

During this test, your child slowly breathes out into a collection chamber so the air from your child's lungs can be tested for nitric oxide levels. Children with asthma that is triggered by allergies often have increased amounts of nitric oxide in their lungs when asthma is not adequately treated. The exhaled nitric oxide test can identify the amount of inflammation present with asthma.

Allergy testing

If your child's health care provider suspects that allergies are causing asthma, he or she may recommend allergy testing. Not all children with asthma need allergy testing.

Allergy skin test

An allergy skin test may help diagnose the cause of an allergy so allergy-producing substances (allergens) can be avoided. Skin tests are done on the arms or back using the prick method. A drop of an allergen is applied to the skin. The skin is then pricked. Skin tests for most allergens are safe and the results are usually available in 15 minutes.

Allergy blood test

Allergies can also be diagnosed using a blood test called the serum specific IgE (ImmunoCAP™). This test gives information similar to skin tests, but it may be used when a skin test would not be suitable.

Asthma Symptoms

When your child has an asthma flare and air is forced to flow through narrowed bronchial tubes, **coughing is often the first symptom.** Coughing may be accompanied by the following symptoms:

- Shortness of breath
- Chest tightness, squeezing or heaviness
- Wheezing

Children with asthma can have any of these symptoms. (But not every cough is caused by asthma.) Symptoms are commonly worse at night or in the early morning. Asthma flares can be from mild to severe and can last a few hours, several days or longer.

When to contact your child's health care provider

Your child's asthma symptoms may vary depending on the severity of an asthma flare. But asthma should not regularly keep a child out of school or otherwise limit daily activities. Use the following as a guide for consulting with your child's health care provider about asthma.

"I feel good."

Your child:

- Has few daytime asthma symptoms.
- Is not troubled with asthma symptoms at night.
- Does not miss school due to asthma.
- Can engage in normal daily activities without being limited by asthma symptoms.
- Does not have any unplanned trips to the doctor.
- Has few asthma flares and those flares can be controlled with medicine.

Action: No need to contact your child's health care provider.

"I do not feel good."

Your child:
- Has frequent symptoms (daytime symptoms more than two days in one week or symptoms that affect sleep more than two nights in one month).
- Experiences an asthma flare without any known trigger.
- Experiences symptoms during daily activities that usually do not cause a flare.
- Does not get full relief from symptoms with quick-relief medication.
- Has to use quick-relief medication more than two times in one week (not including preventive use before exercise or active play.)

Action: Contact your child's health care provider.

"I feel awful."

Your child:
- Is still struggling to breathe several minutes after taking quick-relief medication.
- Suddenly begins wheezing.
- Is unable to cry or to speak more than three words in a row without coughing or struggling to breathe.
- Experiences increased wheezing or chest tightness that is not relieved by quick-relief medications.
- Has severe chest pain.
- Feels light-headed or faint.
- Has a bluish tint to the lips, face or fingernails.
- Has an alarmingly severe or intense asthma flare.

Action: If your child has any of these warning signs, seek emergency medical care immediately.

Asthma Triggers

An asthma trigger is anything that causes an asthma flare. Triggers vary among children. This section covers common asthma triggers. As you read it, think of factors that may trigger your child's asthma.

Allergies

Having allergies is the biggest risk factor for childhood asthma. Bronchial inflammation may be triggered by an allergy-producing substance (allergen), such as:

- Animal dander (old skin scales that are shed into an animal's hair or fur)
- Dust mites
- Pollens
- Mold

An obvious example is a person who is allergic to cat dander may develop asthma symptoms after being near a cat. More often, though, the inflammation that results from exposure to allergy-producing substances is subtle or can be delayed by six to 12 hours.

> Asthma triggered by an allergy can usually be controlled by taking medications and modifying your child's environment (for example, controlling dust mites and reconsidering pet ownership). Discuss with your child's health care provider what measures you can take to decrease allergy-associated triggers.

Environment

Environmental triggers irritate the lining of the bronchial tubes and may lead to an asthma flare. Being aware of environmental asthma triggers and avoiding them can help reduce the frequency of flares.

Cigarette smoke is particularly irritating to the lining of the bronchial tubes. Smoking and secondhand smoke worsen asthma. Children who are exposed to cigarette smoke also have more frequent respiratory infections, which in turn worsen asthma symptoms. Even cigarette smoke on clothing or in car and furniture upholstery is an irritant and can make asthma worse.

Environmental triggers include:

- Smoke
- Cold air
- Motor vehicle exhaust
- Air pollution
- Strong fumes
- Weather changes

Infection

Respiratory infections often trigger asthma symptoms in children. These infections may be caused by a virus, but they can also be due to bacteria. Sometimes a viral infection increases the likelihood of a secondary bacterial infection in the airways. In this case, your child's health care provider may recommend medications for bacterial infections (antibiotics). Antibiotics can be used to treat bacterial illnesses, such as ear or sinus infections, or pneumonia with accompanying asthma symptoms.

Antibiotics do not work against viral infections. Viruses that trigger asthma flares are spread by contact with others who are infected with the virus. Frequent hand washing and limited hand-to-face contact may help prevent viral infections.

To reduce the risk of influenza, children who have asthma should always receive an annual influenza (flu) shot.

If your child has a respiratory illness, such as a cold or flu, **it is very important to treat an asthma flare early** with asthma medications and consult your child's health care provider. Do not give a child who has asthma any over-the-counter cough or cold medications.

Exercise

All children need exercise. Although some children who have asthma may experience asthma symptoms during or after exercise, having asthma does not mean they cannot be active. Medication taken before exercise, as prescribed by your child's health care provider, will help your child during activities such as sports and physical education class. Doing a proper warm-up and cool-down before and after exercise may also help reduce exercise-related asthma symptoms.

Managing Asthma

The goal of asthma management is to achieve the best possible control of your child's asthma with the fewest side effects from asthma medication.

With proper care and treatment, your child should be able to:
- Participate in active play, sports and exercise.
- Sleep through the night without being interrupted by coughing, wheezing or breathing problems.
- Attend school without missing days due to asthma symptoms.
- Avoid urgent visits to the doctor or to the emergency room.

Asthma medication basics

Three types of medications are prescribed for asthma:
- Long-term controllers for ongoing asthma management
- Quick-relief medications for asthma symptoms
- Oral steroids for severe asthma symptoms

Most quick-relief medications and long-term controller medications are delivered to the lungs by inhalation, using either a metered-dose inhaler (MDI) with a spacer device or a dry powder inhaler (DPI). The medication delivery system will depend on the type of medication prescribed, as well as your child's age and ability to use the device. Children who cannot use an inhaler may receive treatment with a nebulizer. This device turns the liquid medication into a mist that can be inhaled through a mouthpiece or mask. Most children can be taught to use inhalers with an appropriate spacer device.

If you have questions about how long the inhaler will last or about any of the medication information in this material, talk with a member of your child's health care team.

Long-term controllers

Long-term controllers are **taken daily** to prevent or reduce inflammation and to decrease airway sensitivity. Improvement in symptoms is a sign that long-term controller medications are working.

Never stop or cut back on your child's long-term controller asthma medication without talking to his or her health care provider first. Your child needs to take long-term controller medications daily, even if he or she does not have asthma symptoms every day.

Inhaled corticosteroids
The most effective long-term controller medications are inhaled corticosteroids because they have a broad action that suppresses inflammation in the airways. These medications must be used with a spacer to ensure best delivery to the lungs and to minimize the amount of medication that is swallowed.

Long-acting beta-agonist
Long-acting beta-agonist medication dilates the airway for several hours. Long-acting beta-agonist should be used only in combination with inhaled corticosteroids. Your child should continue to take quick-relief medication and other long-term controller medications while taking long-acting beta-agonist.

Leukotriene receptor antagonist
The medication leukotriene receptor antagonist helps prevent asthma symptoms by blocking the action of leukotriene — a specific component of airway inflammation. A leukotriene receptor antagonist can be used alone or in combination with other long-term controllers.

Quick-relief medications

The main quick-relief medication for an asthma flare is a bronchodilator. Bronchodilators are fast, safe and effective medications for an asthma flare. A bronchodilator relaxes airway muscles and widens (dilates) the bronchial tubes to allow more normal breathing. This medication is used as needed for asthma symptoms and should be used during an asthma flare (coughing, wheezing and shortness of breath). This medication may also be recommended for use 10 to 15 minutes before exercise. Quick-relief medications typically last four to six hours.

Your child should continue to take long-term controller medications daily, in addition to quick-relief medications.

If your child needs to use quick-relief medication more than two times in one week for daytime symptoms, more than two times per month for nighttime symptoms or if your child is using more than two canisters of quick-relief medications per year, your child's asthma may not be well-controlled. Contact your health care provider. Your child may need different medication to better control asthma.

Oral steroids

Your health care provider may recommend oral steroids (steroid medication taken by mouth in pill or liquid form) if your child's asthma symptoms are not well controlled. Oral steroids reduce inflammation and can help the airways be more responsive to bronchodilators. Oral steroids are usually given for three to seven days, but they should seldom be necessary if your child's asthma is adequately controlled. Your child should continue to take quick-relief and long-term controller medications while taking oral steroids.

Monitoring Your Child's Asthma

To monitor the effectiveness of asthma treatment, it's important to track your child's asthma symptoms, triggers and medications. An asthma action plan, a daily diary and a peak flow meter are all tools you can use to monitor asthma.

Asthma action plan

An asthma action plan is a set of instructions developed specifically for your child by his or her asthma care team to help manage asthma daily. The asthma action plan details the medication your child needs and is tailored to your child's symptoms. The plan should include the names and dosages of medications and how and when to take them.

Give a copy of your child's asthma action plan to your school nurse, daycare provider and others who help care for your child.

Daily diary

Use a diary or calendar to record the events and environmental factors that seem to activate your child's asthma symptoms or that make symptoms worse. Review this record with your child's health care provider to help identify and track asthma triggers.

Measuring lung function with a peak flow meter

Peak flow is the maximum speed a person can blow air out of his or her lungs after taking a full breath. Your child's health care provider may recommend that you regularly record your child's peak flow rates to help you:

- Learn what triggers your child's asthma.
- Learn what medications are effective.
- Know the best times to increase and decrease medications.
- Know when your child's asthma is getting better or worse.

Use of a peak flow meter may not be recommended for all children with asthma. Your health care provider can help you determine if a peak flow meter is appropriate for your child.

Frequently Asked Questions

What information should I provide to my child's school?
Meet with the school nurse to discuss your child's medical condition. Provide a copy of your child's asthma action plan, so the nurse knows what medications your child takes and how often he or she needs to take them. Make sure the school nurse has access to the medication your child needs at school. If your child's asthma action plan changes at any time, make sure the most recent version is on file with the school nurse.

Why does my child need to take asthma medications every day, even when she's not having symptoms?
Daily medications — such as long-term controllers like inhaled corticosteroids — need to be taken every day to prevent or reduce inflammation that can lead to asthma symptoms and to decrease the sensitivity of the airways. No symptoms or a decrease in the number of asthma symptoms is a sign that long-term controller medications are working.

How important is it for my child to get an annual influenza (flu) shot?
Flu shots are very important. Infections often trigger asthma symptoms or make symptoms worse. To reduce their risk, children who have asthma should always receive an annual flu shot.

Can my child participate in physical education class at school?
Exercise is good for your child's heart and lungs. Although exercise and other physical activity can trigger asthma symptoms, your child should be able to join in physical education classes. Medication taken before exercise, as prescribed by your child's health care provider, should help decrease symptoms. Doing a proper warm-up and cool-down before and after exercise may also help reduce exercise-related asthma symptoms. If your child is having significant symptoms during physical education class, talk to the teacher. Make sure the teacher knows that your child has asthma and understands what your child needs to do to be able to actively participate in class. Discuss any concerns with your child's health care provider.

Why do I have to fill out so many forms about my child's asthma?
To accurately assess and treat your child's asthma, the health care team needs you to provide written information about your child's symptoms. This information is used as a guide in developing and updating your child's asthma action plan. In addition, the State of Minnesota also requires health care providers to submit information to the state about childhood asthma management. This information is used to improve the quality of asthma care for children throughout the state.

Conclusion

With effective treatment and preventive measures, children with asthma can lead active, healthy lives. Children and adolescents with well-controlled asthma should be able to:

- Exercise.
- Sleep well.
- Attend school regularly.
- Play and work without asthma symptoms or serious side effects from medications.

Successfully managing asthma may require some life adjustments such as:

- Avoiding asthma triggers
- Taking medications as directed
- Checking in with a member of your child's health care team regularly
- Always getting an annual flu shot

If your child's asthma is not well controlled, talk to his or her health care provider. If you have questions about this information or about your child's asthma, contact your child's Mayo Clinic health care provider.

Health care provider phone number

Other asthma team contacts

Phoenix and Scottsdale, Ariz.
480-301-8000

Jacksonville, Fla.
904-953-2000

Rochester, Minn.
507-284-2511

BARBARA WOODWARD LIPS PATIENT EDUCATION CENTER

Mrs. Lips, a resident of San Antonio, Texas, was a loyal patient of Mayo Clinic for more than 40 years. She was a self-made business leader who significantly expanded her family's activities in oil, gas and ranching, even as she assembled a museum-quality collection of antiques and fine art. She was best known by Mayo staff for her patient advocacy and support.

Upon her death in 1995, Mrs. Lips paid the ultimate compliment by leaving her entire estate to Mayo Clinic. Mrs. Lips had a profound appreciation for the care she received at Mayo Clinic. By naming the Barbara Woodward Lips Patient Education Center, Mayo honors her generosity, her love of learning, her belief in patient empowerment and her dedication to high-quality care.

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