



| Children With Asthma

ST. LOUIS CHILDREN'S HOSPITAL

WASHINGTON UNIVERSITY PHYSICIANS

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Introduction

More than six million children in America have asthma. It is the most common long-term lung disease in children in the United States. Young children, school-age children and teenagers can have asthma. Asthma affects boys and girls of every race from all parts of the world. More children receive treatment for asthma than ever before.



Asthma Can Be Controlled

Children with asthma can stay well and lead normal lives. Managing asthma is the key. The goal is control. When asthma is controlled, you:

- have no signs of asthma
- need rescue medicine less than three times per week
- exercise and play like other children
- sleep through the night
- go to school and work regularly
- have no asthma-related hospital or emergency room visits

What You Can Do

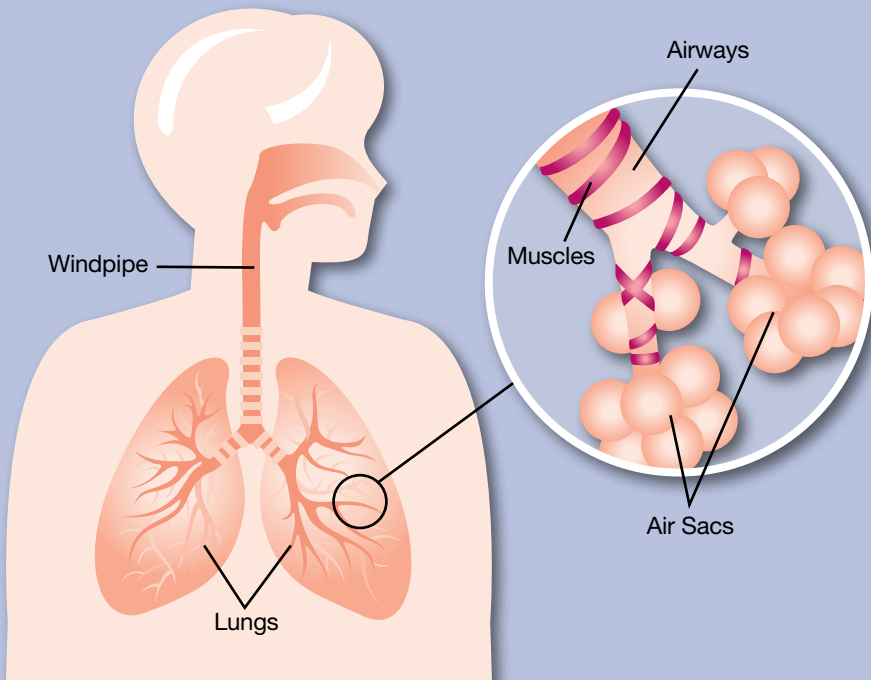
Take Steps to Control Asthma:

- learn about asthma
- have an asthma action plan developed by your doctor or nurse
- know asthma warning signs
- take medicines as ordered
- learn what triggers asthma and helpful control measures
- share action plan with school, day care, coaches, babysitters and all family members.
- see your doctor or nurse regularly

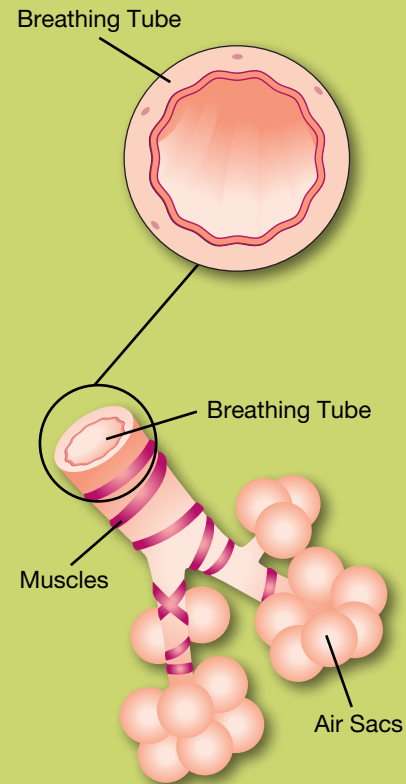
What is Asthma?

Asthma is an illness that affects the lungs and causes coughing, wheezing, difficulty breathing and shortness of breath. To understand what is happening during asthma, it is helpful to know about the lungs and how they work.

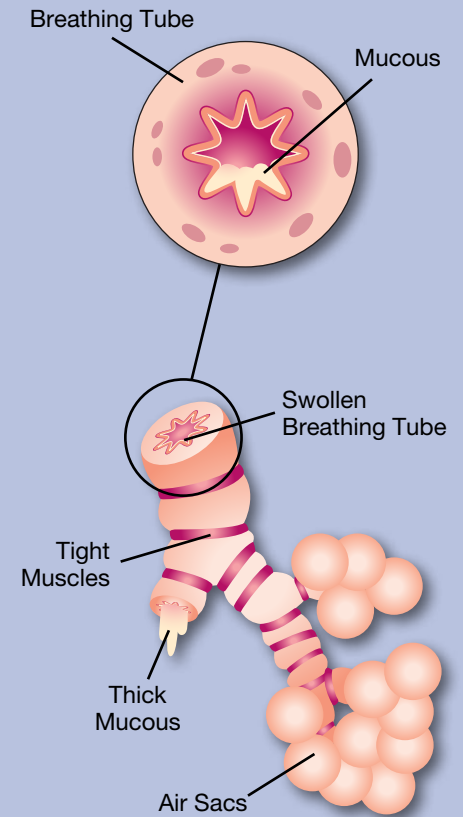
HOW THE LUNGS WORK



Each of us has two lungs. Each lung has many small airways that are surrounded by muscles (See picture). The airways carry oxygen to tiny air sacs in our lungs 'called alveoli'. These air sacs are like balloons that fill with air when we breathe in and shrink when we breathe out. The oxygen we breathe must reach these air sacs before it can get to the rest of the body.



NORMAL AIRWAY



ASTHMA AIRWAY

What happens to the lungs during asthma?

When you have asthma your breathing tubes (airways) are extra sensitive. The lungs overreact to certain things called triggers. When this happens you may have coughing, wheezing and difficulty breathing.

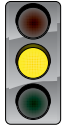
Three things happen in your lungs:

- Breathing tubes get swollen or inflamed. This makes the opening smaller and hard for air to get through.
- Thick mucous plugs up the breathing tubes.
- Muscles squeeze tight around the breathing tubes and make it hard for the air to get in or out.

Signs of Asthma

YELLOW ZONE: Watch Out!

Early Warning Signs of Asthma



Warning signs are like alarms that let you know when asthma is beginning to get out of control. Often signs are subtle and not easily noticed. It is important to recognize these signs early and to act quickly as directed by your doctor or nurse. Follow your Asthma Action Plan. Children need to recognize warning signs and ask for help as needed.

Look for these early warning signs:

- Sneezing
- Runny nose
- Cold symptoms
- Coughing day or night
- Wheezing day or night
- Funny feeling in chest

Other early signs:

- Headache
- Fast heartbeat
- Stomachache
- Feeling tired
- Poor appetite
- Glassy eyes
- Itchy throat

RED ZONE: Emergency!

Late Signs of Asthma



If you miss the early signs of asthma you may have late signs. Follow your Asthma Action Plan and take the quick relief medicine ordered by your doctor or nurse. Late signs mean emergency! Do not waste time! It is important to call your doctor or nurse or go to the emergency room.

Act quickly if you see these emergency signs:

- Tight chest
- Shortness of breath
- Hard or fast breathing
- Using neck or stomach muscles to breathe
- Constant coughing
- Feeling very tired or dizzy
- Not able to play
- Trouble walking, talking or eating
- Vomiting
- Lips or nails blue



PEAK FLOW METERS

A peak flow meter is a device that measures how well air moves out of your lungs. Some older children use a peak flow meter to help them know when their asthma is getting worse. It can also help them to know if their quick relief medicine is working. Ask your doctor or nurse about this device.

Medicines

Medicines are a very important part of asthma treatment. Some children need to take medicines every day and others will need their medicines only when they are getting sick. Your doctor or nurse will decide what is best. Medicines should be available at all times.

Don't Run Out of Medicine!

- Plan ahead.
- Make sure to get refills before you run out of medicine.
- Check the date on your medicine. Do not use if it is too old.
- Check that you have medicine when you are going to be away from home.
- Some inhalers come in a generic form.



A spacer or holding chamber is used with many inhalers to help more medicine get into the lungs. There are some inhalers that do not need a spacer or holding chamber. Ask your doctor or nurse if you need one.

Quick Relief/Rescue Medicines

Short-acting Bronchodilators

- **albuterol (Pro-Air[®], Proventil[®] HFA, Ventolin[®] HFA)**
- **levalbuterol (Xopenex[®])**

- Help relax the muscles around the breathing tubes and open them up.
- Work quickly – within 15 minutes.
- Relieve symptoms for 4-6 hours.
- May be used before exercise.
- May cause shakiness, increased activity, trouble sleeping and fast heartbeat. These side effects are usually brief. It is still important to take the medicine as directed.

CALL YOUR DOCTOR OR NURSE IF RESCUE MEDICINE:

- Does not work in the first hour (usually 3 doses 20 minutes apart).
- Is needed more often than every 4 hours after the first hour.
- Is needed every 4 hours for more than 24 hours.

Oral Steroids

- **prednisone**
- **prednisolone (Orapred[®], Dexamethasone[®])**

- May need to take along with rescue medicine in moderate to severe episodes to decrease swelling and mucus in the breathing tubes.
- Take by mouth.
- Usually taken for 3-5 days.
- May cause mood change, increased activity or increased appetite.
- Long-term side effects are uncommon if steroids are only occasionally taken for short periods of time.
- Sometimes needed over long period of time to control severe asthma.
- Should not take without directions from your doctor or nurse.

Long-Term Control Medicines

Inhaled Steroids

- **beclomethasone (Qvar[®])**
- **budesonide (Pulmicort[®])**
- **ciclesonide (Alvesco[®])**
- **fluticasone (Flovent[®])**
- **mometasone (Asmanex[®])**



- Take every day to reduce swelling and control or prevent asthma.
- Rinse or brush teeth after use to help prevent thrush.

Combination Anti-inflammatory/Bronchodilator Medicines

- **fluticasone/salmeterol (Advair[®], Air Duo[®] and Wixela Inhub[™])**
- **budesonide/formoterol (Symbicort[®])**
- **mometasone/formoterol (Dulera[®])**

- Inhaled steroid and long-acting bronchodilator in one inhaler.
- Reduce swelling and open breathing tubes to control asthma.
- Take every day.
- Rinse or brush teeth after use to help prevent thrush.
- Used in moderate to severe asthma.
- Not for rescue.

Leukotriene Modifier

- **montelukast (Singulair)**

- Taken everyday to prevent swelling and control asthma.
- May also be used to treat allergies (allergic rhinitis).
- Not a steroid or rescue medicine.

Biologics

- **benralizumab (Fasenra)**
- **mepolizumab (Nucala)**
- **dupilumab (Dupixent)**
- **omalizumab (Xolair)**

- Advanced therapies for severe, hard to control asthma.
- Target specific molecules in the immune system
- Not a steroid or rescue medicine.
- Common side effects: soreness at injection site, headache, sore throat.

Other Related Medicines

Nasal Steroids

- **beclomethasone (Beconase AQ®, Qnasl®)**
- **budesonide (Rhinocort®)**
- **ciclesonide (Omnaris®, Zetonna®)**
- **fluticasone (Flonase® and Flonase® Sensimist)**
- **mometasone (Nasonex™)**
- **triamcinolone (Nasacort®)**

- Used to treat symptoms of allergic rhinitis.
- Take on a routine basis to decrease inflammation in the nose and sinuses.
- Can cause irritation within the nose if sprayed directly onto the tissue lining the nose.

Antihistamines

- **cetirizine (Zyrtec®)**
- **loratadine (Claritin®, Alavert®)**
- **diphenhydramine (Benadryl®)**
- **Xyzal**
- **fexofenadine (Allegra®)**

- Prevent histamine release and symptoms of allergic rhinitis (runny nose, itchy nose, scratchy throat, sneezing, and watery, itchy eyes).
- Are not used to treat asthma but may help some of the allergy.

What is an Asthma Action Plan?

Everyone needs an Asthma Action Plan. The Asthma Action Plan will help you manage your asthma every day. Contact your doctor or nurse to get a specially designed Asthma Action Plan. Everyone who helps to take care of you should have a copy of the plan. Don't forget school, daycare, babysitters, sport coaches, and grandparents.

GREEN ZONE

- You are well! No signs of asthma. This is where you should be every day.
- You are able to do normal activities.
- You have no problems while sleeping.
- Take daily control medicines as directed.
- Watch for early signs of asthma
- Use pre-exercise medicines as directed

YELLOW ZONE

- Watch Out! You are having early signs of asthma. Take action to get control.
- Follow Asthma Action Plan.
- Call your doctor or nurse if rescue medicine doesn't work.
- Continue to take Green Zone medicines.

RED ZONE

- Danger! This is an emergency. You are having late signs of asthma.
- Follow Action Plan.
- Call your doctor or nurse immediately.
- Call 911 (or the emergency number in your area) or go to the nearest Emergency Room if you cannot reach your doctor.

Never have a delay in seeking care!

Triggers

Certain things may make asthma worse. Asthma triggers may be different for everyone. Try to learn what triggers your asthma and have a control plan.

Allergens

In most children, asthma is related to allergy. Some allergens are around all year and some are seasonal. Allergens can be inside or outside.

Mold and Pollen

- Avoid opening doors and windows in spring and fall when mold and pollen counts are high.
- Use air conditioning as much as possible.
- Clean or change filters on air conditioner and furnace once a month.
- Do not use vaporizers or humidifiers.
- Use dehumidifiers if living area is damp.
- Clean tub and shower curtain regularly to decrease indoor mold growth.
- Shower or bathe after playing outside.

Dust Mites

- Place mattress and pillow in a zippered plastic or allergy-proof cover.
- Wash bed linens, pajamas and stuffed toys weekly in hot water.
- Limit the number of stuffed toys in the child's bedroom.
- Limit the amount of carpet and curtains.
- Vacuum and dust weekly.
- Keep child out of the room during vacuuming or dusting, and for one hour afterward.



Dust Mite

Dogs, Cats, Birds

- Do not have feathered or furry pets in the home.
- Avoid things made with feathers such as pillows and comforters.

Cockroaches

- Store food in closed containers.
- Keep living area clean. No dirty dishes laying around that may attract pests.



Cockroach

Weather and Season Changes

- Stay indoors as much as possible when the weather is changing.
- Watch closely for signs of asthma on days of extreme weather change.

Colds and Viruses

- These are the most common triggers in young children, especially fall through spring. Sinus infections can also trigger asthma.
- Avoid people with colds, flu, or viruses.
- Wash your hands often.
- Teach good hand washing.
- A flu shot is recommended every fall.

Irritants

The following are just some of the irritants that can trigger asthma: cigarette smoke, air-pollution, wood-burning stoves and fireplaces, dust, perfume, strong odors, cleaning supplies, air fresheners and paints.

- Do not smoke or let anyone else smoke around your child. There should be no smoking in the house or car even if the child is not there.
- Avoid perfumes, talcum powder, hairsprays, carpet-fresh powders and air fresheners.



Emotions

Stress or excitement (laughing, crying, yelling) can sometimes trigger asthma.

- Follow the Asthma Action Plan if emotions trigger asthma.
- Teach children how to relax when stressed.

Exercise

Playing hard at recess, gym or sports can trigger asthma. All children need exercise. Children with asthma can do the same activities as their friends when asthma is under control. Medicines should be taken as directed by a doctor or nurse.

- Work out a plan with your doctor or nurse that allows exercise.
- Make sure quick relief rescue medicine is available during exercise. Tell your coach and teacher about your asthma medicine and action plan.
- Start an exercise program slowly. Warm up and cool down.
- Avoid outside exercise when levels of pollution are high. Be careful during extreme weather conditions.

Commonly Asked Questions



1. What causes asthma?

No one really knows. If one or more family members have asthma, it is likely others will too.

2. Is asthma contagious?

No. However, viruses that sometimes trigger asthma are contagious.

3. Can children die from asthma?

Yes. However, asthma can be well controlled and children with asthma can lead regular, full lives.

4. Can children with asthma exercise?

Yes. Exercise is an important part of staying healthy. Children may become overweight if they don't exercise. Overweight children may have a harder time controlling asthma. Some children with asthma may need to take medicine before exercise in addition to their usual controller medicines. Some exercises like swimming, baseball or sports that have rest periods are better tolerated. Children should be encouraged to try whatever sport they are most interested in. Doctors and nurses will work to find a medicine schedule to allow all children to take part in exercise.

5. Does everyone with asthma wheeze?

Some people with asthma never wheeze or wheezing is not heard. They may have other symptoms such as coughing or chest discomfort.

6. Can taking steroids be harmful?

Inhaled steroids may be taken daily to control asthma. This method of taking steroids is safe and has very few side-effects. Steroids taken by mouth daily for more than a week have the potential for side-effects. Doctors and nurses try to limit the time children take steroids by mouth. Remember, these medicines are very important in helping children get over a serious asthma attack.

7. Do children "outgrow" asthma?

Some children with asthma do get better as they get older, but they still could have asthma symptoms or an asthma attack. Remember, asthma symptoms can begin again during adulthood.

8. Do children with asthma need to take medicine every day?

Many children need to take asthma control medicine every day. Ask your doctor or nurse for an Asthma Action Plan to guide you with your medicine. Families must work together to be certain that medicines are taken as directed. Medicines must be refilled so that they are always available. If you have questions or concerns about continuing a medicine, ask your doctor or nurse.

9. How often do children with asthma need to see a doctor or nurse?

Children with asthma should see a doctor or nurse on a regular basis **even when they are feeling well.** At these visits the Asthma Action Plan may be updated and prescription refills provided. If a child has had to visit the hospital, it is very important to see a doctor or nurse within several days after going home. Some children may be directed to see an asthma specialist.

10. What about allergy testing and allergy shots?

Many children with asthma have allergies. Allergy testing can help you know what to avoid. Allergy testing can be done at any age.

Remember: Negative allergy skin tests do not mean the child will not become allergic in the future. Children should not be around things known to cause allergy problems. Allergy shots can be helpful in some children with asthma. Allergy testing must be done before allergy shots can be started.

11. Do some children with asthma also have food allergy?

Yes. Talk to your doctor or nurse if food allergy is suspected. Ask for a food allergy action plan. Food allergy can be life threatening.

12. Can children with asthma have pets?

Children with asthma are very often allergic, or become allergic, to feathered or furry pets. These allergies can make their asthma very hard to control. Pet dander gets in your furniture and bedding and is spread everywhere in your house by air vents. Outdoor pets may be okay. Indoor pets should only be animals such as reptiles or fish.

13. Should my child take cough medicine?

Cough medicine is not recommended. Coughing is the body's way of clearing extra mucous from the airways. Rescue medicines like albuterol help open the airways and clear mucous.

14. Is there a way my child can be part of a study about asthma?

Yes. The asthma team at St. Louis Children's Hospital and Washington University School of Medicine are very interested in learning how to improve asthma care. If you would like information about current asthma studies, call 314.286.1173.

Asthma Action Plan



Asthma Action Plan

Green Zone: Well

- No signs of asthma
- Able to do normal activities
- No problems while sleeping

• Peak flow above: _____
(above 80% of best)

*Rinse mouth after this medicine



Give these medicines every day:

MEDICINE:	HOW MUCH:	WHEN:
_____	_____	_____
_____	_____	_____
_____	_____	_____

Yellow Zone: Watch Out!

Early Signs of Asthma:

- Cold symptoms
- Coughing day or night
- Wheezing day or night
- Funny feeling in chest

• My first sign: _____

• Peak flow: _____
(50-80% of best)



First — give:

■ Albuterol _____ 2-4 puffs or 1 nebulizer _____ 1-3 times in first hour

■ Call your Doctor or Nurse if not in Green Zone after first hour.

Next — if asthma is better after first hour, you may give:

■ Albuterol _____ 2-4 puffs or 1 nebulizer _____ every 4 hours as needed

Call your Doctor or Nurse if:

- Albuterol needed more often than every 4 hours.
- Albuterol needed every 4 hours for more than 1 day.

Keep taking other Green Zone medicines.

Red Zone: EMERGENCY!

Late Signs of Asthma:

- Tight chest
- Breathing hard or fast
- Using neck or stomach muscles to breathe
- Constant coughing
- Trouble talking or walking
- Vomiting
- Lips or nails blue

• Peak flow below: _____
(below 50% of best)



First — give *now*:

■ Albuterol _____ 6 puffs or 1 nebulizer _____

■ AND call your Doctor or Nurse.

Next — if you cannot reach your Doctor or Nurse *immediately*, give:

■ Albuterol _____ 6 puffs or 1 nebulizer _____

(oral steroid)

■ AND go to the nearest emergency room or call 911.

Patient/Parent/Guardian Signature Date

RN/MD Signature Date

Phone number of Doctor or Nurse:

Day: _____

Night: _____

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Resource List:

- Asthma/Allergy Foundation of America (AAFA): 314-645-2422
- Smoking Cessation: 1-800-QUIT-NOW
- St. Louis Crisis Nursery: 314-533-6900
- Healthy Homes for Asthma Prevention
 - St. Louis City: 314-657-1423
 - St. Louis County: 314-615-5323

If you would like to make an appt with an asthma specialist, please call 314-454-2694.

Emergency Numbers

Notes



St. Louis Children's Hospital

One Children's Place
St. Louis, Missouri, 63110

314.454.KIDS (5347)

800.678.KIDS (5347)

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