

# ASTHMA MANAGEMENT SYMPTOMS AND MEDICATIONS



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ASTHMA CAN BE CONTROLLED

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## ASTHMA MANAGEMENT, SYMPTOMS AND MEDICATIONS

**A**sthma management can become a simple part of the child's daily routine, like brushing his or her teeth. With good medical care and help from the child's asthma team, most children's asthma can be controlled so they can do the things they want and live normally. **Management of asthma includes monitoring the child's asthma signs, avoiding triggers, taking medicines, and making regular doctor visits to review how well the asthma is being controlled.** Asthma is well controlled when the signs of asthma are so mild and infrequent that asthma does not interfere with normal activities.

Good asthma control leads to the child being able to:

- Run as fast and as long, as the child wants.
- Play and exercise when the child wants.
- Sleep through the night without cough or wheeze.
- Avoid urgent visits to the doctor and avoid hospitalizations for asthma.





## EDUCATION

Well trained staff in preschools or childcare is a key part of the team that works to help the child control asthma. The young child relies on adult caregivers to be observant and knowledgeable about his or her asthma and to take action when the child has signs of asthma. **Preschool and childcare personnel need to be able to recognize the signs of asthma** so they can handle an asthma episode if it occurs. When staff recognize signs of asthma, they can talk about it with parents whose children may have uncontrolled asthma. **All staff should be aware of the potential triggers** for children with asthma and **take steps to reduce exposure** to those triggers. Staff must know how to get appropriate help when a child shows signs of an asthma episode. Regular training about asthma for all staff can help create a safe, asthma friendly place for children.

The best way to handle asthma at preschool (or at childcare) is to have a preschool-wide asthma management policy, with established procedures to follow for specific situations that occur with asthma. See PLANS AND POLICIES FOR MANAGING ASTHMA beginning on page 65 for more hints about school-wide asthma management. Each child should have an asthma action plan tailored to the child's specific needs. Staff must have quick and easy access to the asthma action plan and asthma medicines at all times when a child with asthma is in their care.

**Effective communication** between the parent and childcare staff is key to developing a strong asthma team for the child. Preschool and childcare staff should aim to create a supportive environment so that the child with asthma is comfortable taking care of asthma at school. When a child is diagnosed with asthma, it can be scary for parents. They may fear their child will not be able to lead a normal life. Parents may wonder how they will manage if their child has an asthma episode. Teachers and childcare staff may also have these fears. One key to coping is to become as informed as possible about asthma and how to control it. Knowing that the child's preschool or childcare staff is knowledgeable about asthma and how to care for children with asthma can be very reassuring to the parent and child.

Children with asthma are helped by keeping lines of communication open and letting them express their feelings about it.

**The child may feel:**

- Different from other children: *Let them know they're the same as other children in all the ways that matter.*
- Sad – some children blame themselves if family life is upset because of their asthma: *Let them know it is not their fault and it can be controlled.*
- Fearful – when their asthma is out of control. Being unable to breathe easily can be scary. Children may fear going to the hospital: *Reassure the child that with proper treatment, hospitalization due to asthma is extremely unlikely. Early treatment helps prevent emergency room visits.*
- Angry –due to limits caused when they are having signs of asthma: *Help them focus on what they can do and on keeping their asthma under control to limit feeling frustrated by asthma.*
- Irritable – in a young child, the discomfort of chest tightness may lead to irritability: *Be patient and comforting.*

How well children cope with asthma is often related to the attitudes of the people around them regarding asthma. Teachers and childcare staff can work with parents to understand the feelings of very young children about their asthma.

**To help the child cope with asthma --**

- Have a positive attitude. Know that asthma can be controlled.
- Stay calm. A child looks to you for cues about how to react.
- Act confidently during an asthma episode. The child will feel reassured.

## ENVIRONMENTAL CONTROLS

One part of successful asthma management is helping children to avoid and reduce exposure to asthma triggers in the home, school, and play areas. Parents, teachers, and caregivers should help keep the children away from things that they are allergic to or things that irritate the lungs when breathed in. ASTHMA TRIGGERS AND THE ENVIRONMENT beginning on page 47 includes more information about environmental controls.

## ASTHMA MONITORING

The written asthma action plan contains the key information that caregivers need to monitor and treat the child's asthma. Most action plans include information on asthma signs and are divided into zones that tell the caregiver what to do to treat the child.

### Asthma Signs

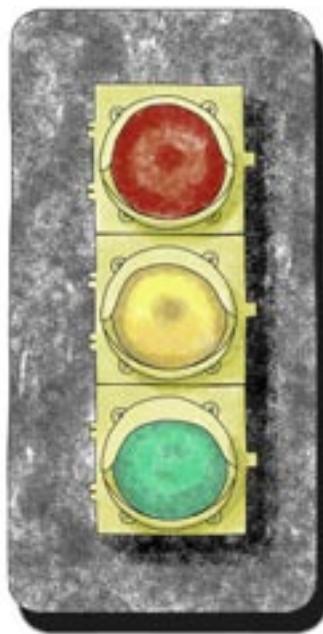
By paying attention to the child's asthma signs and observing changes in these signs, the child's parent(s) and caregivers can notice early on when an asthma episode is starting. By looking at and listening to the child, the caregivers can tell how serious the episode is and take appropriate action. They can tell if it is getting worse and needs treatment, and if the breathing treatment has made it better. When alerted, caregivers can check the child more often and provide treatment early to relieve asthma signs and prevent a severe asthma emergency.

The four main signs of asthma are **coughing, wheezing, sucking in of the chest skin, and breathing faster**. These signs can be seen or heard. They do not require the young child to describe how they are feeling or breathing. Very young children often cannot describe how they are feeling.

In addition to the four signs of asthma, a young child sick with asthma may show these general signs of illness: difficulty feeding (infants may make grunting sounds and have poor sucking); altered sleep patterns; irritability and inactivity or not moving much; decreased appetite.

The child's activity level and quality of sleep the night before can alert the caregiver to look for signs of an asthma episode. If the child has had a "bad" night with wheezing and coughing, it can be a "heads up" to the caregiver to observe the child more closely. Some children have particular ways of showing that they are starting to have an asthma episode in addition to the four signs of asthma – including complaining of stomach aches, being irritable, refusing to eat, etc. While these signals may be helpful, they are often not easy to see or evaluate. Using the four signs of asthma that can be seen, heard, and measured is a useful way of assessing a child's asthma episode.





## Asthma Zones

Many asthma action plans describe the child's asthma status based on zones that compare to a traffic signal. The green zone means the child has no asthma signs – no coughing, no wheezing, no sucking in the chest skin and no fast breathing. The yellow zone means the child is having a mild or moderate asthma episode. The red zone means the child is having a severe episode. The child's asthma action plan will tell the parent or childcare giver what to do for the child's asthma depending on which zone the child is in.

Children with extreme signs of asthma may need emergency treatment that requires calling 9-1-1.



## **Scoring Asthma Signs**

Dr. Thomas Plaut, a pediatrician and leading asthma consultant, has developed a simple system to help parents and caregivers determine if the young child is having an asthma episode and if it is a mild, moderate, or severe (emergency) episode. It uses asthma zones, but splits the yellow zone into two zones (high and low yellow) for more precision. The system scores the signs of asthma to make determining the zone easier. It takes about two minutes of observation to check and score the signs of asthma. Doing this will help determine the child's asthma status (what zone he or she is in) and if a treatment is needed. This can be done on arrival with the daily health check, or when the child is having an asthma episode.

The teacher or caregiver observes the child for the four signs of asthma, and evaluates their severity. Each sign has a numeric “point” score. Table 2.1, entitled “Scoring Asthma Signs”, shows the point score for each asthma sign based on how strong the sign is or how often it occurs. Looking at the child, determine if he or she has any asthma signs, which signs, and how severe they are. By noting the point score for each sign, and adding them to get the total score, the caregiver can identify which asthma zone the child is in. The asthma action plan will describe what to do for the specific zone the child is in. A total score of “0” means the child is in the green zone and asthma is under control. A total score of “1-8” means the child is in the yellow zone and is having a mild to moderate asthma episode. A score of “1 to 4” is the high yellow zone (mild) and “5-8” is the low yellow zone (moderate). A total score of “9 or more” is in the red zone and the child is having a severe asthma episode.

(Note: Some asthma action plans only have one yellow zone. When scoring asthma signs to determine the child's zone, any asthma action plan can be used even if it only has one yellow zone – just follow the treatment directions on the plan.)

Table 2.1 **Scoring Asthma Signs**

**Asthma Signs**

<b>Coughing</b> Has the child coughed in the last 5 minutes?	<b>NONE</b> 0 Points	coughing a few times <i>(less than one per minute)</i>	<b>1 point</b>	coughing frequently <i>(one to four per minute)</i>	<b>2 points</b>	coughing continuously <i>(more than four per minute)</i>	<b>3 points</b>
<b>Wheezing</b> Is the child wheezing? <i>(noisy high-pitched breathing or whistling sounds when breathing)</i>	<b>NONE</b> 0 Points	barely wheezing at the end of breathing out	<b>1 point</b>	wheezes with the entire breath out	<b>3 points</b>	wheezes when breathing in and out	<b>5 points</b>
<b>Chest skin sucking in</b> Is the child breathing hard so that the spaces between the ribs show?	<b>NONE</b> 0 Points	barely noticeable	<b>1 point</b>	obvious	<b>3 points</b>	chest skin pulled in a lot with each breath	<b>5 points</b>
<b>Breathing rate</b> Is the child breathing faster than normal for that child?	<b>NORMAL RATE</b> 0 Points	breathing rate a little faster	<b>1 point</b>	breathing rate is fast	<b>2 points</b>	breathing rate is much faster	<b>3 points</b>

**Score:**

1. Look at child
2. Circle signs you see
3. Add all the points circled to get **Total Score**

**Total Score:**

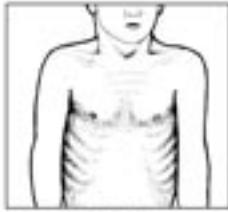
Adapted from One Minute Asthma: What You Need to Know  
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**What Does the Total Score Mean?**

**Total Score Key:**

- 0 = Child is in Green Zone: Child's asthma is under control**
- 1-4 = Child is in High Yellow Zone: Child's asthma is mild**
- 5-8 = Child is in Low Yellow Zone: Child's asthma is moderate**
- 9 or More = Child is in Red Zone: Child's asthma is severe**

The “Asthma Emergency Guide” is another form that can be used to quickly score each sign, get the total score, and determine the child’s asthma treatment zone (see ASTHMA FORMS page 94). Further, after treating the child with an asthma episode, his or her signs of asthma can be re-scored. A change in score can tell whether the child is improving or getting worse after being treated for asthma.

<b>Asthma Emergency Guide</b> a tool for pre-school and daycare staff “Rule of Nine”								
<b>DANGER SIGNS:</b> Call 911 if you see any ONE of these:								
<ul style="list-style-type: none"> <li>• Trouble walking or talking</li> <li>• Child is hunched over</li> <li>• Child is struggling to breathe</li> <li>• Lips or tips of fingers are gray or blue</li> </ul> After calling 911, call the office and tell them to contact a parent.								
<b>ASTHMA SIGNS:</b> score the severity of these signs before you treat								
<b>Cough</b> <table border="0" style="width: 100%;"> <tr> <td style="width: 15%;">• None</td> <td style="width: 15%;">0</td> </tr> <tr> <td>• Less than 1 per minute</td> <td>1</td> </tr> <tr> <td>• 1 - 4 per minute</td> <td>2</td> </tr> <tr> <td>• More than 4 per minute</td> <td>3</td> </tr> </table>	• None	0	• Less than 1 per minute	1	• 1 - 4 per minute	2	• More than 4 per minute	3
• None	0							
• Less than 1 per minute	1							
• 1 - 4 per minute	2							
• More than 4 per minute	3							
<b>Sucking in the chest skin</b> between, above and below the ribs								
<table border="0" style="width: 100%;"> <tr> <td style="width: 15%;">• None</td> <td style="width: 15%;">0</td> </tr> <tr> <td>• Can barely see</td> <td>1</td> </tr> <tr> <td>• Easy to see</td> <td>2</td> </tr> <tr> <td>• Severe</td> <td>3</td> </tr> </table>	• None	0	• Can barely see	1	• Easy to see	2	• Severe	3
• None	0							
• Can barely see	1							
• Easy to see	2							
• Severe	3							
								
<b>Wheeze with naked ear</b> <table border="0" style="width: 100%;"> <tr> <td style="width: 15%;">• None</td> <td style="width: 15%;">0</td> </tr> <tr> <td>• End of exhale</td> <td>1</td> </tr> <tr> <td>• Throughout exhale</td> <td>2</td> </tr> <tr> <td>• Inhal and exhale</td> <td>3</td> </tr> </table>	• None	0	• End of exhale	1	• Throughout exhale	2	• Inhal and exhale	3
• None	0							
• End of exhale	1							
• Throughout exhale	2							
• Inhal and exhale	3							
<b>Breathing faster</b> <table border="0" style="width: 100%;"> <tr> <td style="width: 15%;">• None</td> <td style="width: 15%;">0</td> </tr> <tr> <td>• A little</td> <td>1</td> </tr> <tr> <td>• Some</td> <td>2</td> </tr> <tr> <td>• A lot</td> <td>3</td> </tr> </table>	• None	0	• A little	1	• Some	2	• A lot	3
• None	0							
• A little	1							
• Some	2							
• A lot	3							
<b>TOTAL SCORE:</b> _____								
<b>If total score is NINE OR MORE, this is an URGENT problem:</b> <ul style="list-style-type: none"> <li>• Give care using the child’s or school’s asthma plan.</li> <li>• Contact a parent. Tell them to take the child to a doctor within two hours.</li> </ul>								
<b>If total score is five or more, this is a moderate problem:</b> <ul style="list-style-type: none"> <li>• Give care using the child’s or school’s asthma plan.</li> <li>• Contact a parent. Tell them to take the child to a doctor today.</li> </ul>								
Thomas F. Plano, MD Copyright © 2007 Pedipress, Inc. www.pedipress.com All rights reserved. May be copied by school nurse or district. Contact info@pedipress.com for commercial use or sale. Asthma Emergency Guide/Protocol 1.0 10/06								

When unsure of the child’s score or asthma zone but the child is having problems - treat the child - if no improvement -- get help -- as directed by the asthma action plan.

## Treating Asthma Signs Based on Asthma Zones

At the first sign of an asthma flare-up, remove the child from any known or suspected asthma triggers and follow the directions in the child's asthma action plan regarding giving medicines. Even with mild signs, the plan will likely recommend that some quick relief medicine be given. Each zone in the asthma action plan tells the child's teacher or caregiver what to do to help the child having an asthma episode. It tells how to reduce or eliminate the child's asthma signs.



## **General Treatment Information Found on Most Asthma Action Plan**

### **Green Zone**

### **Asthma Signs Score = 0**

When the child is not having any signs of asthma, he or she is in the “green zone”. The child has no cough, no wheeze, no sucking in of the chest skin and no fast breathing. This indicates that the current treatment plan is effective. Continue to give daily controller medicines if prescribed.

### **High Yellow Zone**

### **Asthma Signs Score = 1 to 4**

The child in the “high yellow zone” or “early cautious zone” is having a mild asthma episode. The child should be removed from any known or suspected asthma triggers and treated according to the asthma plan – which is very likely to require giving the child a quick relief medicine. It takes 1 to 5 minutes for the asthma quick relief treatment to start to work if it is given by inhaler or nebulizer. If it is given orally (swallowed), it can take a half hour to work. After the treatment, check to see if the child’s asthma signs have improved. If not, check the asthma action plan to see if further treatment is needed.

### **Low Yellow Zone**

### **Asthma Signs Score = 5 to 8**

The child in the “low yellow zone” is having a moderate asthma episode. This indicates the need for more aggressive treatment and careful observation of the child until his or her asthma signs improve. Give the treatment detailed on the action plan. This should result in the child improving and returning to at least the high yellow or the green zone within 10 minutes after inhaling a quick relief medicine. Quick relief medicines usually work for about four hours. The child should be observed carefully to be sure the asthma signs score doesn’t worsen and move back into the low yellow zone within the next four hours. If the child’s asthma signs come back sooner, the child will need to be seen by a doctor that day. Follow the written action plan. Communicate with the parent as indicated on the plan.

## **Red Zone**

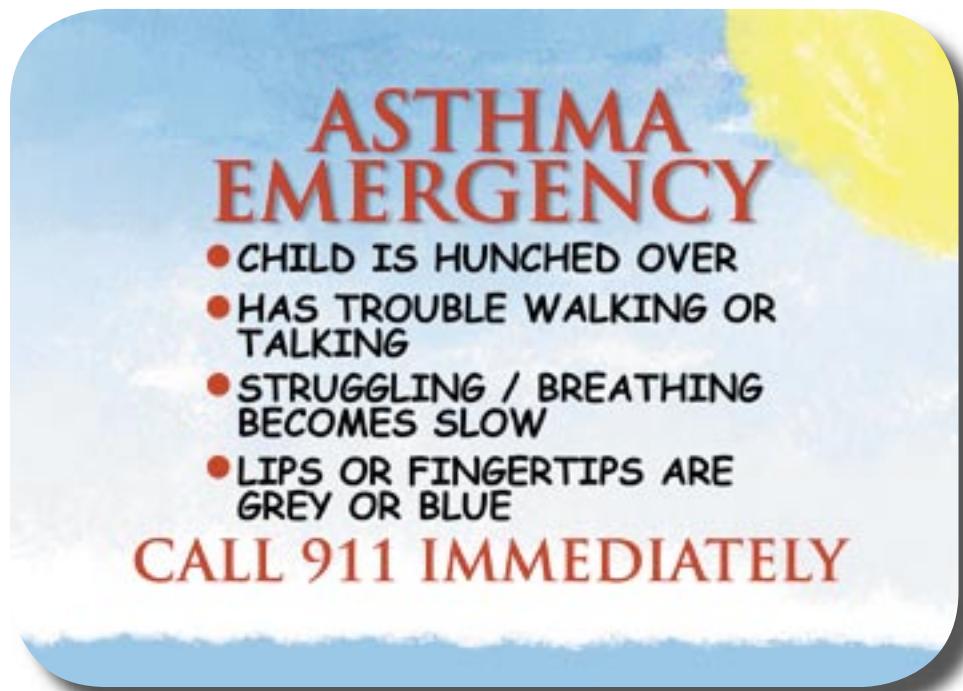
## **Asthma Signs Score = 9 or More**

If the child is in the “red zone”, he or she is having an urgent asthma problem and needs to be treated immediately according to the asthma plan. The plan will usually indicate that if the child’s signs do not improve into the low yellow zone within 10 minutes after inhaling a quick relief medicine, the child will need to be seen by a doctor right away – some plans say within one hour -- some within two hours. Follow the child’s plan. When the child is in the red zone, he or she is at high risk of having a 9-1-1 emergency that would require immediate medical care. Notify the parent right away -- but treat the child first. Even if the child’s signs improve to low yellow, the child will need to be seen by the doctor that day, as the improvement will probably not hold. If the child is in the red zone and the teacher or childcare giver does not have ready access to the child’s quick relief medicine, call 9-1-1 immediately. Never leave the child alone with this degree of asthma signs.

## ASTHMA EMERGENCY

Asthma emergencies are usually preventable and should be rare. For most children, asthma episodes do not occur suddenly, but start with mild signs and get progressively more severe if not noticed or treated properly. Some children will have asthma signs that become moderate to severe fairly quickly, especially if the child is exposed to a potent asthma trigger or several triggers at the same time or is not taking a controller medicine. If there are frequent asthma episodes, staff should talk with parents about ways to help prevent them (such as reducing triggers, and checking with the doctor about adjusting the medicines for better control).

If you see any ONE of these emergency signs, CALL 9-1-1 immediately:



Never leave a child with these signs alone. Give care according to the child's asthma plan. Contact the parent immediately after calling 9-1-1.

## Reporting and Recording Asthma Signs

Communication between parent and caregivers is an important part of keeping the child's asthma under control. Ask the parent about a cough, wheeze, sucking in of the chest, and fast breathing, and scoring the child's asthma signs each morning on arrival. The teacher or childcare provider can be alerted if the child is at risk for an asthma episode. Using a written form and recording the child's asthma signs every morning and after any treatment helps keep track of the child's progress in controlling asthma. A copy of the record can be used to communicate with the parent at the end of the preschool or childcare day. The parent can give a similar written record to caregivers when the child is brought to the center, preschool, or home (see pages 95-98 for sample tracking forms). By carefully recording asthma signs and the medicines given and why, and communicating this to parents, the child's asthma will be well cared for between home and preschool/childcare.

DAILY ASTHMA MEDICINE RECORD										
For Staff to complete: Give medicine only if you can answer yes to all questions below:										
Is the permission form for medicine completed? <input type="checkbox"/> Yes <input type="checkbox"/> No										
Is the original prescription label present? <input type="checkbox"/> Yes <input type="checkbox"/> No										
Is the name of the child on the prescription label? <input type="checkbox"/> Yes <input type="checkbox"/> No										
Is the date on the prescription label current? <input type="checkbox"/> Yes <input type="checkbox"/> No										
Child's Name _____										
Observations <small>Indicate Agency</small>										
Date	Cough	Wheeze	Sucking In/Chest	Breathing Rate	Score <sup>1</sup>	Name of Medicine	Dose	Time	Given By	Pulse Rate
KEY TO OBSERVATIONS										
Cough	Wheeze	Sucking In/Chest	Breathing Rate							
0-1/Rare	0-1/Slight	0-1/None	0-100/Breath							
2-3/Moderate	2-3/Moderate	2-3/None	2-1000/Breath							
4-5/Frequent	4-5/Extremely Frequent	4-5/None	4-10000/Breath							
6-7/Severe	6-7/Extremely Severe	6-7/None	6-100000/Breath							
100000/Breath										

## ASTHMA MEDICINES

Asthma medicines are very safe and effective. They are not addictive. It is very important to use each asthma medicine the correct way. Some medicines are taken every day and some only when asthma signs are present. Children with asthma require medicine as soon as possible when they start to have signs of an asthma flare-up. Childcare and preschool staff may be requested by the parent to give medicines when the child has signs of asthma.

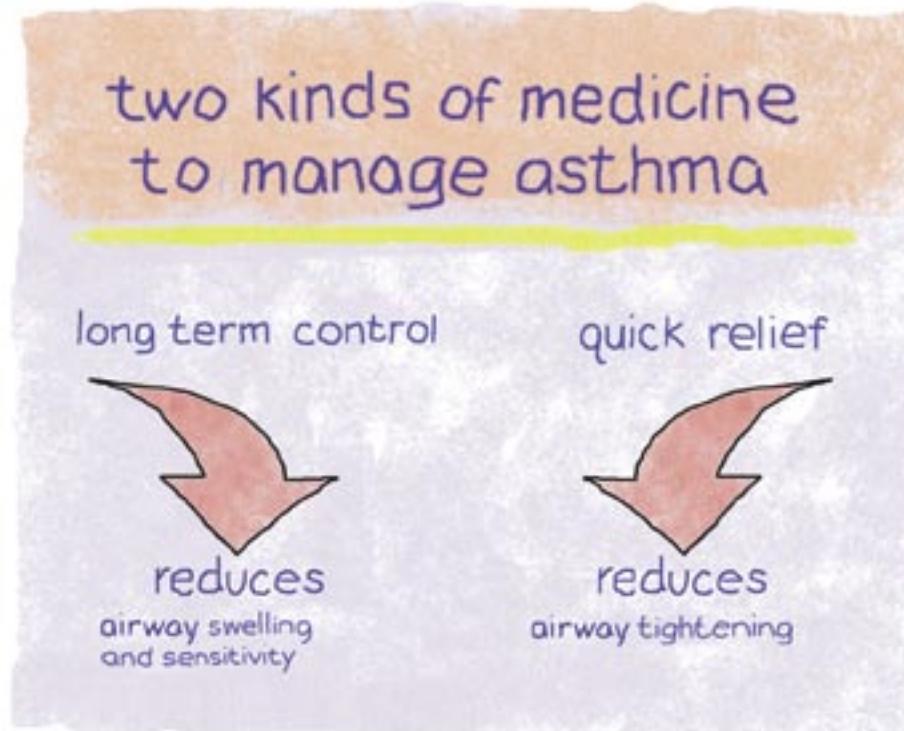
The childcare home, center, or preschool will need to have policies and procedures in place describing who can give the medicine (who is authorized and trained), the parents' written consent for this care, and a method to record that medicine was given and its outcome (see page 81 for additional information about medicine policies). Information that must be available in the child's record includes the exact medicine name and dosing instructions, and how and when it is to be given. An asthma action plan can provide this information for the child's record. When caring for a child with asthma, review the child's asthma action plan with his/her parent or guardian. Review all the medicines that the child may need. Have the parent or guardian demonstrate the way to give the child's medicine.

Use extreme care in giving any medicine. Staff authorized to give the medicine must carefully check to be sure they have matched the name on the medicine's prescription label with the child's name, and that they are giving the correct medicine (as listed on the asthma plan), the correct dose, using the correct device, and following up correctly.

**NOTE:** It is better to give asthma medicine when the child is not crying. The child does not breathe deeply when crying and less medicine gets into the lungs. Try to calm the child to help stop the crying, and help make the medicine delivery more effective.

## Two Primary Types of Asthma Medicines

There are two primary types of asthma medicines - quick relief medicines and controller medicines. Both are available as inhalers (medicines that are breathed in) or in liquid form. Inhalers for quick relief medicines and controller medicines may look similar but the medicines have two very different effects on the body. Parents and caregivers must know which medicine the child is taking and how it works, and give the right medicine when the child is having an asthma episode (check the written plan to be sure). Children with asthma should have immediate access to quick relief medicine.



**Quick relief or “reliever”** medicines provide nearly instantaneous relief of airway constriction – they start to work within 1 to 5 minutes of taking the medicine when taken by inhaler or nebulizer. They can take up to 1/2 hour to work when taken orally (swallowed). These medicines are also called rescue medicines or bronchodilators. These medicines are given to treat an asthma episode.

**Long-term or “controller”** medicines prevent asthma episodes, often by preventing and reducing the swelling in the airways. These medicines also reduce the severity of asthma episodes when they do occur. Controller medicines take time to work and must be used daily. A controller medicine will not stop an asthma episode.

**The poster on page 77 pictures many types of asthma quick relief medicines and controller medicines.**

## QUICK RELIEF - BRONCHODILATOR

When a child is having trouble breathing, the quick relief medicine relaxes the tightened muscles around the airways. This makes breathing easier. The best way to give it is by using an inhaler with a holding chamber or by using a nebulizer (mist machine). It can also be given as a liquid medicine that is swallowed. Many people taking quick relief medicines experience common, unavoidable reactions including: shaking, pounding heart, nervousness, and restlessness. These side effects are much more intense when the medicine is swallowed. This is because the dose is ten times greater when swallowed than when inhaled.

Quick relief medicines work for about three or four hours. If the child still has trouble breathing after using the medicine, re-administer the medicine (if directed by the asthma action plan) or get help for the child.

## LONG-TERM CONTROLLER

Some controller medicines keep an asthma episode from happening by preventing or controlling swelling in the airways and decreasing the reaction of the airways to triggers. Controller medicines do not help stop an asthma episode. Long-term control medicines only work if taken every day.

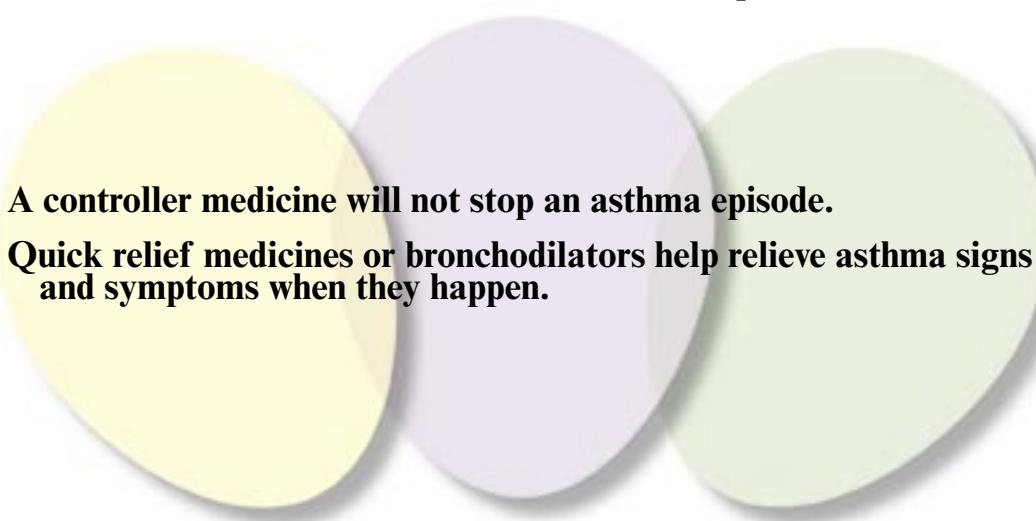
When a controller medicine is taken daily, the airways are less sensitive and asthma episodes are prevented. Since it takes several days for the medicine to reach maximum effectiveness, the child needs to take the medicine every day to keep asthma signs under control. Some parents may stop giving their child the controller medicine when the child's breathing is better – thinking that it is no longer needed. However, the child's airways are always sensitive and will swell when next exposed to an asthma trigger. If the controller medicine is stopped, the airways will become inflamed again and the child's asthma will reoccur. The child's medical care provider, should supervise the stopping or starting of medicines and update the asthma action plan accordingly.

Controller medicines are frequently prescribed as an inhaled medicine that can be breathed into the lungs through the mouth. This way the medicine is delivered directly to the airways where it can go to work right away. Controller medicines are usually given at home once or twice a day. They are used in a childcare or preschool setting only if the parents are unable to give the medicines at home.

Two common types of controller medicines are *inhaled steroids* which help prevent and reduce swelling in the airways, and *leukotriene modifiers* which help reduce airway swelling and relax the muscles around the airways. Inhaled steroids are the most effective long-term control medicine currently available. Inhaled steroids for asthma control are not the same as “body-building steroids” used by some athletes.

**Taking inhaled steroids has fewer risks than not controlling asthma.** Some possible side effects of inhaled steroids are hoarseness of voice, fungal infections in the mouth, and temporary slowing of growth in height. To help prevent fungal infections and hoarseness from happening, the child should rinse his/her mouth and spit out after taking the inhaled steroid. Side effects of the swallowed leukotriene modifier medicines may include headache, nausea, rash, dizziness, fatigue and stomach ache.

There are other medicines that doctors prescribe for children’s asthma. These should be listed on the written asthma action plan.



A controller medicine will not stop an asthma episode.  
Quick relief medicines or bronchodilators help relieve asthma signs and symptoms when they happen.

## ALLERGY MEDICINES

Some children with asthma take allergy medicine to control the allergies that cause their asthma signs. They come in several forms including pills, capsules, tablets, chewable tablets, liquid, or nose sprays. Some side effects of these medicines are drowsiness, dizziness and dry mouth. Nose sprays can also cause bloody noses and sore throats. Only use the allergy medicine as directed. It should be indicated on the asthma action plan.

## ASTHMA MEDICINE DELIVERY DEVICES

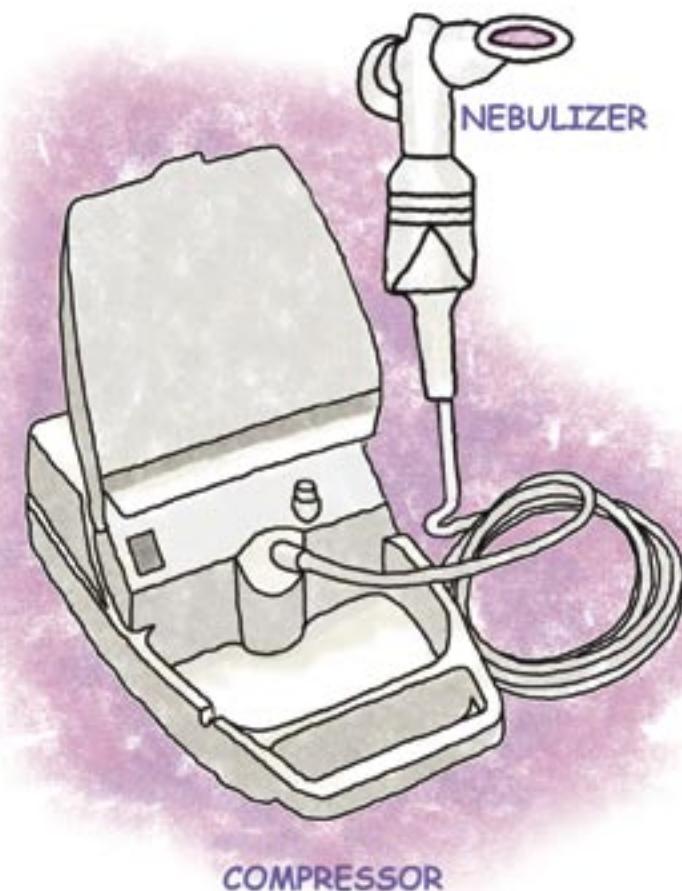
Inhaled medicines are often used to treat asthma because they go directly into the airways. For this reason, they can be used in smaller doses than medicine that is swallowed. Using a smaller dose causes fewer side effects. Also, since inhaled quick relief (rescue) medicines get into the lungs right away, they begin to work faster. Even infants can use inhaled asthma medicines. All young children must use special medicine delivery devices when taking these asthma medicines. The child's doctor will decide which type of device is best for the child to use.

Devices specifically used by young children to make it easier to take inhaled medicines for asthma include:

- Nebulizers with a mask or mouthpiece
- Metered Dose Inhalers (**MDI**) with a holding chamber (spacer) with or without a mask.

## NEBULIZER

The nebulizer is a cup into which medicine is placed and air is forced through, causing the medicine to become a mist. The machine that forces the air into the nebulizer is an air-compressor. Tubing is used to connect the nebulizer cup to the machine. The nebulizer produces a fine aerosol or mist, which is a blend of air and medicine that goes directly into the airways. There are several different kinds of nebulizers available but their basic operations are very similar. There are portable, battery-powered compressors that can be used for travel or an emergency. Be sure to read and follow the manufacturer's instructions, if available. Have the parent or guardian demonstrate how to use the equipment.



## How To Use The Nebulizer

- Place the machine (compressor) on a table near you to control it easily while the child is using it.
- Unwind the tubing. Attach one end of the tubing to the compressor and the other end to the nebulizer cup at its base.
- Place one dose of the medicine in the nebulizer cup itself. Some types of cups require that you remove the top to do this while others allow you to put it directly into the top. Check the unit's instructions.
- Replace the top of the cup. Be sure the tubing is in place.
- Attach either a mouthpiece or a mask (as recommended by the doctor) to the nebulizer.
- Make sure the on-off button is in the off position and plug in the unit.
- Hold the child, or have the child sit up in a comfortable position near the unit. Some nebulizers must be used sitting up while others can be used either sitting or lying down. Again, check the directions.
- Turn the on-off switch to the on position.
- Have the child relax and breathe slowly in and out into the mouthpiece or mask.
- It takes about 4 to 12 minutes for the child to breathe in all of the medicine, depending on the amount of medicine put in the cup, the child's breathing rate, and the type of nebulizer used.
- To make it a pleasant experience, reassure the child you will keep him company-possibly read a story, show interesting pictures, or sing songs.
- At the end of the treatment, a “sputter” sound will occur and that is the sign that the medicine is done and you can turn the machine off.
- Remove the mask or mouthpiece. Encourage the child to play quietly.
- When the treatment is done – wash the nebulizer cup and have it ready to go for the next time.

**NOTE:** Some parents and health professionals hold the mouthpiece or mask away from the child's face to keep from bothering the child. However, this results in most of the medicine going into the room rather than into the child. The child will need to be given more treatments to clear his or her symptoms. Ask the parent who requests that the childcare provider use this “blow by” method, to review with the doctor the best method for administering the child's asthma medicine.

## Mask

- If the child is using a mask, place it over the nose and mouth; the elastic band goes around the head to be sure that the mask has a tight seal and that no air leaks out. If there is no elastic band, place your hand gently at the base of the child's head and with the other hand hold the mask to the face.
- Make sure no medicine is leaking around the mask. Masks come in different sizes. They should fit snugly over the nose and below the child's lips with no air leakage. As children grow, they will need a larger mask



## Mouthpiece

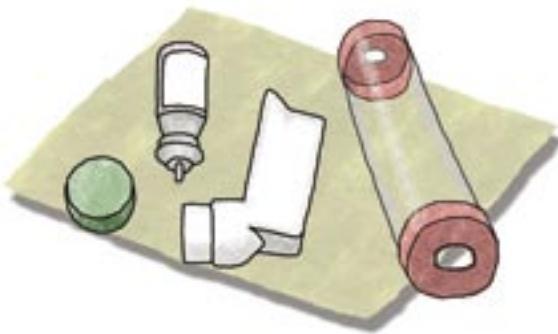
As the child gains coordination and learns to cooperate, the doctor may change the child from a mask to a mouthpiece. The child gets more medicine into the lungs using a mouthpiece rather than a mask. Medicine is not wasted in the mask and does not escape through the holes in the mask. To be able to use the mouthpiece and not the mask, the child must know how to keep his or her lips closed and to breathe through the mouth only (not the nose) during the treatment.

- Place the nebulizer mouthpiece between the child's teeth and on the tongue and ask him to close his lips around it.
- Encourage the child to take deep breaths through the mouth – not the nose – to inhale the medicine.



## Cleaning the Nebulizer

Rinse the nebulizer after each treatment. Once a day, thoroughly clean it. Disconnect the tubing from the machine and from the nebulizer. Take the nebulizer apart. Wash the nebulizer in warm soapy water. Rinse in hot water. Then, soak in a solution of vinegar and water – 3 cups hot water and one cup vinegar – for 30 minutes. Then, remove from the solution, and rinse with warm water and air dry. Since only air flows through the tubing, it does not have to be cleaned often. Some nebulizers can be washed in the dishwasher. The compressor itself does not need to be cleaned; just wipe it off periodically. Some compressors may need a new filter once a month.



## METERED DOSE INHALER (MDI)

A child of any age can use a Metered Dose Inhaler or MDI. “Metered” means measured or regulated. An MDI consists of a pressurized canister of medicine in a plastic case with a mouthpiece. Pressing the MDI canister releases a mist of medicine. It is portable, efficient, and convenient to use. It is important to use an MDI correctly to get the full dose and have the medicine reach the small airways, increasing the medicine’s effectiveness. Using the MDI correctly can also help reduce the side effects of the medicine.

Effective use of the MDI depends on proper positioning and timing. Use the MDI with the mouthpiece down and the canister up. Always shake the canister before pressing to release the puff of medicine. To use the MDI without a holding chamber (or spacer), the person must start to breathe in **before** pressing down on the small canister to release the medicine. Then, he or she must inhale the medicine, and hold his or her breath for 5 to 10 seconds. Since young children cannot coordinate their inhale with the release of the mist, and often cannot hold their breath for at least 5 seconds, they need to use a holding chamber (or spacer) to benefit from an MDI. Without a holding chamber, the child must start to breathe in before the top of the canister is pressed down; otherwise, much of the medicine will bounce away from the face and be lost. The holding chamber allows the child to breathe the medicine directly into the airways where it can work, and less medicine stays in the mouth.

## MDI WITH HOLDING CHAMBER (SPACER)

Using the MDI with a holding chamber does not require hand-breath coordination to be effective. The MDI puffs medicine into the holding chamber where it stays until the child breathes it in. Ask the child to breathe in the medicine right after pressing the canister so the medicine won't stick to the sides of the holding chamber. And, using a quiet pleasant location while giving the treatment can be calming to the child.

When the child first gets the inhaler and holding chamber, the parent may have the child play with it before they have to use it to take the medicine. This allows the child to get used to it and see that it is not going to be harmful or painful. The parent may ask the caregiver or preschool staff to help the child adjust to the new device.



**NOTE:** The parent and doctor will determine when the child can use a holding chamber without a mask. Generally, this is when the child can breathe in through the mouth without breathing through the nose, keep his or her lips sealed around the mouthpiece, and hold his or her breath for 5 seconds.

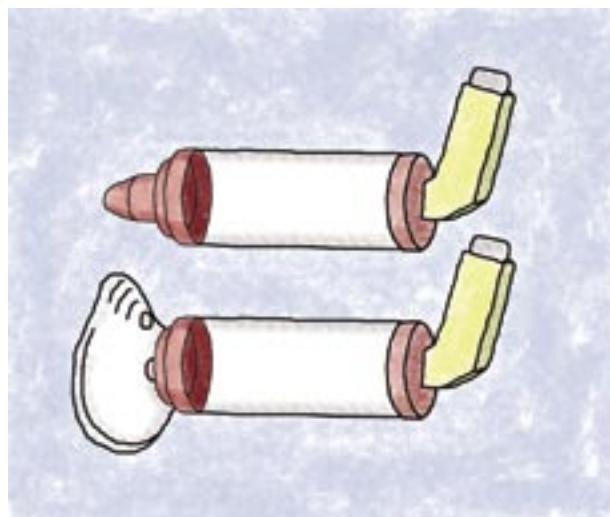
## **THE FOLLOWING DESCRIBES HOW TO USE A METERED DOSE INHALER (MDI) WITH A HOLDING CHAMBER (SPACER) - WITH OR WITHOUT A MASK:**

### **WITH A MASK:**

- 1) Make sure that the medicine is the correct medicine and the correct dose according to the asthma plan.
- 2) Remove the medicine cap on the end of the inhaler.
- 3) Connect the inhaler to the holding chamber (spacer).
- 4) Connect the mask to the holding chamber.
- 5) Have the child in a standing or seated-upright position. For some children, holding them in your lap makes giving the treatment easier.
- 6) Shake the device several times to mix the medicine with the propellant just before giving the medicine.
- 7) Place the mask on the child's face so medicine cannot escape.  
Press the mask against the cheeks a little to be sure there is an airtight seal, while not making the child uncomfortable. Make sure the mask covers the nose and mouth with no open space between the mask and the child's face. Some masks have a small valve on top that moves up and down with the child's breathing. If that valve isn't moving, air is leaking and you should apply the mask more snuggly.
- 8) Press the top of the canister (little can) to release a puff of the medicine into the holding chamber. After depressing the canister, have the child breathe in and out normally for six breaths. No coaching, no deep breath is needed.
- 9) If the doctor has ordered more than one dose of medicine (see instructions on the asthma action plan), wait one to three minutes while the first puff opens the airways. Shake the canister attached to the holding chamber before giving the next puff. Repeat steps 7 & 8, as above.

## **WITHOUT A MASK:**

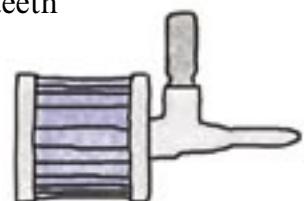
- 1) Make sure that the medicine is the correct medicine and the correct dose according to the asthma plan.
- 2) Remove the medicine cap on the end of the inhaler.
- 3) Connect the inhaler to the holding chamber (spacer).
- 4) Have the child in a standing or seated-upright position. For some children, holding them in your lap makes giving the treatment easier.
- 5) Shake the device several times to mix the medicine with the propellant just before giving the medicine.
- 6) Have the child place the holding chamber's mouthpiece between the teeth and flat on the tongue. Ask the child to close his or her lips snugly around the mouthpiece.
- 7) Press the canister to release a puff of the medicine into the holding chamber.
- 8) Have the child breathe in through the mouth – emptying the medicine from the chamber and hold his or her breath for five seconds.
- 9) If the doctor has ordered more than one dose of medicine (see instructions on the asthma action plan), wait one to three minutes while the first puff opens the airways. Shake the canister attached to the holding chamber before giving the next puff. Repeat steps 7 & 8, as above.



## **MDI - Inhaler with "Bag" Spacer**

Another type of holding chamber is the “bag” spacer. It has a mouthpiece and a blue or colorless bag that collapses as the child breathes in the medicine – making it clear that he or she is getting the medicine. To use the bag spacer, assemble it by attaching the mouthpiece to the plastic bag by matching the tabs and pushing in and gently, twisting to lock them in place.

- Shake the inhaler to mix the medicine.
- Fit the inhaler into the top of the bag spacer mouthpiece.
- Pull the bag open to its full size.
- Ask the child to breathe out gently.
- Have the child put the mouthpiece in his or her mouth between the teeth and close the lips around it.
- Press the inhaler once to deliver the medicine into the bag.
- Have the child inhale the medicine in 5-6 breaths, or breathe in the entire contents of the bag and hold the breath for up to 10 seconds to allow the medicine to get into the airways.
- Start normal breathing again.
- Wait about 1 to 3 minutes and repeat if indicated by the written asthma action plan.



## **Cleaning and Care for the Bag Spacer**

- Disconnect and clean the mouthpiece thoroughly with warm water. Do not put in the dishwasher.
- Shake off excess water.
- Air dry on a clean towel and wait until dry before storing.
- Do not clean the collapsible plastic bag. It should be replaced every 4 weeks or as needed.
- The mouthpiece should be replaced every 6 months, or when it is no longer working correctly.

It is important that the parent or guardian demonstrate to the preschool or childcare staff how to use the specific asthma delivery device that the child is using. If possible, written instructions for the device should be placed in the child's record. Also, have parents or guardians carefully explain and demonstrate use of medicines according to the asthma action plan.

There are other techniques and devices for delivering asthma medicines, including using inhalers without a holding chamber and using powdered inhalers. However, these methods are not usually used by young children and are not covered here.

## PEAK FLOW METER

An asthma episode can start before the child with asthma actually shows visible signs. Sometimes the airways are inflamed and the child doesn't show it. Over hours or even days, the condition worsens without the child or caregivers realizing. One way to see how well the lungs are functioning is to measure how fast the child can blow air out of his lungs after a deep breath. This is done using a small hand-held device called a **peak flow meter**. Children over four years of age can use a peak flow meter whenever there is a hint of an asthma problem.



Measuring peak flow can help adults and the child identify changing asthma symptoms early and treat them before they worsen. The child can use this peak flow meter at home, at preschool or childcare to measure how much air moves through his airways. The parent may ask the child's caregivers to help measure the child's peak flow.

Keeping a record of peak flow measurements can guide the doctor to make changes or adjustments in the child's medicines and the asthma action plan, if necessary.

The peak flow reading can help the caregiver match the child's current asthma condition to the directions on the asthma action plan. If the child's peak flow is between 80%-100% of the child's personal best, the child is in the green zone and asthma is under control. If the child's reading is between 65% – 80%, the child is in the high yellow zone and needs to take medicine according to the asthma action plan. If it is between 50% – 65%, the child is in the low yellow zone, use greater caution, follow the asthma action plan. If the meter is below 50% of the child's personal best, the child is in the red zone, is having a severe asthma episode, and needs to follow the action plan accordingly.