



NURSES:
PARTNERS IN
ASTHMA CARE

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PREFACE

Asthma can be controlled when managed properly. This guide will help nurses in physician's offices, clinics, hospitals, schools, and worksites to establish and maintain a partnership with patients to help them manage their asthma. Moreover, the guide will help nurses assess patient needs, tailor management plans, educate patients to follow their management plan, and coordinate the overall plan of care with other health professionals. Tips are provided for working with patients of all ages and cultural backgrounds and in different health care settings.

The nurses who developed this guide know firsthand that nurses want very practical information on asthma management. A needs assessment of nurses in clinical and hospital settings found overwhelmingly that nurses wanted information they could use and convey to patients easily. Thus, the decision was made to limit theoretical explanations, technical terms, and complex discussions of pathophysiology in this guide.

If you want more detailed or technical information on asthma management, refer to the Executive Summary of the National Asthma Education and Prevention Program's *Guidelines for the Diagnosis and Management of Asthma* on which this guide is based. (See Selected Resource Publications, page 34.)

Please take the time to become familiar with this guide; then refer to it as needed. Please send any suggestions for improving the guide or descriptions of how you used it in your work to:

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ASTHMA IS A CHRONIC LUNG DISEASE CHARACTERIZED BY:

- **Airway inflammation.**
- **Airway hyperresponsiveness** to a variety of stimuli.
- **Airway obstruction** (or airway narrowing) that is partially or completely reversible either spontaneously or with treatment.

The underlying problem in asthma is airway inflammation. Asthma results from complex interactions among a variety of inflammatory cells, mediators, and the cells and tissues in the airways. See figure 1.

First, **stimuli activate the release of inflammatory mediators** from mast cells, macrophages, eosinophils, and other inflammatory cells within the airways. These stimuli may include indoor and outdoor allergens, irritants, viral respiratory infections, cold air, and exercise.

Next, the inflammatory mediators signal other **inflammatory cells to migrate into the airways and to become activated.** The activation of these inflammatory cells and the release of more inflammatory mediators lead to epithelial injury, increased smooth muscle contraction and mucus secretion, swelling, and changes in the parasympathetic control of airway function.

This results in the airways becoming more narrow and obstructed. These inflammatory processes **also lead to airway hyperresponsiveness,**

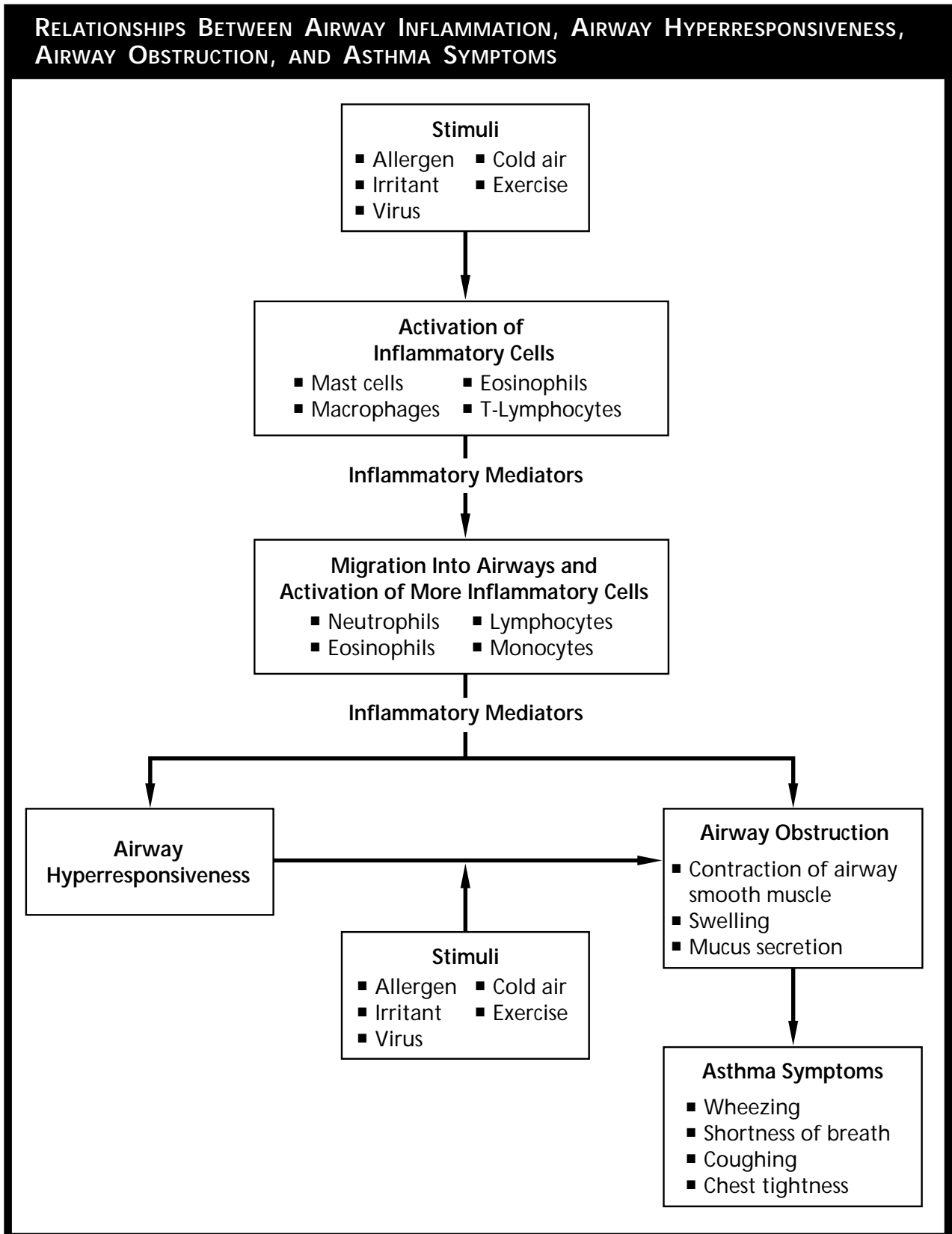
which is characterized by an excessive narrowing of the airways in response to a variety of stimuli.

Airway obstruction or narrowing causes the symptoms of coughing, wheezing, chest tightness, shortness of breath, and decreased endurance. Airway obstruction can develop gradually or abruptly.

For about half the asthma patients who inhale an allergen, symptoms recur 4 to 8 hours after the initial narrowing of the airways. This late-phase response may be more severe and prolonged than the earlier response.

Reducing airway inflammation can lessen airway hyperresponsiveness, lessen asthma symptoms, and decrease the need for frequent use of bronchodilators—in other words, control asthma. Airway inflammation can be reduced greatly by decreasing or eliminating exposure to the allergens, irritants, or other stimuli that provoke an asthma episode and by taking anti-inflammatory medication daily.

Figure 1



PRACTICAL GUIDE TO ASTHMA MANAGEMENT

This section provides a practical summary of asthma management for nurses in any setting and addresses the following:

- Goals of asthma management.
- General principles of asthma management.
- Four components of asthma management.

Subsequent sections discuss special considerations for managing asthma in selected settings and with patients of various ages and cultural backgrounds.

GOALS OF ASTHMA MANAGEMENT

The goals of asthma management are to:

- **Maintain normal activity levels** (including exercise).
- **Maintain (near) normal pulmonary function rates.**
- **Prevent chronic and troublesome symptoms** (e.g., coughing or breathlessness at night, in the early morning, or after exertion).
- **Prevent recurrent episodes of asthma** (e.g., no hospitalizations or emergency department visits).
- **Avoid adverse effects from asthma medications.**

Most asthma patients will be able to achieve the goals of asthma management with proper therapy. These goals can be used as the basis for initial and followup assessments, as will be discussed later.



Goal: full participation in physical activities.

GENERAL PRINCIPLES OF ASTHMA MANAGEMENT

The principles of asthma management listed below will help guide your approach to asthma management.

- **Long-term, ongoing care is required** to control symptoms, prevent acute asthma episodes, and reduce persistent airway inflammation caused by this chronic disease.
- **Prevention of acute episodes is a key ingredient** for achieving asthma control. This can be achieved by avoiding allergens or irritants and pretreating before exercise or exposure to other stimuli. In addition, patients with moderate or severe asthma can prevent episodes by taking anti-inflammatory medication daily.
- **Anticipatory or early treatment of symptoms is important** to reduce the likelihood of developing severe airway narrowing. Early warning

signs that should be treated immediately include (1) a peak flow rate 20 percent below predicted or personal best (peak flow rates will be described in more detail later), (2) cough, (3) wheeze, (4) tightness of the chest, (5) shortness of breath, or (6) other individual signals a patient may have of an upcoming episode.

- **Objective measurement of asthma severity** should guide the management of asthma.
- **Management activities should focus on (1) reducing airway inflammation to prevent asthma episodes and (2) relieving airway narrowing when necessary.** This principle is based on the current understanding of the pathophysiology of asthma.

FOUR COMPONENTS OF ASTHMA MANAGEMENT

Your encounters with asthma patients can be organized around the four components of asthma management, which are listed below and then explained in more detail.

1. **Objective measures of lung function** to both assess and monitor each patient's asthma.
2. **Environmental control** efforts to reduce or eliminate exposure to allergens and irritants (often called asthma triggers) that induce airway inflammation and precipitate acute asthma episodes.
3. **Pharmacologic therapy** to prevent, reverse, and control airway inflammation and obstruction.
4. **Patient education** to help patients prepare and follow their daily management plan and their action plan for dealing with symptoms.

Asthma Management Component 1: Objective Measures of Lung Function

Objective measures of lung function are important for making a diagnosis, assessing the severity of asthma, and developing and using asthma control plans. They provide an accurate way of assessing lung function. Attempts to assess lung function through physical examinations and patients' reports are often inaccurate. Objective measurements of



Coach patients to use correct technique.

lung function are obtained with spirometers and peak flow meters.

Spirometry

The spirometric measurements most often used are:

- **Forced expiratory volume in 1 second (FEV₁)**—the amount of air forcefully blown out in the first second. FEV₁ is one of the most useful measures because it indicates both large and small airway function.
- **Peak expiratory flow rate (PEFR)**—the highest flow rate that can be created by the patient forcefully blowing with fully inflated lungs. PEFR correlates well with FEV₁ although it primarily measures large airway function. PEFR measurements are made in liters per minute.
- **Forced vital capacity (FVC)**—the total volume of air that the patient can blow out as rapidly as possible. FVC is a good indicator of patient effort and also may help determine airway obstruction.
- **Maximum midexpiratory flow rate (MMEF)**—the flow measured between 25 and 75 percent of the forced expiratory volume. MMEF measurements assess small airway function.

Nurses can instruct and work with patients to ensure that lung function evaluations are made

with correct, reproducible techniques. (See table 1.) Information about spirometry and spirometers is available in the manufacturers' manuals and from the American Lung Association. (See page 34 in

Selected Resource Publications section.) Pulmonologists, allergists, and respiratory therapists are also valuable sources of information.

Table 1

CORRECT TECHNIQUE FOR PERFORMING SPIROMETRY TESTS

- **Keep conditions constant for each effort and each patient.** Nose clips are recommended but optional, and the patient can sit or stand. Very obese patients should lean back slightly in their chairs.
- **Record the descriptive data in the patient record** (such as date, time, age, sex, height, and race) so you can find the corresponding predicted values for the patient. (Predicted values are average rates for persons the same sex, age, and height as the patient.) Check the height of growing children at each visit. If results seem dramatically different from what is expected, evaluate the patient's effort and check the accuracy of the patient's data.
- **Explain and demonstrate the steps listed below. Then have the patient do these steps:**
 1. Exhale comfortably.
 2. Inhale as deeply as possible.
 3. Place the spirometer mouthpiece between the teeth and seal the lips around it.
 4. Blow, pushing the air out quickly and forcefully.
 5. Continue to blow for at least 6 seconds "squeezing" all the air out.

When the patient is blowing, the nurse or technician needs to encourage the patient strongly with calls to "Blow hard; push! push! push! keep going; breathe out more . . . Good effort."
- **Obtain at least three acceptable measurements.** (See below for indicators of unsatisfactory spirometric measurements.) Take no more than eight tries to achieve these three measurements during a single test session.

INDICATORS OF UNSATISFACTORY SPIROMETRIC MEASUREMENTS

According to the American Thoracic Society, any effort is considered unsatisfactory if any of the following occurs:

- **Very hesitant or broken expiration** at the beginning of the test (or an extrapolated volume of more than 5 percent of FVC or 0.100 L, whichever is greater).
- **Coughing** occurs during the first second of the test or interferes with measurement after the first second. (Coughing at the end of the FVC maneuver does not affect the FEV₁ measurement.)
- **The expiration stops after less than 6 seconds;** expiration time longer than 6 seconds is needed for patients with obstructed airways.
- **The mouthpiece is blocked.** For example, the tongue or false teeth of the patient slip in front of the mouthpiece.
- **Glottis closure (Valsalva maneuver) occurs.** Indicators of glottis interference or closure include vocal sounds, rumbling in the throat, and flow volume curves with vertical jagged lines.
- **A leak occurs.** Patient's lips lose their seal around the mouthpiece.

Peak Flow Monitoring

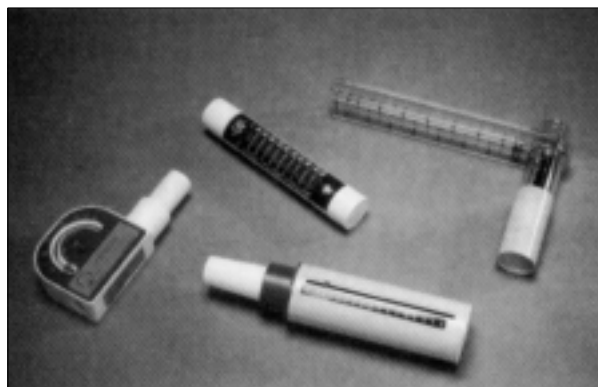
Portable peak flow meters measure PEF. This provides patients with an objective measure of their lung function and helps them become actively involved in managing their asthma. The PEF is the highest air flow rate that can be created by patients forcefully blowing after fully inflating their lungs. With a peak flow meter and proper training, patients can detect when their asthma is getting worse, often before symptoms occur. Patients can also objectively assess the severity of an asthma episode, which will indicate what actions they should take. Peak flow measurements can also assess the response to therapy. See the patient handouts “How To Use Your Peak Flow Meter” and “Asthma Management Plan” (appendix D) for more information.

Actions/Implications for Nurses: Objective Measures

- **Ensure that patients obtain accurate spirometric readings by coaching them** to use the correct technique.
- **Use the handouts “How To Use Your Peak Flow Meter” and “Asthma Management Plan” (see appendix D) to instruct patients how to use a peak flow meter**, obtain their personal best, and use peak flow readings to help them manage their asthma. Help patients to be aware of other signs that indicate the need to take medications, such as coughing, wheezing, and difficulty breathing.
- **Ask all patients to demonstrate their PEF technique** at each visit. Use the five steps listed in “How To Use Your Peak Flow Meter” to check off each step they complete accurately.

Asthma Management Component 2: Environmental Control Measures

A variety of stimuli can increase airway inflammation and bring on acute asthma episodes. Eliminating or reducing exposure to these stimuli—also called triggers—has proven to be



Patients need to use the same peak flow meter once selected.

effective in decreasing the need for asthma medications and in reducing symptoms. Environmental stimuli that can make asthma worse include airborne allergens and irritants, infections, and cold air; nonenvironmental stimuli include exercise and strong emotional expressions that increase respiration, such as laughing, crying, yelling, and fear.

You can identify what makes a patient's asthma worse by taking a thorough history of past asthma episodes. If needed, have patients keep written records of all their episodes. The information you want from patients includes:

- The number of asthma episodes and how long they lasted.
- When symptoms first appeared.



Avoiding triggers is potent anti-inflammatory therapy.

- What patients suspected made their asthma worse.
- Whether emergency department visits or hospitalizations were necessary.
- What patients felt reduced the number of episodes.

Improvement in symptoms is often directly related to the degree patients follow environmental control recommendations. How well patients follow the recommendations is greatly affected by the strength of the partnership established with the patient and the completeness and quality of the patient education provided. Develop with patients plans and methods they will use to stay away from asthma triggers. Use the handout “How To Stay Away From Things That Make Your Asthma Worse” (in appendix D).

Allergens

The majority of people with asthma have an allergic or IgE-mediated component to their asthma. For many, exposure to allergens is the primary cause of airway inflammation, hyperresponsiveness, and narrowing.

The diagnosis of allergy is made after taking a thorough history and then using skin tests or in vitro methods to assess sensitivity to the allergen(s). The outdoor molds and pollens that commonly bring on allergic symptoms are usually seasonal. Exposure is year round for the most common indoor allergens: house-dust mites, cockroach feces, and animal dander.

There are three main treatments for allergies. These are listed in the order in which they should be tried: (1) reducing the exposure to the offending allergens, (2) medications, and (3) immunotherapy.

Irritants

Exposures to irritants should be minimized, especially for those irritants that patients know bring about acute asthma episodes. Indoor irritants include tobacco smoke, smoke from wood-burning stoves, strong odors and sprays (for example,



Ask smokers to quit smoking, then follow up with them.

perfume, hair spray, cooking odors, paint fumes, and insecticides), and occupational exposures to airborne irritants. Outdoor irritants include air pollutants, particularly ozone, nitrogen dioxide, and sulfur dioxide.

Actions/Implications for Nurses: Environmental Control

- **Help patients eliminate—or reduce as much as possible—exposure to the things that make their asthma worse.** Use the handout “How To Stay Away From Things That Make Your Asthma Worse” in appendix D. Highlight the control measures most appropriate for each patient. Urge patients and their families to attempt one or two control measures at a time, starting with the least expensive and/or the most effective.
 - **Ask about the presence of smokers in every household and advise them to quit.** Recommend to the smokers directly that they stop smoking for the health of the patient and for themselves. Ask them to set a quit date, and refer them to quit-smoking materials and programs. Follow up with all smokers periodically to assess and reinforce their progress in thinking about or actually quitting. If the smokers are not ready to quit, ask them not to smoke in the house or car and ask them to keep thinking about quitting. It is best for them to quit.
-

Asthma Management Component 3: Pharmacologic Therapy

To achieve the goals of asthma management listed on page 3, an individualized step-care approach to medications needs to be used to (1) achieve long-term control of asthma and (2) treat acute episodes of asthma. The “steps” will be discussed after the asthma medications are described.

Two Major Groups of Asthma Medications: Anti-inflammatory and Bronchodilator

Anti-inflammatory and bronchodilator medications are used in step-care therapy to treat airway inflammation and airway obstruction. (See appendices A and B for more details on these medications.)

- **Anti-inflammatory medications** prevent and reduce airway inflammation. Inhaled corticosteroids, cromolyn sodium, and nedocromil sodium are **taken daily to prevent symptoms and keep asthma under control**. Short courses of oral corticosteroids are used to help reverse the increased inflammation of a severe acute episode, speed recovery, and prevent recurrence. Sometimes, oral corticosteroids are used longer term to control severe chronic asthma.
- **Bronchodilator medications** relax bronchial smooth muscles. **Short-acting inhaled beta₂-agonists are taken as needed to relieve symptoms**. Longer acting bronchodilators can help **prevent symptoms**, especially nighttime symptoms. Longer acting bronchodilators include extended-release theophylline or oral beta₂-agonists and long-acting inhaled beta₂-agonists.



Label the inhalers so patients know when to use them.

Clearly distinguish and review at each visit the medications patients are to take to *relieve* symptoms and those they are to take to *prevent* symptoms. Ask patients to bring their medicines to their visits and label them with terms they readily understand. Try the terms below to help make the distinction with your patients:

- **Inhaled anti-inflammatory medications** have been called “controllers,” “preventive,” “preventers (of symptoms),” and the medicine for the “quiet” part of asthma.
- **Short-acting beta₂-agonists** have been called “symptom relievers,” “quick-relief medicine,” “rescue medicine,” and the medicine for the “noisy” part of asthma.

Step-Care for Chronic Asthma and Acute Asthma Episodes

Step-care for chronic asthma. Medications to prevent or control chronic symptoms are given to patients in accordance with the severity of their asthma. The level of severity—mild, moderate, severe—is based on chronic symptoms and PEF_R. (See table 2.) The medication “steps” that correspond to each level of severity are provided in figure 2.

The medications and their dosages should be adjusted until the goals of asthma management are achieved. If control is sustained for 3 months, medications can be reduced with careful monitoring. Preventive medications should be added or increased if any one of the indicators listed in the box is present. **The most effective preventive medications are inhaled anti-inflammatory medications (inhaled corticosteroids, nedocromil, cromolyn).**

Step-care for acute episodes. Medications to *relieve* acute episodes of asthma also are added in a step-care pattern as needed. The handout “Asthma Management Plan” (see appendix D) describes a step-care pattern used to manage asthma. The steps or “zones” are based on the severity of the acute episode as measured by peak flow meters and symptoms.

INDICATORS FOR INCREASING PREVENTIVE ASTHMA MEDICATIONS

- Acute asthma episodes occur more than twice a week.
- More than three to four doses of an inhaled short-acting beta₂-agonist are used in a day.
- Inhaled short-acting beta₂-agonists are taken daily.
- PEFr changes more than 20 percent from morning to afternoon or evening, or before and after taking short-acting beta₂-agonists.

Written Medication Plans for Patients— An Important Aid

The Asthma Management Plan (see handout in appendix D) helps physicians and nurses to prepare with patients a written individualized medication/ action plan for controlling chronic asthma symptoms and relieving acute asthma episodes. **The actions and medications patients should take within each zone are as follows:**

- **Green zone**—stay away from things that make their asthma worse. Take daily medications to *control* chronic symptoms.

- **Yellow zone**—take medications to *relieve* asthma episodes at home.

- **Red zone**—call doctor or seek emergency care.

See the handout for more details.

Recommendations for Exercise-Induced Asthma

All asthma patients should be encouraged to exercise and to prevent exercise-induced asthma (EIA). EIA affects 70 to 90 percent of all patients with asthma as well as 40 percent of children with allergies but no clinical signs of asthma. EIA is a narrowing of the airways that occurs after 6 to 8

Table 2

CLASSIFICATION OF ASTHMA BY SEVERITY OF DISEASE BEFORE TREATMENT*

Characteristics	Mild	Moderate	Severe
Frequency of exacerbations	≤2 times/week; brief (<1 hour)	>2 times/week; may last days; not frequently severe	frequent exacerbations, often severe
Frequency of symptoms	minimal	often	continuous
Exercise tolerance	good	diminished	poor; activity limited
Frequency of nocturnal asthma	≤2 times/month	>2 times/week	almost nightly, chest tight in a.m.
School or work attendance	good	fair	poor
Pulmonary function			
Peak expiratory flow rate (PEFR)	>80%	60–80%	<60%
PEFR variability	<20%	20–30%	>30%
Spirometry	minimal airway obstruction	airway obstruction evident with reduced expiratory flow at low lung volumes	substantial airway obstruction with increased lung volumes and marked unevenness of ventilation

*After treatment, severity is determined by the minimum medications needed to maintain good health.

Figure 2

MEDICATIONS USED FOR EACH LEVEL OF ASTHMA SEVERITY	
Severity	Treatment
Mild	<p>Inhaled beta₂-agonists as needed</p> <ul style="list-style-type: none"> - Before exercise or other stimuli - For symptom relief <hr/> <p><i>If daily use or >3 doses of beta₂-agonist per day*</i></p> <p style="text-align: center;">↓</p>
Moderate	<p>Inhaled beta₂-agonists as needed. Inhaled anti-inflammatory agent—taken daily</p> <ul style="list-style-type: none"> - Inhaled corticosteroids - Cromolyn - Nedocromil <hr/> <p><i>If symptoms persist*</i></p> <p style="text-align: center;">↓</p> <p>Inhaled beta₂-agonists as needed. Inhaled corticosteroids (higher dose)</p> <ul style="list-style-type: none"> - With or without cromolyn or nedocromil - With or without extended-release theophylline and/or oral beta₂-agonist, particularly to control nocturnal symptoms. <hr/> <p><i>If symptoms persist*</i></p> <p style="text-align: center;">↓</p>
Severe	<p>Inhaled beta₂-agonists as needed. Inhaled corticosteroids (higher dose)</p> <ul style="list-style-type: none"> - With or without cromolyn or nedocromil - With or without extended-release theophylline and/or oral beta₂-agonist, particularly to control nocturnal symptoms. <p>Oral corticosteroids</p> <ul style="list-style-type: none"> - Use daily or alternate day schedule. - Reassess often, may need only for short term.

* Assess if medications are being taken correctly. If not, teach the patient to take medicines correctly. When taken correctly, patients may not need to increase their medication.

ENCOURAGE PATIENTS WITH EXERCISE-INDUCED ASTHMA TO:

- Take inhaled beta₂-agonist or cromolyn less than 30 minutes before exercising if prescribed.
- Warm up and cool down when they exercise.
- Exercise in warm humid air or cover the face when the air is cold.
- Avoid exercising outside in the afternoon and evening when pollen, mold, or ozone counts are high.
- Avoid exercising when asthma is unstable or PEFRs are low.

minutes of vigorous exercise and results in a 15 percent or more drop in PEFR or FEV₁. EIA usually peaks 3 to 12 minutes after stopping the exercise and resolves within 30 to 60 minutes. An exercise challenge helps diagnose the existence of EIA.

Emphasize to patients that they should be able to exercise. Ask them to contact their doctor or you if their plan to control EIA is not working effectively.

**Actions/Implications for Nurses:
Pharmacologic Therapy**

Asthma Management Plan

- **Emphasize long-term ongoing therapy and swift treatment of the early warning signs of an asthma episode** (PEFR falls 20 percent below their predicted or personal best or symptoms occur).
- **Emphasize that patients with moderate and severe asthma need daily inhaled anti-inflammatory medication to prevent asthma episodes.**
- **Work with the patient and physician to develop a written Asthma Management Plan tailored to the patient's needs.**
- **At each visit, assess and review each patient's use and understanding of his or her Asthma Management Plan. Review how patients are taking their medicines.** (See Patient Education section, pages 12–17, for more details.)

- **At each visit, ask patients about all medications they are using, including over-the-counter medications.** Ask patients to be sure they are NOT taking beta blockers (frequently used for high blood pressure, for migraines, and in eye drops for glaucoma). For patients sensitive to aspirin, advise them NOT to take aspirin-containing drugs and nonsteroidal anti-inflammatory drugs (NSAIDs). These drugs can cause severe and even fatal acute asthma episodes. Teach patients to read labels carefully and to wear medical alert bracelets. Remind them that safe alternatives to aspirin and NSAIDs include acetaminophen, sodium salicylate, or salsalate.
- Coordinate and integrate for patients the different recommendations that may arise when several nurses and physicians are involved (e.g., recommendations from primary care, pulmonology, allergy, or emergency department staff).

Correct Metered-Dose Inhaler Technique

- **Teach the correct techniques for using metered-dose inhalers, spacers, and nebulizers.** (Use handouts in appendix D.)
 - **At each visit, have the patient demonstrate the use of medications via the inhaler, spacer, or nebulizer.** Emphasize the importance of correct technique and reteach as needed.
-

Asthma Management Component 4: Patient Education

Nurses play a vital role in helping patients to decide and learn how to take the many specific actions needed to control asthma. These patient actions are the focus of all asthma patient education. These actions are listed in table 3 and further described in the patient handouts. (See appendix D.)

Additional content should include an explanation of asthma, the goals and principles of asthma management discussed earlier, and the dangers of the underuse as well as overuse of medications.

Planning Patient Education: Keys to Success

What you say and do or omit to say and do will have a significant effect on your patients. Nurses need to deliberately plan and conduct their patient education to increase the chances that their patients will follow the recommended actions. The chances the recommended actions will be taken increase greatly when patients:

- **Plan to do the action at a specific time and place.**
 - **Find it easy to do.**
 - **Benefit from doing it** at an acceptable cost and find it helps them avoid serious consequences or prevents them from losing something they value.
- **Believe they can do it.**
 - **Remember to do it.**

Keep these five factors in mind while working with patients. Use them to help prepare what you will say to patients. Review each handout with the questions listed in the box “Questions for Planning Patient Education.” Think of your patients as you read the questions. Consider making your own checklist of key questions to ask patients and points you want to make. Highlight the key information in the handouts when you speak to patients.

If you prefer fewer questions to use for planning or to discuss with patients, use the following:

1. **What will make it more likely** for the patient to take the action?
2. **What will make it difficult** for the patient to take the action? How can the difficulties be reduced?
3. **What will the patient agree to do?**

In addition to working with patients, nurses need to build partnerships with patients’ families and other health professionals to ensure that support, consistent messages, and coordinated care are provided. The results of such partnerships will be controlled asthma, fewer sick days, and better lives for patients.

QUESTIONS FOR PLANNING PATIENT EDUCATION

Plan To Act	What specific action do you want the patient to agree to do? When, where, how, and how often do the patients need to take the action?
Barriers	How can the action be made easier for the patient to do? How can the medication-taking schedules be adjusted to fit into the patient’s schedule? What patient fears or concerns about asthma and its treatment need to be discussed?
Benefits	What are the benefits patients would receive and find worth the effort? What do the patient’s family and friends think of the actions and the benefits? What are the consequences that are likely to occur and are possibly serious if no action is taken?
Confidence	What skills training or other help does the patient need to take the action?
Memory	What will help the patient remember to act?

Table 3

ACTIONS PATIENTS NEED TO TAKE: THE GOALS OF ASTHMA PATIENT EDUCATION

Objective Measures—Peak Flow Monitoring

Actions:

- Take peak flow rate accurately and maintain a daily diary of the rates and asthma symptoms.

Handout:

How To Use Your Peak Flow Meter

Environmental Control

Actions:

- Identify and then reduce or eliminate exposure to patient's triggers.

Handout:

How To Stay Away From Things That Make Your Asthma Worse

Pharmacotherapy

Actions:

- Develop a written Asthma Management Plan with the clinician and follow it.
- Take medications as prescribed.
- Monitor whether the goals of asthma management are being achieved.
- Use an inhaler with or without a spacer and/or use a nebulizer correctly.
- Treat symptoms early and follow the action plan for handling asthma episodes.
- Call the health care provider when peak flow is below 50 percent of baseline; when breathing, walking, and talking are difficult; and/or when medication does not improve the condition. (Have a specific written plan for handling emergencies at any time of the day.)

Handouts:

Asthma Management Plan

Your Metered-Dose Inhaler: How To Use It

Spacers: Making Inhaled Medicines Easier To Take

How To Use and Care for Your Nebulizer

Note: Reproducible copies of the patient handouts are in appendix D.

Implementing Patient Education: Effective Strategies

Help Patients Plan and Take Action

Patients tend to do what *they* decide is worthwhile and what *they* make specific plans to do. Thus, patient education is not simply giving patients information; it is also assessing their needs and expectations and discussing their response to and decisions about what they are being asked to do.

(See appendix C for specific examples of the asthma patient education process.)

Ask patients what they see as the **benefits** of a recommended asthma management activity. Ask about any **barriers** to their taking the action. Involve the patient in finding solutions and making *plans* to do the asthma management activities. Get the patient involved by asking open-ended questions.



Always negotiate a plan of action with patients.

Always end with a clear plan of action, and obtain or confirm the patient's commitment to follow it. Ask patients to repeat to you what they are to do. Or ask them to tell you how they would explain to a family member what they agreed to do. Tell patients that at the next visit you will assess their asthma and talk about their experience doing these actions.

Followup with patients is critical for success.

At the next visit and each one thereafter, ask patients what agreed-upon actions they took. Reinforce their efforts. Then go over the benefits and barriers and make new plans as discussed above.

Patients' readiness to act varies. Some patients you see will be more ready than others to do asthma management activities. Some may need help resolving their fears and concerns. Some may need more time to think about what you have discussed with them. Ask these patients to think about the benefits they are **losing or missing** by not taking the specific recommended action(s) (e.g., "By not taking the actions, you are *losing* the chance to control your asthma and become symptom-free"). In addition, ask them to talk to family and friends about the action and its benefits, and possibly to try the action. Then, follow up with the patient.

Always convey to patients that you believe they will take the recommended action. For example, DO NOT say, "If you do . . ."; SAY, "When you do" Tell patients that you know they will eventually take the actions and control their asthma.

Build Confidence: Teach Patients To Do the Asthma Management Activities Correctly

The four R's—reach agreement, rehearse, repeat, reinforce—are the basis for patient teaching. Each "R" is described below, and an application of the "four R's" is presented in table 4.

- **Reach agreement on goals and activities.** Written action plans and agreements are best. Agree on:
 - Goals of asthma management.
 - Related personal or family goals.
 - Actions patients are to perform.
- **Rehearse the asthma management techniques.** Use the following four steps:
 - **Describe** to patients each step they are to take (e.g., review a handout with patient).
 - **Show** patients each step by doing it yourself.
 - **Practice**—have the patients show you how they do each step. When there are many steps, have the patients just do the first three or so first, then the next three, and so on.
 - **Give feedback.** First, praise patients for appropriate steps taken, and then gently correct any missteps. Correct only one error at a time using the steps listed above: describe, show, have patient practice, and give feedback.
- **Repeat, repeat, repeat.**
 - Repeat instructions in several ways—orally, visually, and in writing.
 - Ask patients to repeat the instructions in their own words at this AND at subsequent visits.
 - Review *when* patients are to take the agreed-upon actions (e.g., when medications are to be taken).

Table 4

ILLUSTRATION OF THE FOUR R'S: INHALER TRAINING

1. **Reach agreement** on what the patient is to do when taking inhaled medication—open mouth or closed mouth technique or use of a spacer.
2. **Rehearse:**
 - **Tell** the patient the instructions on inhaler use by reading from “How To Use Your Peak Flow Meter” (See appendix D) as you show the patient the handout.
 - **Show** or demonstrate each step for the patient.
 - **Practice.** Ask the patient to show you how to use the inhaler. (He or she can look at the handout while doing this at first.)
 - **Feedback.** Use the eight steps in the handout as a checklist; check each step that the patient does correctly. Then review what steps he or she did well and what needs to be improved. Ask the patient to demonstrate the inhaler use again. Remember that the patient does not have to do everything correctly after the first instructions.
3. **Repeat.** Ask patients to practice what they have learned when they use their inhaler. Have them show you their technique at subsequent visits. Help them with any errors in their technique.
4. **Reinforce.** Praise the patients at each visit for doing some aspect of the technique correctly or just for trying. Express confidence in their ability to master the technique. Enthusiastically tell them when they get the technique correct.



Teach and review inhaler technique at every visit.

- Ask them to “practice” the technique (e.g., inhaler technique) at those times.
- Ask patients to demonstrate (rehearse) their peak flow and inhaler techniques at *every* visit.

■ Reinforce.

- Praise patients who correctly perform ANY actions they agreed to do.
- Recruit the family to remind and praise the patient.

Remember that patients often will not do everything correctly after the first instructions. Give patients time to practice. You might suggest that they work on one aspect of the action and then help them with their errors in technique at subsequent visits.

The key to success is to generate a feeling of confidence within patients that they can learn and do the action. Being critical and demanding before the patient has learned the actions can undermine their confidence and your partnership with them.



Give praise at every visit.

Help Patients Remember Your Verbal and Written Communications

The way you communicate with patients will greatly affect how much they remember. Below are tips to help you shape your verbal and written communications so patients better remember them.

- **Limit the amount of information given** at any one time (e.g., do not give a patient extensive written material, unless the patient requests it. Do not teach peak flow monitoring and how to use an inhaler for the first time at the same visit, if possible).
- **Categorize information into three to five topics** and tell patients these categories before discussing the topics (e.g., “We will talk about three things today: (1) how to use a peak flow meter, (2) how to record your peak flow rate, and (3) how to interpret the numbers”).
- **Use terms that are familiar to the patient**, not medical jargon. Use analogies and illustrations relevant to the patient.
- **Be concrete and specific** (specify what to do, when to do it, and how).
- **Ask patients how they will remind themselves** to take the recommended action (e.g., put a sign on the refrigerator, do the action with another daily routine like brushing teeth or eating meals).
- **Repeat key points.** Ask patients to repeat key points and to tell family and friends what they have learned. Rehearsal and reinforcement (see four R’s on pages 14 and 15) are also important.

Help Patients Understand and Remember Written Information

The tips listed below are pertinent for all patients, but they are especially important for patients who cannot read well.

- **Provide simple, easy-to-read directions** for asthma management activities that require multiple steps. (See handouts in appendix D.)

- **Review the contents of the written material with patients** when you give materials to them. Do not give written information as a substitute for verbal instruction.
- **Highlight key points** by underlining, circling, or using a highlighting marker, preferably as you present the information to the patient. Highlighting key points can enable you to use published material that may be too complex, contains extraneous information, or has only a few sections that you want the patient to pay attention to.

See appendix C for more detailed information for conducting patient education at each clinic visit.

***Actions/Implications for Nurses:
Patient Education***

- **Focus on helping patients to decide on, plan, and take specific actions to control asthma.** Discuss the benefits, barriers, and detailed plans for doing each major asthma management activity.
- **Put in writing the Asthma Management Plan, other agreements, and instructions.** Always review and highlight key points in preprinted materials.
- **Assess patient needs, expectations, and satisfaction with their care at each visit** and



Always review written materials with patients.

make needed adjustments. Maintain the partnership with the patient.

- **Make asthma management as easy as possible for patients.** Adjust medication plans to fit the patients' schedule, keep recommended actions simple and clear, and limit the amount of information given at any one time. Ask about and discuss with patients anything that might interfere with their taking the actions.
 - **Teach and review asthma management actions with patients so they become confident and proficient** in doing them. Describe the action, demonstrate it, ask the patient to do it, and provide feedback to the patient.
 - **Repeat instructions and key points.** For example, ask patients to demonstrate their peak flow and metered-dose inhaler technique at every visit.
 - **Ask patients at the end of each visit to review what specific asthma management activities they plan to do. At followup visits, ask what patients did,** reinforce them for their effort, correct any problems, or discuss adjusting the regimen as needed.
-

WORKING WITH PATIENTS FROM DIFFERENT CULTURAL BACKGROUNDS

3

Every minority and nonminority group has unique characteristics based on common values, beliefs, practices, race, ethnicity, country of origin, and language. This section will introduce you to ways to develop partnerships for asthma care with patients from different cultural backgrounds and experiences. Table 5 provides a brief practical summary of this section.

America has a very diverse population with four major minority groups: African Americans, Hispanics/Latinos, Asians and Pacific Islanders, and American Indians and Alaska Natives. Asthma is more common and causes more deaths in African Americans than in the general population. Data on asthma are very limited or absent for minority groups other than African Americans; however, Puerto Rican and Cuban Americans appear to have higher prevalence of asthma than whites.

APPRECIATING INDIVIDUAL PATIENTS FROM DIVERSE GROUPS

Nurses need to acquire a basic understanding of their patients' culture and background and give the time and attention needed to ensure accurate and smooth communication. Patients will feel grateful for the attention, effort, and care given to them. In this way, cultural differences can be transformed from barriers into bridges to a strong partnership for asthma care.

Open-ended questions asked with genuine interest will help nurses learn about the patients' beliefs and practices as well as the community and cultural influences on them. This approach will enable nurses to provide appropriate care regardless of their knowledge of a patient's culture and background.

Within each ethnic or minority group, there is a wide diversity of people. Not all people who belong to a particular group believe or behave in the same way. Thus, even when nurses are familiar with a patient's culture and background, they need to get to know *each* individual patient.

TIPS FOR WORKING WITH PEOPLE FROM DIFFERENT CULTURAL BACKGROUNDS

The following tips will help you establish partnerships with patients who have cultural backgrounds different from your own.

- **Be polite, predictable, somewhat formal, and nonconfronting** with patients and their family members, especially at the first meeting. Treat everyone with deference and respect.



Nurses can treat patients from diverse backgrounds.

Table 5

A CHECKLIST FOR WORKING WITH PATIENTS FROM DIFFERENT BACKGROUNDS/CULTURES

Formal/Friendly Approach

- Use formal address (e.g., Mr., Mrs.) unless patient says otherwise.
- Convey respect and genuine interest in the patient.
- Ask open-ended questions to learn about patient.
- Be nonjudgmental.

Language Issues

- Assess ability to speak English.
- See if a family member can read and interpret for the patient.
- Provide educational materials in a language and reading level patients can read, if they can read. Show patients the key points in the material.

Family Involvement

- Identify who in the family will help the patient.
- Involve the family member in developing the treatment plan, if appropriate and the patient wants this.

Medical Practices

- Address immediate care needs and then help arrange longer term care (e.g., a primary care doctor, transportation, payment).
- Learn local/traditional medical beliefs and practices.
- Ask patients about “other” things they do for their asthma. Identify the use of traditional and home remedies.
- Accept/accommodate practices not harmful to patient’s asthma.

Community Resources

- Ask people in the community to interpret for patients, review materials, work as nurses’ aides, or obtain additional resources as needed.

- Use a formal address (Mr. Padilla, Ms. Washington, Mrs. Nguyen) unless told to do otherwise by the patient.
- Do not make assumptions; ask questions. Observe body language and be responsive.
- Realize that people from some cultures may not maintain eye contact with you. This does not necessarily indicate inattentiveness.
- **Assess patients’ ability to speak and understand English.** Make provisions for those who do not speak English well. (See below.) Language is certain to be more of a barrier for recently arrived and first-generation Hispanics/Latinos and Asians and Pacific Islanders.
 - Determine the language in which the patient is most comfortable reading and speaking.

- Learn, at minimum, how to greet non-English-speaking patients in their own language.
 - Use an interpreter, if needed (when bilingual staff members are not available). Find out whether family members who speak or read English can help.
 - Provide bilingual printed materials where needed. Remember that fluency in a language does not guarantee an ability to read in that language.
 - Use visual aids, especially when there are language problems.
- **Involve family members** when appropriate. In general, the most influential people for patients will be members of their immediate and extended family—including grandparents, parents, and children. In ethnic communities, family members are often the source of health-related information second only to the clinician. Individuals who are ill frequently consult family members and may ask them to come with the patients on their medical visits.
- Ask patients whether there is someone who can help them with specific activities (e.g., taking medicines as prescribed, getting to the doctor's office).
 - Make sure the waiting room can accommodate patients' families.
- Ask patients how their family responded to their diagnosis and treatment. Ask whether someone is telling them something different about their asthma than the doctor or nurse did. If there is conflicting information, reassure the patient, and offer to talk to the person.
- **Learn about and accommodate traditional health beliefs and practices relevant to your patients.** Some members of ethnic groups may use traditional medicines and healers (e.g., cuandero, herbalist, spiritualist, root workers) in combination with mainstream health services. Traditional medicine may significantly influence the patients' perception of symptoms, decision on when to seek medical care, and adherence to the asthma management plan. To ensure effective asthma treatment and control:
- Learn about the beliefs and practices of all patients and of the community where they reside. For example, visit the community and interact with the people; participate in cultural events in the area.
 - Assess how the beliefs, practices, and behaviors may interact with the patient's asthma management plan. If a practice is a real threat to the patient's control of asthma, inform the patient of this fact. Discuss options and then the patient will need to decide what to do.

TWO EXAMPLES OF TRADITIONAL HEALING PRACTICES

A traditional Asian form of healing is "coin rubbing," which is based on the belief that illness needs to be "drawn out" to restore balance in the body. Rubbing produces welts, making it appear that the illness has been brought to the surface. Nurses can ask patients about such welts and what they mean to them. For patients practicing coin rubbing, it may be useful to say that an inhaled bronchodilator can "draw out" the tightness in the chest and wheezing.

To give another example, some Hispanics/Latinos believe that health conditions are either hot or cold and that cold conditions should be treated with hot remedies and vice versa. Asthma is considered to be a cold condition. Thus, recommending that the asthma medications be taken with hot herbal teas may promote effective asthma management.

- Accommodate patient and family health beliefs and practices. Undermining traditional beliefs only leads to resistance and failure. Fitting new asthma information into the traditional medicine frame of reference is far more effective than trying to “educate” the traditional beliefs away.
- Integrate asthma information into the patient’s traditional beliefs, practices, and behaviors. See examples below.
- **Locate and use community resources.** Many ethnic and racial groups have strong and active community groups and churches that can be helpful to patients and nurses.
- Engage and use the services and resources of churches, community groups, and local agencies: social services and local sections of the American Lung Association, Asthma and Allergy Foundation of America, or Allergy and Asthma Network. Refer patients to support groups and summer camps organized in their communities.
- Recruit community volunteers to assist you in reviewing patient education materials and for interpreting.
- Develop referral lists of physicians with whom ethnic patients in your area would be comfortable (e.g., bilingual physicians).

WORKING WITH CHILDREN AND ADOLESCENTS

4

Specific tips are provided in this section to help nurses deal with the special needs of children at different developmental levels. The tips include such things as how nurses and parents can effectively use a nebulizer with infants and toddlers, when children are ready to do various self-management tasks, and ways to work with teenagers. How to detect and what to do during an asthma episode in infants, toddlers, and preschoolers are presented in table 6 and the box below.

INFANTS (0 TO 12 MONTHS)

Developmental task: trust versus mistrust. Trust is developed when a small number of caregivers meet

the infant's physical and emotional needs **predictably**. Trust and an environment that fosters physical and emotional comfort will make the infant more amenable to asthma management efforts.

Tips for Using a Nebulizer With Infants

Infants can get their medication by nebulizer or by metered-dose inhaler equipped with a spacer and a mask. Tips for using a nebulizer with infants are listed below.

- **Make the nebulizer treatment as pleasant an experience as possible for all.**

SELECTED TIPS FOR PREPARING PATIENTS TO CARE FOR AN ASTHMA EPISODE IN INFANTS, TODDLERS, AND PRESCHOOLERS

Preparation

- **Review the indicators** of an asthma episode listed in table 6 with the parent(s).
- **Instruct parents** in how to promptly give the prescribed medication, usually with a nebulizer.

Care During the Episode

- **Give the prescribed medication.**
- **Make the child comfortable.** For infants, adjust their position for maximum chest expansion. For toddlers, sitting up or laying down part way may make breathing easier.
- **Monitor need for fluids.** Infants may be given one-quarter of a cup or less of fluids per hour. The nipple can be enlarged for easy access. Toddlers may be given one-quarter to one-half of a cup of fluids, and preschoolers may be given one-half to one cup per hour. The liquids should be sipped slowly. Note: These actions are intended to prevent dehydration. Drinking very large quantities of water is not recommended.
- **Do not give the child food, drink, or medications that are not well tolerated.** Usually, the child should NOT drink hot or cold liquids, drink quickly, or eat solid foods. Teach the family which medications may irritate the stomach and how to take them, if necessary.

Table 6

INDICATORS OF PROBLEMS WITH ASTHMA IN INFANTS AND CHILDREN*					
Measure	Infants	Toddlers (1 to 3 years old)	Preschoolers (3 to 5 years old)	6 to 12 years old	12 to 17 years old
General responsiveness	Fussy, lethargic, unresponsive, irritable.	Lethargic, not active.	Does not respond normally to play or stimulation.	Can say how they feel but may be breathless.	Determine if behavior is different from usual.
Ability to eat, sleep, play	Stops feeding to breathe. Sleep altered by cough.	May refuse to eat or drink; may cough and vomit; sleep and play disrupted.	May stop eating solids, decrease fluid intake, vomit with coughing, or complain of stomachache.	Cannot keep up with others their age, absent from school due to asthma, avoids "gym," physical activity.	Poor appetite, broken sleep, or not involved with peers. History can tell if problems are asthma related.
Quality of voice	Shorter, softer cry.	Effort to breathe may affect voice.	Has trouble speaking several words together. May be hoarse or wheezy.	Cannot speak one or two full sentences without breathlessness.	Cannot speak one or two full sentences without breathlessness.
Respiratory symptoms	Cough increases, especially when lying down. May wheeze. Retractions may be evident.	Cough at night may indicate developing episode. Listen to parents for symptoms of past episodes.	Sits quietly, breathing hard, wheezing, or coughing. Have walk around and observe response.	Should be able to describe symptoms and what happened in past episodes.	If able, ask to walk or jog up corridor or stairs and observe response/symptoms.
Color	Pale to cyanotic.	Pale, dark circles under eyes, cyanotic.	Pale, dark circles under eyes, cyanotic.	Pale, dark circles under eyes, cyanotic.	Pale, dark circles under eyes, cyanotic.
Respiratory rate at sleep (approx.) indicating problems	>35 breaths per min.	>25 breaths per min.	>25 breaths per min.	>23 breaths per min. (for 6- to 8-year-olds)	>20 breaths per min.
Respiratory rate when awake (approx.) indicating problems	>85 breaths per min.	>46 breaths per min.	>41 breaths per min.	>23 breaths per min. (for 6- to 8-year-olds)	>20 breaths per min.
Heart rate, normal range-sleeping	80–200 beats per min.	70–120 beats per min.	60–110 beats per min.	60–90 beats per min.	50–90 beats per min.
Heart rate, normal range-awake	80–200 beats per min.	80–150 beats per min.	70–150 beats per min.	70–110 beats per min.	55–100 beats per min.

*NOTE: A comprehensive assessment of the child and clinical judgment are required in evaluating children. This table gives only *guidelines* for assessment. Also, parents may not know *all* the times their child had symptoms.

- **Identify what activities soothe the infant and when the infant is likely to accept treatments**—such as after meals, before naps, or at bedtime.
- **Minimize the noise from the nebulizer, if it bothers the infant.** Move the nebulizer farther away by attaching longer tubing (up to 20 feet), set the machine on a rug or towel, or play soft music near the infant.
- **Limit treatments to 10 minutes.**
- **Prop or seat the infant at an angle of 45 degrees or more.** Some nebulizers will not mist if the infant is lying down.

- **Don't use a mask strap**, which may feel too tight or restrictive. If the child will not tolerate a mask, **cup your hand** over the infant's nose to make a "hand mask," which may be better tolerated.
- **Remember that infants' skin tends to be sensitive.** Wash the infant's face after treatment or cover it with a barrier cream (such as a petroleum ointment) before treatment if the infant's face breaks out in a rash or becomes red.

TODDLERS (12 TO 36 MONTHS)

Developmental task: autonomy versus shame and doubt. Toddlers believe they are the "boss." Their favorite word is "no." Their body language and actions match. Their ability to make themselves understood is limited. Parents and care-givers must remember that when a toddler says no, it does not always mean no. It may mean yes, not right now, or I don't know. Nurses must work with the family to understand the unique personality traits of the toddler and to help the family participate in the partnership for asthma care.



Tips for Using a Nebulizer With Toddlers

- **Involve the toddler in pleasant experiences during and after treatment.** Select a special area and activity to take place only during treatments. Give the toddler a used mask setup to put on a favorite bear or doll. After the treatment, let the toddler choose a reward, such as brushing teeth (toddlers love water), having a snack (e.g., a favorite fruit), or watching a special television program.
- **Establish a treatment time in a way the toddler can understand.** Prepare the toddler by telling him or her that, for example, at the next commercial or when the timer goes off, it's time for the medicine. Tell the toddler that the treatment will last until the timer goes off again, the program ends, or the story is over.
- **For the toddler who will not tolerate sitting for the entire treatment:**
 - **Have the toddler take five to seven "practice" deep breaths using the nebulizer.** *If the treatments are a struggle and the child is not in distress, stop the treatment.* The treatment will not be finished, but a positive, cooperative environment will be established.
 - **Use a timer**, setting it for increasing lengths of time to help the toddler develop tolerance.
 - **Consider using a metered-dose inhaler with a spacer and face mask.** This may be a good alternative for the toddler who will take five to six breaths on command. A metered-dose inhaler with spacer and face mask has been shown to be as effective in delivering medication as a nebulizer.

Tips for Giving Oral Medications to Toddlers

- **Remember: The fact that an adult wants the toddler to take the medicine may be the very reason the toddler refuses.** Tell the toddler, "I'm giving you some medicine to help you breathe (feel) better." Assume the toddler will take the medicine and say, "Would you like a piece of fruit or juice after your medicine?"
- **Praise the toddler** for efforts to take the medicine.
- **Taste the medicine yourself.** Disguise the medicine as necessary in a small amount of strong but good-tasting food (such as plums), but do not mix the medicine with a meal or in a whole glass of liquid. Have the toddler suck a lollipop or brush his or her teeth before taking

the medicine to minimize the taste; but *never* call the medicine candy.

Tips for Preparing the Toddler To Use Peak Flow Meters and Metered-Dose Inhalers

Have the toddler practice “blowing out” with party favors (preparation for peak flow meter) and “breathing in slowly” with straws (preparation for metered-dose inhaler). Use the same words to reinforce a job well done. Call the toddler’s lungs “air balloons” to help the toddler understand “in and out.” Do *not* teach the use of a peak flow meter and an inhaler at the same time. Teach the proper use of the inhaler first.

PRESCHOOL CHILDREN (3 TO 5 YEARS)

Developmental task: initiative versus guilt.

Preschool children are moving into a larger social environment and beginning new activities. They are verbal and can participate in their care, although reasoning is rudimentary, problem solving is intuitive rather than logical, and thinking remains egocentric. Nurses must also help families recognize that the preschooler needs to, wants to, and has to have opportunities to act independently.



Keep lines of communication open so problems can be identified and solved. Children as young as 4 may be aware of their “difference” due to asthma, and their behavior may reflect this—not wanting to take medicine, play outside, sleep. At each visit, ask parents about their children’s activities and provide support or solutions to help children

with things that may be difficult for them to do consistently. Help parents understand the unique personality traits and capabilities of their preschool child in encouraging the partnership for asthma care.

Preschool children often ask questions about asthma and their medication (e.g., “Why do I have to take medicine?”) but need only basic answers (e.g., “to help you with your cough,” “to help you breathe”). The concepts of lungs, mucus, and airways are difficult for a preschool child to understand.

Begin teaching about what makes the child’s asthma worse and how to avoid or manage exposures. Preschool children may, for the first time, spend much of their time outside the home and encounter such triggers as smoke, pets, chalk dust, and upper respiratory infections. Asthma episodes may increase. The goal is to avoid or manage exposures to prevent such episodes.

Tips for Training Preschoolers To Use Inhalers and Peak Flow Meters

Preschool children are becoming better able to use peak flow meters and metered-dose inhalers with spacers. Once preschool children are approximately 3 feet tall, the standard charts of predicted peak flow rates can be used. Once the child can reliably use the peak flow meter, an objective personal best can be established. (See patient handout in appendix D.)

First, train preschoolers to use an inhaler with a spacer. After 1 to 2 months, train them to use a peak flow meter. It is too confusing for the child to learn both techniques at the same time. Ensure that the preschool child has adequate time to learn the new techniques and receive adequate medication by doing the following:

- **Give just the midday treatment with the inhaler when starting the training.** Continue with morning and evening nebulizer treatments.
- **After 1 to 2 weeks, change completely to an inhaler—if asthma symptoms are well controlled day and night.**

- Young children can learn how to use a peak flow meter by blowing into a party favor and making it unroll and make noise.
- **Use a sticker chart for reinforcement for using the inhaler and/or peak flow meter.** Preschool children love stickers and like being able to select one to put on their own chart after each treatment. Additional reinforcement can be given at the end of a particular time period (such as every week).

SCHOOL-AGE CHILDREN (6 TO 12 YEARS)

Developmental task: industry versus inferiority.

The major task of the school-age child is to learn and achieve independence. A school-age child is inquisitive, engaging, conscious of peers, influenced by adults other than parents, and involved in outside-the-home activities. In addition, positive reinforcement for reaching physical potential and emphasizing other strengths are valuable in the child's development.



The many issues that arise from the school-age child's separation from parents require sensitivity. Nurses need to help families understand the school-age child's need for independence and foster the child's ability for self-care within the partnership for asthma management.

To assist the school-age child with asthma, it is important to:

- **Start preparing the child for independent self-care.** Depending on the child's comfort level, begin seeing the child alone at the start of a visit. (Explain to parents why their child is being seen alone before doing so.) Discuss the goals of asthma management and the treatment plan. Then have the parent come into the room and have the child explain or help you explain the key points. This helps establish rapport and tells children that they are "grown up," taken seriously, and responsible for the care of their asthma. Having parents observe such attention increases their confidence in the child's ability to master self-care.
- **Work with school-age children so they can manage their asthma episodes.** Ask about and discuss signs and symptoms the child has before and during an asthma episode. (See table 6.) Actively involve the child in deciding what to do. Explain when the child should contact parents, nurses, doctors, and/or other helpful adults.
- **Address the four components of asthma management.** (See section 2, "Practical Guide to Asthma Management," for details.)
 - **Peak flow monitoring.** Check children's peak flow meter techniques often and review their peak flow diary, if used, at each visit.
 - **Environmental control.** Make sure school-age children recognize their asthma triggers and that appropriate actions are being taken to control them. When episodes occur, help children identify what set off the episode and what they could do differently next time to prevent an episode.

- **Medications.** Assess whether children know the difference between their medications, when to take them, how to take them, and the possible side effects.
- **Patient education.** In addition to the issues listed above, assess children's understanding of asthma and clarify any fears or misconceptions. At each visit, ask children to demonstrate their inhaler technique and ask when they are taking their medications. Devise ways with the child and parents to remind them to take the medication at the times prescribed.
- **Evaluate whether the child is taking his or her medication appropriately** by asking the child and parents separately about how often and how much is taken. If adherence with the treatment plan is a problem, suggest that the child (or the parents) monitor the medication taking by keeping a medication diary. Reinforce adherence to the regimen.
- **Tell school-age children that they can or will be able to participate in activities other children their age do, when their asthma is properly managed.** Let children with asthma know that some Olympic athletes have asthma. Put a poster of these athletes in your office. (Order poster #NN504 from NAEPP. See page 35 for address.)
- **Encourage parents to be advocates for the child at school.** One of the goals of therapy for a school-age child with asthma is to achieve full participation in all school activities, including sports. A team meeting with parents and school personnel may help to delineate rules for school attendance and special needs for tutorial or physical education programs. Plans for handling asthma episodes at school also need to be developed and written.
- **Encourage the school-age child to attend a local asthma camp.** Call the local American Lung Association affiliate to find local camps.

ADOLESCENTS (13 TO 17 YEARS)

Developmental task: identity and intimacy versus confusion and isolation. The process of identity formation begins in early adolescence when the individual's interest is focused on peer group activity. The peer group defines acceptable and unacceptable behavior and through the peer group, adolescents try to demonstrate they are "doing their own thing." Authority in general may be viewed with skepticism. Adolescents tend to be self-conscious, believing that other people are constantly evaluating their appearance and behavior.



Adolescents receiving proper care usually proceed through their adolescent years with only minor problems due to asthma. However, some adolescents with asthma may rebel against all constraints and refuse medication and treatment.

Nurses must work together and individually with adolescents and parents to promote the partnership for asthma care. Be careful not to get caught in the middle between a parent and an adolescent who are not communicating.

Tips for Getting Adolescents' Attention and Building a Partnership

- **Talk to adolescents as adults.**
- **Find out from the adolescent how asthma has affected his or her activities.**

- **Review management of episodes at each visit. Ask about asthma episodes and symptoms that occurred since the last visit and the actions taken to control them.**
- **Focus on immediate benefits and consequences.**
- **Help the adolescent to be responsible and successful in keeping his or her asthma under control. Follow the patient education recommendations in this guide and treat adolescents as adults.**
- **Involve parents in the care while maintaining the focus on the adolescent.**

Tips for Identifying Problems and Negotiating the Asthma Management Plan

- **Conduct well-planned nursing assessment interviews with adolescents.** (See appendix C, for example.) Absence from school and sports and peer issues also can be assessed.
- **Negotiate an agreement with the patient using the Asthma Management Plan (see handout in appendix D) as a guide.**
- **Make sure adolescents have immediate access to their medications. Contact the school about medication policy, if needed.**
- **Refer adolescents who continue to have problems** managing their asthma to self-management programs and support groups, especially those with other adolescents.

WORKING WITH ADULTS AT DIFFERENT AGES

In this section, issues related to all adults with asthma will be presented first. Then issues relevant to younger and older adults will be addressed briefly.

TIPS FOR WORKING WITH ADULTS

In teaching and communicating with adults of all ages, remember these principles of adult learning:

- Adults *want* to learn when they experience needs that can be satisfied through learning. Stimulate the desire to learn through patients' desire for the benefits of having their asthma under control (e.g., able to exercise, not miss work or school, sleep through the night, feel good).
- Adult orientation to learning is life centered. Solve asthma care problems in terms of effect on lifestyle.
- Experience is the richest resource for adult learning. Build on the asthma patient's experience. Discuss, use case studies, act out situations.
- Adults have a deep need to be self-directing or independent. Actively involve adults in developing their own asthma care plans.

Issues To Address With All Adults With

Asthma. For all adults with asthma, nurses should assess whether the patient is meeting the goals of asthma management and review and reevaluate the written plan of care based on the four components of asthma management. (See section 2, page 4 for details.)

- **Peak flow monitoring.** Review patients' peak flow meter technique and their PEFr diary. Discuss how they use their PEFrs.

- **Environmental control.** Ask patients about things that make their asthma worse and what they do to avoid or reduce exposure.
- **Medications.** Make sure the patient knows about his or her medications, when to take them, how to take them, and their possible side effects. Have patients show you their technique with the metered-dose inhaler, spacer, and/or nebulizer.
- **Patient education.** In addition to the issues listed above, assess patients' execution of their asthma management plans. Reach agreement on needed actions, rehearse, repeat, and reinforce.

SPECIAL CONSIDERATIONS FOR YOUNG ADULTS

- **Pregnancy issues.** Asthma control is particularly important. An adequate supply of oxygen for the fetus must be maintained. The risks of uncontrolled asthma to the pregnant patient



and her fetus are far more dangerous than the risks from the medications to control asthma. (See the National Asthma Education and Prevention Program publication “Executive Summary: Management of Asthma During Pregnancy” on page 35.)

- **Issues surrounding the inheritability of asthma.** The tendency to develop allergies is inherited. Allergies increase the chances of developing asthma.

SPECIAL CONSIDERATIONS FOR OLDER ADULTS (AGE 65 AND OVER)

Older adults with asthma have decreased maximum breathing capacity, vital capacity, inspiratory reserve volume, and oxygen-diffusing capacity. Older adults may also be affected by normal physiologic changes in other body systems (such as vision loss and decreases in gastrointestinal absorption and muscle strength) and by coexisting diseases (such as stroke, arthritis, and chronic obstructive pulmonary disease).

To be responsive to older adults, nurses need to do the following:

- **Be sensitive and accommodating to neurologic changes** (such as slowed or altered sensory responses, memory loss, decreased sense of balance and fine motor movement, and hearing and vision losses). Nurses can be responsive to

these changes in a variety of ways, including the following:

- Make sure treatment plans are as simple as possible.
 - Use short written explanations with simple graphics.
 - Provide instructions for medications in larger typeface and use color-coded peak flow meter diaries.
 - Speak in a low-pitched voice with adequate volume for the patient to hear easily.
 - Increase lighting levels.
 - Have the patient read and then repeat instructions.
 - Allow time for both demonstration and redemonstration of inhaler and peak flow meter techniques.
- **Monitor the use of nonasthma medications** such as beta blockers, aspirin, and nonsteroidal anti-inflammatory drugs (NSAIDs) that can cause asthma episodes.
 - **Identify and be responsive to psychosocial changes** such as disruptions in lifestyle caused by loss of spouse, loss of family members and friends, loss of financial independence, and retirement.

SPECIAL CONSIDERATIONS FOR SURGERY AND GASTROESOPHAGEAL REFLUX PATIENTS

SURGERY

Patients with asthma who must undergo surgery are predisposed to intraoperative and postoperative respiratory complications. Prior to any surgery, a complete assessment of the patient must be made, and the patient's lung function optimized. Techniques are described in the section on surgery and asthma in the NAEPP *Guidelines for the Diagnosis and Management of Asthma*. (See NAEPP materials, page 35.)

GASTROESOPHAGEAL REFLUX

A significant proportion of patients with asthma experience gastroesophageal reflux—the return of stomach contents into the esophagus. Reflux may increase asthma symptoms, and reflux may occur at any age. However, the extent to which gastroesophageal reflux contributes to asthma symptoms is controversial.

Symptoms of gastroesophageal reflux in older children or adults include belching, heartburn, and nighttime asthma episodes that do not respond to

therapy. Symptoms in infants and young children include excessive belching, burping, spitting up, and fussiness.

The medical management of gastroesophageal reflux includes:

- Not eating or drinking for 3 hours before retiring—or before lying down, for example, on the floor or couch to watch television.
- Elevating the head of the bed 6 to 8 inches (blocks of wood can be used). Keep infants upright.
- H₂ receptor antagonists (such as cimetidine, ranitidine, famotidine).

If the patient is taking theophylline, which decreases lower esophageal sphincter pressure, the clinician may consider switching to other medications or try reducing the serum theophylline level to under 10 µg/mL. The clinician may also refer the patient to a gastroenterologist.

RESOURCES TO MEET PATIENTS' NEEDS

Nurses need to emphasize to patients with asthma that when asthma is under control and when triggers are eliminated or lessened in the environment, the costs of asthma are also lessened.

FINANCIAL ASSISTANCE

Options for financing health care for asthma include health insurance, government-sponsored programs, and services furnished by voluntary organizations. Patients and their families may also find assistance—or prices better matching their income level—through contacting:

- The office of social services in the medical facility where the asthma patient is receiving treatment or care.
- The primary care or health care provider.
- The agent or claims representative of their health insurance company.
- The billing department for a specific health care provider or medical facility.
- Their State department of health and welfare.

Health Insurance

Many patients and their families have health insurance through employers or as individuals. Patients need to know what is covered, if asthma is a preexisting condition excluded from coverage, and if any preapprovals are needed. Issues that nurses may need to explore with patients include the following:

- A nebulizer costs \$__ in this area. Will your insurance cover this cost?

- This medication costs \$__. Do you have to pay for it? Do you have to pay up front and get reimbursed? Does it cost less at a wholesale pharmacy? Do you need to send away for your prescription medications?
- Do you have to contact your primary health care provider before you make clinician appointments? Arrange for lab work or x-rays? Go to the emergency department?

In addition, see if your patients can be enrolled into asthma case management programs offered by some preferred provider organizations and other insurers.

Government-Sponsored Programs

The Federal and State government programs that provide financial assistance for asthma care (including medications and equipment) include:

- Medicare.
- Medicaid.
- Hill-Burton Program.
- Department of Veterans Affairs (VA).
- Civilian Health and Medical Programs of the Uniformed Services (CHAMPUS).
- Children with special needs programs.
- Pharmacy assistance programs.

Voluntary Organizations Assistance

Service and community organizations often provide assistance, although not necessarily direct financial aid. Among these organizations (most of which are listed under "Social Service Organizations" in the

yellow pages directory) are the Salvation Army, United Way, Lutheran Social Services, Jewish Social Services, and Associated Catholic Charities as well as local churches, synagogues, and professional women's organizations. The Kiwanis, Knights of Columbus, Elks, and Moose lodges may also be helpful, particularly if a family member belongs to the organization.

Health Care and Equipment Providers

Health care professionals are aware of the economic burden of asthma care and may be able to devise ways to reduce costs or extend payments over a longer period of time. In addition, local medical schools may provide free or low-cost care.

Patients with asthma and their families may need to apply for financial aid. They may need to explain their financial situation to, for example, a hospital's business office or social work department, the physician, or an equipment company. Sliding scales for payments based on income and need—for which the patient or family must ask consideration—may be available.

Actions/Implications for Nurses:

- Be familiar with the real costs of asthma care to patients in your community, including costs of asthma medicines, equipment, and equipment rentals.
 - Encourage patients and parents to express any concerns about the financing of asthma care.
 - Be aware of community resources to help meet the financial needs of asthma patients. These may include drug programs for people with low income, social services, State and local health departments, and voluntary organizations.
 - Be familiar with the coverage of asthma care that various health insurance policies and government-sponsored programs provide *before* a treatment plan is worked out with the patient.
-

SOURCES OF ASTHMA INFORMATION AND MATERIALS

SOURCES OF PATIENT EDUCATION MATERIALS AND AIDS FOR NURSES

Inclusion in this list does not indicate endorsement by the National Heart, Lung, and Blood Institute. Information was accurate at the time of printing.

- **American Academy of Allergy, Asthma, and Immunology**, 611 East Wells Street, Milwaukee, WI 53202 (414-272-6071) (www.aaaai.org).
- **American College of Allergy, Asthma, and Immunology**, 85 West Algonquin Rd., Suite 550, Arlington Heights, IL 60005 (847-427-1200) (www.allergy.mcg.edu).
- **American Lung Association (ALA)**. Use the telephone directory to find your local ALA affiliate. If you need assistance in finding the affiliate nearest to you, contact the national office at: 1740 Broadway, New York, NY 10019 (800-LUNGUSA) (www.lungusa.org).
- **Allergy and Asthma Network/Mothers of Asthmatics, Inc.**, 2751 Prosperity Avenue, Suite 150, Fairfax, VA 22031-4397 (800-878-4403) (www.aanma.org).
- **Asthma and Allergy Foundation of America (AAFA)**, 1125 15th Street, N.W., Suite 502, Washington, DC 20005 (800-7-ASTHMA) (www.aafa.org).
- **National Asthma Education and Prevention Program**, National Heart, Lung, and Blood Institute (NHLBI) Information Center, P.O. Box 30105, Bethesda, MD 20824-0105 (www.nhlbi.nih.gov).
- **National Jewish Medical and Research Center**, 1400 Jackson Street, Denver, CO 80206 (800-222-LUNG) (www.njc.org). (Provides care for very severe asthma patients and operates an information service staffed by nurses.)
- **State Medicaid Directors Association**, Affiliate of the American Public Welfare Association, 810 First Street, N.E., Suite 500, Washington, DC 20002-4205 (202-682-0100) (<http://medicaid.apwa.org>). (Note: Maintains a directory that lists State Medicaid directors.)
- **National Association of Insurance Commissioners**, 120 West 12th Street, Suite 1100, Kansas City, MO 64105 (816-842-3600) (www.naic.org). (Note: Maintains a directory that lists State insurance commissioners. The State commissioners regulate insurance sold in their State.)

SELECTED RESOURCE PUBLICATIONS

- **Children With Asthma**, by T.F. Plaut, M.D.
Available from: Pedipress, 125 Red Gate Lane, Amherst, MA 01002 (800-611-6081) (www.pedipress.com). A paperback guide.
- **One-Minute Asthma—What You Need To Know** (also available in Spanish), by T.F. Plaut, M.D.
Available from: Pedipress, 125 Red Gate Lane, Amherst, MA 01002 (800-611-6081) (www.pedipress.com).
- **Peak Flow Meters: A Thermometer for Asthma**.
Available from: American Academy of Allergy, Asthma and Immunology, 611 East Wells Street, Milwaukee, WI 53202 (414-272-6071) (www.aaaai.org).
- **Standardization of Spirometry—1994 Update—** Recommendations on how to do spirometry.
Available from: American Thoracic Society, 1740 Broadway, New York, NY 10019 (212-315-8700) (www.thoracic.org).

- **Asthma Care and Patient Education: The Nurses Role.** **Available from:** Asthma and Allergy Foundation of America, Suite 502, 1125 15th Street, N.W., Washington, DC 20005 (www.aafa.org). **OUT OF PRINT JANUARY 1999**
 - **You Can Control Asthma**—Easy-to-read material for children. **Available from:** Asthma and Allergy Foundation of America, Suite 502, 1125 15th Street, N.W., Washington, DC 20005 (800-7-ASTHMA) (www.aafa.org).
 - **Your Child and Asthma.** **Available from:** National Jewish Medical and Research Center, 1400 Jackson Street, Denver, CO 80206 (800-222-LUNG) (www.njc.org).
 - **Open Airways For Schools**—A school-based asthma health education program for children with asthma. **Available from:** Local affiliates of the American Lung Association, 1740 Broadway, New York, NY 10019 (800-LUNGUSA) (www.lungusa.org).
 - **Health Care Financing: A Guide for Families** (1988), by Julianne Beckett. **Available from:** National Maternal and Child Health Resource Center, College of Law/University of Iowa, Iowa City, IA 52232 (319-335-9073). **OUT OF PRINT JANUARY 1999**
 - **Understanding Your Health Insurance Options,** by Margaret McManus. **Available from:** Association for the Care of Children's Health, 7910 Woodmont Avenue, Suite 300, Bethesda, MD 20814, (301-654-6549). **OUT OF PRINT JANUARY 1999**
 - **Title XIX State Agency and HCFA Regional Office Directory** (1987). **For patients and nurses:** This free directory defines all Medicaid and Federal health finances in their various programs. **Available from:** Office of Intergovernmental Affairs, HCFA (Health Care Financing Administration), Room 403-B, Hubert H. Humphrey Building, 200 Independence Avenue, S.W., Washington, DC 20201. **OUT OF PRINT JANUARY 1999**
 - **Parent advocacy groups**—Listed yearly in *Exceptional Parent Magazine* or with the National Information Center for Children and Youth With Disabilities, P.O. Box 1492, Washington, DC 20013-1492 (800-695-0285) (www.nichcy.org).
- NAEPP MATERIALS**
- The following publications are available from the National Asthma Education and Prevention Program (NHLBI Information Center, P.O. Box 30105, Bethesda, MD 20824-0105) (www.nhlbi.nih.gov).
- **Practical Guide for the Diagnosis and Management of Asthma** (1997) (60 pages).
 - **The Role of the Pharmacist in Improving Asthma Care** (1995)—This guide details six specific ways a pharmacist can increase patients' understanding of asthma and its treatment (10 pages).
 - **Teach Your Patients About Asthma: A Clinician's Guide** (1992)—Patient education guide that includes teaching notes and patient handouts (98 pages).
 - **Facts About Controlling Your Asthma** (1997)—An overview of asthma (also available in Spanish) (12 pages).
 - **Your Asthma Can Be Controlled: Expect Nothing Less** (1992)—A pamphlet for patients with asthma (20 pages).
 - **Asthma and Physical Activity in the School** (1995)—For teachers and coaches who want to help students with asthma participate in sports and physical activities (18 pages).
 - **Making a Difference...Asthma Management in the School** (1994)—A 13-minute videotape designed to improve understanding and management of asthma in school settings.
 - **Asthma Awareness Curriculum for Elementary School** (1993)—Two 30-minute lessons help students understand and accept classmates who have asthma.
 - **Managing Asthma: A Guide for Schools** (1991) (17 pages).

APPENDIX A

DOSAGES AND SIDE EFFECTS OF MEDICATIONS FOR CHRONIC ASTHMA

Anti-inflammatory medications. Anti-inflammatory medications prevent swelling and narrowing of the airways. To effectively manage chronic asthma, these medications need to be taken every day whether asthma symptoms are present or not.

Medication	Dosage	Side Effects	Comments/Tips
Nonsteroidal Anti-inflammatory Medications Cromolyn sodium	<i>Metered-dose inhaler</i> 2 puffs bid-qid <i>Nebulizer solution</i> 1 ampule (20 mg) bid-qid	Rare. Cough or throat irritation	<p>Comments Used to prevent asthma symptoms and episodes.</p> <p>Need to use for 4 to 6 weeks to determine if there will be a positive effect.</p> <p>Can be taken 5 to 60 minutes before exercise or contact with asthma trigger to prevent symptoms. Effects last 3 or 4 hours.</p> <p>Will not provide immediate relief of symptoms during an asthma episode. During an episode, patients should use a bronchodilator first but also continue their regular schedule of cromolyn.</p> <p>Tips Drink water before and after use to avoid dry cough. The canister holding the medicine should not be put in water.</p>
Nedocromil sodium	2 puffs bid-qid	Rare. Headaches, nausea, vomiting, cough, unpleasant taste	<p>Comments Used to prevent asthma symptoms and episodes.</p> <p>Recommended for adults and children 12 years or older.</p> <p>Will not provide immediate relief of symptoms during an asthma episode. During an episode, patients should use a bronchodilator first but also continue their regular schedule of nedocromil.</p> <p>Tips Rinse the mouth with water or brush teeth after use to decrease unpleasant taste. Canister should not be put in water.</p>



Medication	Dosage	Side Effects	Comments/Tips
<p>Steroidal Anti-inflammatory Medications</p> <p>Inhaled corticosteroids</p>	<p>Children <i>Moderate–Severe</i> 2–4 puffs bid–qid (168–672 mcg)</p> <p>Adults <i>Moderate Asthma</i> 2–4 puffs bid (168–336 mcg)</p> <p>Adults <i>Severe Asthma</i> 2–6 puffs bid–qid (168–1,008 mcg)</p>	<p>Throat irritation, yeast infection in the mouth, occasional cough, difficulty or pain in speaking</p>	<p>Comments Used to prevent asthma symptoms and episodes.</p> <p>Children as young as 3 years of age can use inhaled corticosteroids if a holding chamber or spacer device is attached to the inhaler.</p> <p>Children with moderate asthma are usually given an initial trial of cromolyn sodium. Then inhaled steroids are introduced, if needed.</p> <p>Concentration per inhalation varies: beclomethasone—42 mcg/puff; triamcinolone—100 mcg/puff; flunisolide—250 mcg/puff.</p> <p>The number of puffs per dose presented here is taken from the NAEPP Guidelines. These doses were considered to be illustrative and they referred to beclomethasone. In the absence of complete data, the same dosage in micrograms may be applied to other inhaled steroid formulations—triamcinolone and flunisolide. However, you may see prescribed dosages in micrograms that vary across different inhaled steroid preparations. This may be due to the fact that the studies that established the efficacy and safety of these preparations, to date, have used different microgram dosages.</p> <p>Corticosteroids are not the same as anabolic steroids, which are used illicitly by some athletes. Corticosteroids are relatively safe when used as prescribed.</p> <p>Tips Use a spacer device and rinse the mouth after taking the medicine.</p> <p>Treat yeast infections with antifungal therapy.</p>

Medication	Dosage	Side Effects	Comments/Tips
Oral corticosteroids	<p>Children <i>Severe Asthma</i> Less than 5 years old 5-10 mg alternate days decrease to lowest dose that stabilizes symptoms and peak flow</p> <p>Over 5 years old Use the lowest alternate a.m. dose that stabilizes symptoms and peak flow</p> <p>Adults <i>Severe Asthma</i> Burst for active symptoms (40 mg a day, single or divided dose, for 1 week, then tapered for 1 week)</p>	<p><i>Short term:</i> increased appetite, fluid retention, weight gain, swelling of face, changes in mood, high blood pressure, peptic ulcer, aseptic necrosis of the hip, abnormalities of glucose metabolism</p> <p><i>Long term:</i> thinning of the bones (osteoporosis), high blood pressure, Cushing's syndrome, cataracts, muscle weakness, fragile skin, petechiae, peptic ulcer, aseptic necrosis of the hip, abnormalities of glucose metabolism, impairment of the immune system, potassium loss, hypothalamic-pituitary suppression, slower growth in children, changes in mood</p>	<p>Comments Use in short bursts to help patients control and recover from severe asthma episodes. May only be needed for a few days.</p> <p>Use for a prolonged period of time only if a patient's asthma is very severe. Monitor long-term side effects.</p> <p>During prolonged use, side effects may be minimized by a single a.m. dose given on alternate days.</p> <p>Goal is to switch to inhaled corticosteroids ultimately.</p> <p>Tips Take with food to avoid stomach irritation.</p> <p>For long courses of therapy, side effects may be minimized by a single a.m. dose given on alternate days.</p> <p>Have long-term use assessed frequently with an optimal goal of switching to inhaled corticosteroids.</p> <p>Monitor children's growth patterns.</p> <p>Have ophthalmology exams every 1 to 2 years with long-term use.</p>

Bronchodilator medications open up the airways.

Medication	Dosage	Side Effects	Comments/Tips
Short-acting inhaled beta ₂ -agonists	<p>Children <i>Metered-dose inhaler</i> (e.g., albuterol, metaproterenol, bitolterol, terbutaline, pirbuterol) 2 puffs every 4–6 hours PRN</p> <p><i>Dry powder inhaler</i> 1 capsule every 4–6 hours PRN</p> <p><i>Nebulizer solution</i> Albuterol 5 mg/mL; 0.1–0.15 mg/kg in 2 cc of saline every 4–6 hours (maximum 5.0 mg)</p> <p>Metaproterenol 50 mg/mL; 0.25–0.50 mg/kg in 2 cc of saline every 4–6 hours (maximum 15.0 mg)</p> <p>Adults <i>Metered-dose inhaler</i> (e.g., albuterol, metaproterenol, bitolterol, terbutaline, pirbuterol) 2 puffs every 4–6 hours PRN</p> <p><i>Dry powder inhaler</i> 1 capsule every 4–6 hours PRN</p> <p><i>Nebulizer solution</i> Albuterol, bitolterol, metaproterenol (see package insert)</p>	Nervousness, tremor, anxiety, nausea, rapid heart rate, headache, dizziness, vomiting	<p>Use episodically to treat and control asthma symptoms and episodes.</p> <p>Works within 5 to 15 minutes and lasts 4 to 6 hours.</p> <p>Can be taken before exercise or contact with asthma trigger to prevent symptoms.</p> <p>A holding chamber or spacer device attached to an inhaler makes the inhaler easier to use by ALL patients.</p> <p>In particular, use a nebulizer with children under age 5, patients who have trouble using an inhaler, and patients with severe asthma episodes.</p> <p>Nebulizer solution of bitolterol is not recommended for children under 12 years of age.</p>

Medication	Dosage	Side Effects	Comments/Tips
Long-acting inhaled beta ₂ -agonists	Salmeterol (NAEPP has no dosage recommendation at this time.)	Nervousness, tremor, anxiety, nausea, rapid heart rate, headache, dizziness, vomiting	<p>A relatively new medication that the NAEPP has not reviewed to clearly define its role in asthma therapy.</p> <p>Added to the regimen when inhaled corticosteroids are not sufficient to control symptoms. Used to help prevent asthma symptoms and episodes.</p> <p>Generally, should not be used more than twice a day.</p> <p>Not for the immediate relief of symptoms during an asthma episode. During an episode, patients should use a short-acting beta₂-agonist but also continue their regular schedule of salmeterol.</p> <p>Recommended for adults and children 12 years of age and older.</p>
Oral beta ₂ -agonists	<p>Children</p> <p>Liquid albuterol 0.1–0.15 mg/kg every 4–6 hours</p> <p>Liquid metaproterenol 0.3–0.5 mg/kg every 4–6 hours</p> <p>Tablet albuterol 2 or 4 mg tablet every 4–6 hours; 4 mg extended-release tablet every 12 hours</p> <p>Tablet metaproterenol 10 or 20 mg tablet every 4–6 hours</p> <p>Tablet terbutaline 2.5 or 5.0 mg tablet every 4–6 hours</p> <p>Adults</p> <p>Albuterol 4 or 8 mg extended-release tablet every 12 hours</p>	Nervousness, tremor, anxiety, nausea, rapid heart rate, headache, dizziness, vomiting	<p>Comments</p> <p>Begins to work within 30 minutes and lasts as long as 4 to 6 hours. Inhaled beta₂-agonists are faster acting and preferred for treating acute episodes.</p> <p>Long-acting oral beta₂-agonists are helpful for nocturnal asthma symptoms.</p> <p>Tips</p> <p>Inhaled beta₂-agonists have fewer side effects than liquids or tablets.</p>

Medication	Dosage	Side Effects	Comments/Tips
Theophylline	Liquid, tablets, capsules, and extended-release dosage to achieve serum concentration of 5–15 µg/mL Pregnant Women Dosage to achieve serum concentration of 8–12 µg/mL	Nausea, vomiting, stomach cramps, diarrhea, headache, muscle cramps, rapid or irregular heart beat, irritability, restlessness, increased urination, seizure, coma	<p>Comments Sustained-release theophylline is helpful for nocturnal asthma symptoms.</p> <p>Preferred time for once daily dosage is 6–7 p.m.</p> <p>Doses should not be increased or other brands substituted without consulting the doctor.</p> <p>Theophylline blood levels are monitored to make sure concentrations are not too high. A simple blood test may be performed 3 to 4 days after starting and at 6- to 12-month intervals.</p> <p>Tips Advise physician of changes in concomitant medicines. Theophylline levels are affected by antibiotics (e.g., erythromycin), phenytoin, cimetidine, and other medications. Having a fever, influenza, impaired liver or kidney function, and other conditions can also affect theophylline serum levels.</p> <p>Take with food to avoid stomach irritation.</p> <p>Refrain from chewing tablets or mixing theophylline with hot food to avoid releasing too much medicine into the body at one time.</p>
Anticholinergics			<p>Benefits of use in the day-to-day management of asthma have not been established.</p> <p>Some report of incremental benefits when used in nebulized form with nebulized beta₂-agonists to treat severe asthma episodes.</p>

APPENDIX B

DOSAGES FOR ACUTE EXACERBATIONS OF ASTHMA

Medications	Dosage	
Inhaled beta ₂ -agonists	Children <i>Metered-dose inhaler</i>	
	Albuterol	2 puffs every 5 minutes for a total of 12 puffs (Use PEF _R or FEV ₁ to document response.) If not improved, switch to nebulizer. If improved, decrease to 4 puffs every hour.
	Metaproterenol	2 inhalations
	Terbutaline	2 puffs every 5 minutes for a total of 12 puffs
	<i>Nebulizer solution</i>	
	Albuterol	0.1–0.15 mg/kg/dose up to 5 mg every 20 minutes for 1–2 hours (minimum dose 1.25 mg/dose) If improved, decrease to 1–2 hours. If not improved, use by continuous inhalation.
	Metaproterenol	0.1–0.3 cc (5–15 mg) Do not exceed 15 mg.
	Adults <i>Nebulizer solution</i> (dilute solutions with 2–3 cc normal saline)	
	Albuterol	2.5 mg (0.5 cc of a 0.5% solution)
	Metaproterenol	15 mg (0.3 cc of a 5% solution)
	Isoetharine	5 mg (0.5 cc of a 1% solution)
Systemic beta-agonists	Children	
	Epinephrine HCl	0.01 mg/kg up to 0.3 mg s.q. every 20 minutes for 3 doses
	Terbutaline	0.01 mg/kg up to 0.3 mg s.q. every 2–6 hours as needed 10 µg/kg IV over 10 minutes loading dose Maintenance: 0.4 µg/kg/min. Increase as necessary by 0.2 µg/kg/min and expect to use 3–6 µg/kg/min.
	Adults	
	Epinephrine	0.3 mg subcutaneous
	Terbutaline	0.25 mg subcutaneous

B

Medications	Dosage
Corticosteroids	<p>Children</p> <p><i>Outpatients</i> Oral prednisone, prednisolone, or methylprednisolone 1–2 mg/kg/day in single or divided doses</p> <p><i>Emergency Department or Hospitalized Patients (IV or P.O.)</i> Methylprednisolone (IV or P.O.) 1–2 mg/kg/dose every 6 hours for 24 hours, then 1–2 mg/kg/day in divided doses every 8–12 hours</p> <p>Adults</p> <p><i>Intravenous</i> Methylprednisolone 60–80 mg IV bolus every 6–8 hours</p> <p>Hydrocortisone 2.0 mg/kg IV bolus every 4 hours, or 2.0 mg/kg IV bolus, then 0.5 mg/kg/hr continuous IV infusion</p> <p><i>Oral</i></p> <ul style="list-style-type: none"> ■ Prednisone or methylprednisolone 60 mg given immediately; then 60–120 mg/day in divided doses and tapered over several days may be given instead of an IV regimen. ■ With improvement, corticosteroids usually are tapered to a single daily dose (e.g., 60 mg/day) or divided doses (e.g., 20 mg tid), then reduced over several days. ■ For long courses of therapy, side effects may be minimized by a single a.m. dose given on alternate days.

APPENDIX C

ASSESSING AND MEETING NEEDS:

EXAMPLES OF PATIENT EDUCATION FOR EACH CLINIC VISIT

The way you organize and conduct your visits with patients will have a dramatic effect on their following your directions, their satisfaction with their care, and their management of their asthma. Specific examples of patient education for the first and subsequent visits are described in detail in this appendix. The following **three-part patient education process** is used to organize every visit. These “parts” can recur more than once within a single session (e.g., assess progress and agree on next steps for two or more actions).

- I. **Assess needs**, expectations, and progress.
 - II. **Introduce/review an action** patient needs to take.
 - Review the *benefits* of doing the action.
 - Identify concerns and *barriers*, and problem solve.
 - *Teach the action*—describe action, show action, have patient do the action, give feedback.
 - Devise ways to *help the patient remember* when to take the action.
 - III. **Obtain an agreement** with the patient to take specific action(s), and say you will discuss his or her progress at the next visit.
- FIRST VISIT: PATIENT ASSESSMENT AND EXPECTATIONS**
- I.a. **Introduce yourself and agree on expectations for the visit.**
 - Explain what will happen during the visit.
 - Ask if the patient has concerns that he or she wants to have addressed at this visit.
 - Tell the patients when their concerns will be addressed during the visit. Ask if the plans for this visit are likely to meet the patient’s needs.
 - b. **Determine if patients are at high risk for an asthma-related death or life-threatening episode.** Patients at high risk should receive greater attention and vigilance. The following are risk factors for asthma-related death:
 - Age: 17–24, >55 years old.
 - African American, especially those 15 to 44 years of age.
 - Previous life-threatening acute asthma episode.
 - Hospital admission for asthma in the past year.
 - Inadequate general medical management.
 - Psychological and psychosocial problems (e.g., depression, alcohol abuse, recent family death and disruption, recent unemployment, schizophrenia, extreme anxiety).
 - c. **Assess resources and family support** with simple questions requiring only “yes” and “no” answers (discuss periodically after the first visit).
 - **Insurance.** “Are your doctor’s visits and medications covered by private insurance, Medicare, or Medicaid?” “Do you think you may need financial assistance?”

- **Family opinions.** “Does your family understand your problems with asthma?” “Are they helpful and supportive of your getting proper treatment?” Discuss responses if there is time.
 - **Companion at visits.** “Would you like to bring a family member to your next appointment so he or she can learn about your asthma and its treatment?”
- d. **Ask about consequences of asthma.**
- “How does asthma affect your life?” Identify the consequences of asthma that they would like to prevent. Discuss how likely it is that problems will continue if they do *not* take the appropriate action.
- e. **Ask about expected benefits of treatment.**
- “What do you expect the treatment will help you to do?” Review the **goals of asthma management** and tell the patient that these can be achieved by the patient and health care team working together. Present the benefits that would be *lost* by *not* taking the steps needed to control asthma (e.g., lose control of asthma).
- f. **Identify patient concerns/issues.**
- “What concerns do you have about your asthma and its treatment?”
- II. **Teach patients how and when to use their metered-dose inhaler(s).** (See table 4, page 15 and patient handout in appendix D.)
- III. **Explain and agree on the demands of treatment.**
- Explain *generally* what the course of treatment will be, that treatment will be ongoing and long term, and how often they will need to come to the office. Tell them you will be helping them to achieve and maintain control of their asthma. Ask if this is acceptable to them.
 - Ask patient to agree to take specific actions (e.g., taking medicine) discussed in this visit.
- ROUTINE VISITS: ASSESSMENT, INSTRUCTION, REVIEW, AND AGREEMENT**
- I.a. **Agree on expectations for the visit.**
- Explain what will happen during the visit.
 - Ask if the patient has concerns that he or she wants to have addressed at this visit.
 - Tell the patients when their concerns will be addressed during the visit. Ask if the plans for this visit are likely to meet the patient’s needs.
- b. **Assess achievement of the goals of asthma management.** (Simple questions requiring only “yes” and “no” answers can be quickly asked).
- **Symptoms.** “Do you have any of the following symptoms during the day or night since your last visit or in the last month—coughing, wheezing, chest tightness, shortness of breath?”
 - If yes, ask when, where, how often, and during what activity they occurred.
 - **Exercise.** “Do you have symptoms during or after exercising or after exertion?” “Do activities such as running, climbing stairs, cleaning house, or laughing cause any symptoms in you?” “How many times a week do you usually exercise?”
 - **Routine interrupted.** “Has your asthma kept you from going to school, working, or doing other routine activities?”
 - **Emergency/additional care.** “Have you gone to an emergency department, hospital, or walk-in clinic for your asthma since the last visit?”
 - **Side effects.** “What side effects have you had from your medicines?” “Do you feel shaky or nervous?” “Are you having a bad

taste, cough, or upset stomach?" "Are you having trouble working?" "Do you have any other problems with medicines?"

c. **Assess activities in the components of asthma management.**

– **Objective measures—peak flow monitoring**

- Ask what **time** the patient checks his or her peak flow rate each day.
- Review the **pattern** of the patient's daily peak flow rate.
- Have **patient demonstrate** peak flow meter technique.

– **Environmental control**

- **Problems.** "What seems to make your asthma worse?"
- **Actions.** "What have you done (or will you do) to stay away from things that make your asthma worse?"

– **Pharmacotherapy**

- **Medications taken now.** "How much and how often do you take _____ medication?" If inhaled, "What is the name and color of the inhaler?"
- **Treatment of symptoms.** "What do you do when you begin noticing symptoms?" "What medication do you take?" Review asthma management plan.
- What other medications do you take for your asthma?
- **Access to medicines.** "Do you have any problems getting your medicine at any time (e.g., at school or work)?"
- **Effectiveness of medications.** "Do the medicines seem to be working for you?" (Clarify/reinforce benefits.)
- **Concerns or questions.** "Do you have any concerns or questions about your medicine?"

- **Demonstration by patient** of his or her inhaler/spacer and/or nebulizer technique.

d. **Review an activity patients agreed to do at last visit (followup visits only).**

- **Review activities/praise.** "What were you able to do regarding _____ [specific action]? Praise some aspect of the patient's effort.
- **Define problems/barriers.** "Did you have trouble with any actions that we discussed at the last visit?" "What seemed to be the problem?"
 - Unclear what action was
 - Benefits not achieved/believed
 - Lacked skills/confidence
 - Forgot
 - Barriers present—time, circumstances, other people, finances, etc.
- **Problem solve with patient.** Discuss how to resolve the problem with the patient. For example, if patients forget, help them find ways to remind themselves. If they lack skills and confidence, reteach using the four R's. If they seem confused or overwhelmed, reduce the number of management activities patients are to do or the complexity of the activities.
- **Be positive.** Suggest that patients learn from and then forget about any mistakes they may have made. Encourage them to keep trying. They will succeed with time.
- **Reinforce benefits.** "How helpful was _____ [a specific asthma management activity]?" For example, "What effects do you think the inhaled steroids had?" Remind patients that it can take a few weeks before they notice benefits from inhaled steroids. Reinforce benefits mentioned and address any problems.

- **Agree upon patient’s plans to act.** Ask the patient to agree to take the specific action and say you will discuss his or her experience with him or her at the next visit.

II. **Introduce a new activity using the process below (as needed).**

- **Propose an action.** Tell the patient what action he or she needs to learn next (e.g., peak flow rate monitoring). “I would like to talk to you about this action today. Is that OK?”
- **Present benefits.** Present the key benefits to the patient. Ask, “How do you think this could be helpful to you given your experience with asthma?”
- **Teach.** Use the four R’s to guide teaching (reach agreement, rehearse, repeat, reinforce).
- **Address barriers.** “What do you think might keep you from doing this asthma management activity?” “What might make it difficult?” “How can these problems/difficulties be reduced?”
- **Make specific plans.** “**During the next month, what do you plan to do** regarding _____ [specific action] (e.g., taking peak

flow rate every morning when I brush my teeth and record the rate on my peak flow diary at that time)?” Or simply ask, “How likely are you to do _____ [specific action], _____ [frequency], over the next month?”

- **Devise reminders.** Discuss how patients can remind themselves to take the agreed-upon actions.

CLOSING FOR ALL VISITS

Assess satisfaction. “Were your concerns and questions during this visit addressed satisfactorily?” Other satisfaction questions include: “How did your visit with Dr. ____ go?” “Is there anything that was said that you weren’t sure you understood?” “How could we make your visit more helpful to you in the future?” Provide feedback to the rest of the health professionals and make appropriate notations in the patient record.

Review/confirm agreements. Obtain or confirm the patient’s commitment and plans to take each recommended action.

Express interest in future progress. ALWAYS tell patients you will talk to them about their agreed-upon actions at their next visit. Convey interest in their progress and do not make this sound like you are checking up on them.

APPENDIX D

PATIENT HANDOUTS*

How To Use Your Peak Flow Meter

My Asthma Symptoms and Peak Flow Diary

Asthma Management Plan

How To Stay Away From Things That Make Your Asthma Worse

Your Metered-Dose Inhaler: How To Use It

Spacers: Making Inhaled Medicines Easier To Take

How To Use and Care for Your Nebulizer

*Please duplicate for patient use as needed.

HOW TO USE YOUR PEAK FLOW METER

A peak flow meter is a device that measures how well air moves out of your lungs. During an asthma episode the airways of the lungs begin to narrow slowly. The peak flow meter will tell you if there is narrowing in the airways days—even hours—before you have any symptoms of asthma.

By taking your medicine(s) early (before symptoms), you may be able to stop the episode quickly and avoid a severe episode of asthma. Peak flow meters are used to check your asthma the way that blood pressure cuffs are used to check high blood pressure.

The peak flow meter can also be used to help you and your doctor:

- Learn what makes your asthma worse.
- Decide if your medicine plan is working well.
- Decide when to add or stop medicine.
- Decide when to seek emergency care.

A peak flow meter is most helpful for patients who must take asthma medicine daily. Patients age 5 and older are able to use a peak flow meter. Ask your doctor or nurse to show you how to use a peak flow meter.

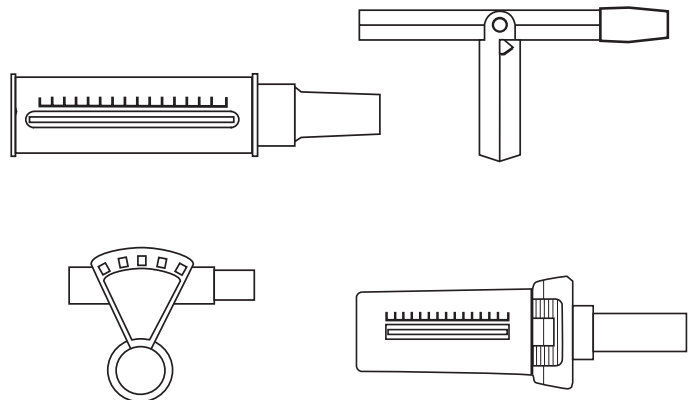
HOW TO USE YOUR PEAK FLOW METER

- Do the following five steps with your peak flow meter:
 1. Put the indicator at the bottom of the numbered scale.
 2. Stand up.
 3. Take a deep breath.
 4. Place the meter in your mouth and close your lips around the mouthpiece. Do not put your tongue inside the hole.
 5. Blow out as hard and fast as you can.
- Write down the number you get.
- Repeat steps 1 through 5 two more times and write down the numbers you get.
- Write down in “My Asthma Symptoms and Peak Flow Diary” the highest of the three numbers achieved.

FIND YOUR PERSONAL BEST PEAK FLOW NUMBER

Your **personal best** peak flow number is the highest peak flow number you can achieve over a 2-week period when your asthma is under good control. Good control is when you feel good and do not have any asthma symptoms.

Each patient’s asthma is different, and your best peak flow may be higher or lower than the peak



There are a variety of peak flow meters.

flow of someone of your same height, weight, and sex. This means that it is important for you to find your own personal best peak flow number. Your medicine plan needs to be based on your own personal best peak flow number.


To find out your personal best peak flow number, take peak flow readings:


- Every day for 2 weeks.
- Mornings and early afternoons or evenings (when you wake up and between 12:00 and 2:00 p.m.).
- Before and after taking inhaled beta₂-agonist (*if* you take this medicine).
- As instructed by your doctor.


Write down these readings in your peak flow diary.

THE PEAK FLOW ZONE SYSTEM

Once you know your personal best peak flow number, your doctor will give you the numbers that tell you what to do. The peak flow numbers are put into zones that are set up like a traffic light. This will help you know what to do when your peak flow number changes. For example:

 **Green Zone** (80 to 100 percent of your personal best number) signals *good control*. No asthma symptoms are present. You may take your medicines as usual.

 **Yellow Zone** (50 to 79 percent of your personal best number) signals *caution*. You may be having an episode of asthma that requires an increase in your medicines. Or your overall asthma may not be under control, and the doctor may need to change your medicine plan.

 **Red Zone** (below 50 percent of your personal best number) signals *danger!* You must take a short-acting inhaled beta₂-agonist right away and call your doctor immediately if your

peak flow number does not return to the Yellow or Green Zone and stay in that zone.

Record your personal best peak flow number and peak flow zones at the top of "My Asthma Symptoms and Peak Flow Diary."

USE THE DIARY TO KEEP TRACK OF YOUR PEAK FLOW

Write down your peak flow number on the diary every day, or as instructed by your doctor.

ACTIONS TO TAKE WHEN PEAK FLOW NUMBERS CHANGE

- **PEFR goes more than 20 percent below your personal best (PEFR is in the Yellow Zone).**

ACTION: Take an inhaled short-acting bronchodilator as prescribed by your doctor.

- **PEFR changes 20 percent or more between the morning and early afternoon or evening (measure your PEFr before taking medicine).**

or

- **PEFR increases 20 percent or more when measured before and after taking an inhaled short-acting bronchodilator.**

ACTION: Talk to your doctor about adding more medicine to control your asthma better (for example, an anti-inflammatory medication).

MY ASTHMA SYMPTOMS AND PEAK FLOW DIARY

_____ My predicted peak flow

_____ My personal best peak flow

_____ My Green (Good Control) Zone 80–100% of personal best	_____ My Yellow (Caution) Zone 50–79% of personal best	_____ My Red (Danger) Zone below 50% of personal best
--	---	--

Date:												
	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.	p.m.
Peak Flow Reading												
No Asthma Symptoms												
Mild Asthma Symptoms												
Moderate Asthma Symptoms												
Serious Asthma Symptoms												
Medicine Used to Stop Symptoms												
Urgent Visit to the Doctor												

Directions:

1. Take your peak flow reading every morning (a.m.) when you wake up and every afternoon or evening (p.m.). Try to take your peak flow readings at the same time each day. If you take an inhaled beta₂-agonist medicine, take your peak flow reading **before** taking that medicine. Write down the highest reading of three tries in the box that says peak flow reading.
2. Look at the box at the top of this sheet to see whether your number is in the Green, Yellow, or Red Zone.
3. In the space below the date and time, put an "X" in the box that matches the symptoms you have when you record your peak flow reading; see description of symptom categories below.
4. Look at your Asthma Management Plan for what to do when your number is in one of the zones or when you have asthma symptoms.
5. Put an "X" in the box beside "medicine used to stop symptoms" if you took **extra** asthma medicine to stop your symptoms.
6. If you made any visit to your doctor's office, emergency department, or hospital for treatment of an asthma episode, put an "X" in the box marked "urgent visit to the doctor." Tell your doctor if you went to the emergency department or hospital.

No symptoms = No symptoms (wheeze, cough, chest tightness, or shortness of breath) even with normal physical activity.

Mild symptoms = Symptoms during physical activity, but not at rest. It does not keep you from sleeping or being active.

Moderate symptoms = Symptoms while at rest; symptoms may keep you from sleeping or being active.

Severe symptoms = Severe symptoms at rest (wheeze may be absent); symptoms cause problems walking or talking; muscles in neck or between ribs are pulled in when breathing.

ASTHMA MANAGEMENT PLAN FOR _____**Green Zone = Good control**

Green Zone: _____ to _____ Peak Flow Rate (80–100% of personal best; no symptoms)

To keep your asthma under control: Stay away from things that make your asthma worse (such as animals, smoke, etc.; talk to your doctor about these things). **Take your medicine(s).**

Name of
Medicine

How Much
To Take

How Often/
When To Take It

Name of Medicine	How Much To Take	How Often/ When To Take It

Yellow Zone = Caution

Yellow Zone: _____ to _____ Peak Flow Rate (50–79% of personal best)

Take medicine listed below to get your asthma back under control.

Symptoms: Coughing, wheezing, shortness of breath, tightness in the chest, or other symptoms of an asthma episode. Symptoms may be mild.

Early signs your asthma is getting worse: _____

Take your Yellow Zone medicine when these early signs occur.

Name of
Medicine

How Much
To Take

How Often/
When To Take It

Name of Medicine	How Much To Take	How Often/ When To Take It

■ Peak flow rate or symptoms not better in _____ minutes after taking the medicine listed above? Call the doctor.

■ Keep taking your Green Zone medicine(s). Keep staying away from things that make your asthma worse.

Red Zone = Danger!

Red Zone: Below _____ Peak Flow Rate (below 50% of personal best)

Take the medicine listed below. Then call your doctor.

Symptoms: Coughing, very short of breath, trouble walking and talking, tightness in the chest, other symptoms.

Name of Medicine	How Much To Take	How Often/ When To Take It
_____	_____	_____
_____	_____	_____
_____	_____	_____

- Call your doctor or emergency room **NOW**, say this is an emergency, and ask what you should do next.
- Go to the doctor or hospital **right away** or call an ambulance without delay if:
 - You are struggling to breathe or your lips or fingernails turn a little blue or grey.
 - Your peak flow remains in the Red Zone level 20 minutes after taking your medicine.
- Keep taking your Green Zone medicine(s).

Doctor: _____

Office Phone: _____

Phone Number After Office Hours: _____

Emergency Room: _____

Notes

HOW TO STAY AWAY FROM THINGS THAT MAKE YOUR ASTHMA WORSE

Because you have asthma, your airways are very sensitive. They may react to things that can cause asthma attacks or episodes. Staying away from such things will help you keep your asthma from getting worse.

- Ask your doctor to help you find out what makes your asthma worse. Discuss the ways to stay away from these things. The tips listed below will help you.
 - Ask your doctor for help in deciding which actions will help the most to reduce your asthma symptoms. Carry out these actions first. Discuss the results of your efforts with your doctor.
-

Tips for Those Allergic to or Bothered by Any Item Listed Below

House-Dust Mites

The following actions should help you control house-dust mites:

- Encase your mattress and box spring in an airtight cover.
- Either encase your pillow or wash it in hot water once a week every week.
- Wash your bed covers, clothes, and stuffed toys once a week in hot water (130 °F).

The following actions will also help you control dust mites—but they are not essential:

- Reduce indoor humidity to less than 50 percent. Use a dehumidifier if needed.
- Remove carpets from your bedroom.
- Do not sleep or lie on upholstered furniture. Replace with vinyl, leather, or wood furniture.
- Remove carpets that are laid on concrete.
- Stay out of a room while it is being vacuumed.
- If you must vacuum, one or more of the following things can be done to reduce the amount of dust you breathe in: (1) Use a dust mask. (2) Use a central vacuum cleaner with the collecting bag outside the home. (3) Use double-wall

vacuum cleaner bags and exhaust-port HEPA (high-efficiency particulate air) filters.

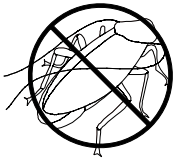


Animals

Some people are allergic to the dried flakes of skin, saliva, or urine from warm-blooded pets. Warm-blooded pets include ALL dogs, cats, birds, and rodents. The length of a pet's hair does not matter. Here are some tips for those allergic to animals:

- Remove the animal from the home or school classroom.
- Choose a pet without fur or feathers (such as a fish or a snake).
- If you must have a warm-blooded pet, keep the pet out of your bedroom at all times. Keeping the pet outside of your home is even better.
- If there is forced-air heating in the home with a pet, close the air ducts in your bedroom.
- Wash the pet weekly in warm water.
- Do not visit homes that have pets. If you must visit such places, take asthma medicine (cromolyn is often preferred) before going.

- Do not buy or use products made with feathers. Use pillows and comforters stuffed with synthetic fibers like polyester. Also do not use pillows, bedding, and furniture stuffed with kapok (silky fibers from the seed pods of the silk-cotton tree).
- Use a vacuum cleaner fitted with a HEPA filter.
- Wash hands and change clothes as soon as you can after being in contact with pets.



Cockroaches (Some people are allergic to the droppings of roaches.)

- Use insect sprays; but have someone else spray when you are outside of the home. Air out the home for a few hours after spraying. Roach traps may also help.
- All homes in multiple-family dwellings (apartments, condominiums, and housing projects) must be treated to get rid of roaches.



Tobacco Smoke

- Do not smoke.
- Do not allow smoking in your home. Have household members smoke outside.
- Encourage family members to quit smoking. Ask your doctor or nurse for help on how to quit.
- Choose no-smoking areas in restaurants, hotels, and other public buildings.

Wood Smoke

- Do not use a wood-burning stove to heat your home.
- Do not use kerosene heaters.



Strong Odors and Sprays

- Do not stay in your home when it is being painted. Use latex rather than oil-based paint.
- Try to stay away from perfume, talcum powder, hair spray, and products like these.
- Use household cleaning products that do not have strong smells or scents.
- Reduce strong cooking odors (especially frying) by using an exhaust fan and opening windows.

Colds and Infections

- Talk to your doctor about flu shots.
- Stay away from people with colds or the flu.
- Do not take over-the-counter cold remedies, such as antihistamines and cough syrup, unless you speak to your doctor first.

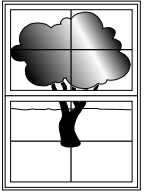


Exercise

- Make a plan with your doctor that allows you to exercise without symptoms. For example, take inhaled beta₂-agonist or cromolyn less than 30 minutes before exercising.
- Do not exercise during the afternoon when air pollution levels are highest.
- Warm up before doing exercise and cool down afterward.

Weather

- Wear a scarf over your mouth and nose in cold weather. Or pull a turtleneck or scarf over your nose on windy or cold days.
- Dress warmly in the winter or on windy days.



Pollens

During times of high pollen counts:

- Stay indoors during the midday and afternoon when pollen counts are highest.
- Keep windows closed in cars and homes. Use air conditioning if you can.

- Pets should either stay outdoors or indoors. Pets should not be allowed to go in and out of the home. This prevents your pet from bringing pollen inside.
- Do not mow the grass. But if you must mow, wear a pollen filter mask.

Mold (Outdoor)

- Avoid sources of molds (wet leaves, garden debris, stacked wood).
- Avoid standing water or areas of poor drainage.

REMEMBER: Making these changes will help keep asthma episodes from starting. These actions can also reduce your need for asthma medicines.

Notes

YOUR METERED-DOSE INHALER: HOW TO USE IT

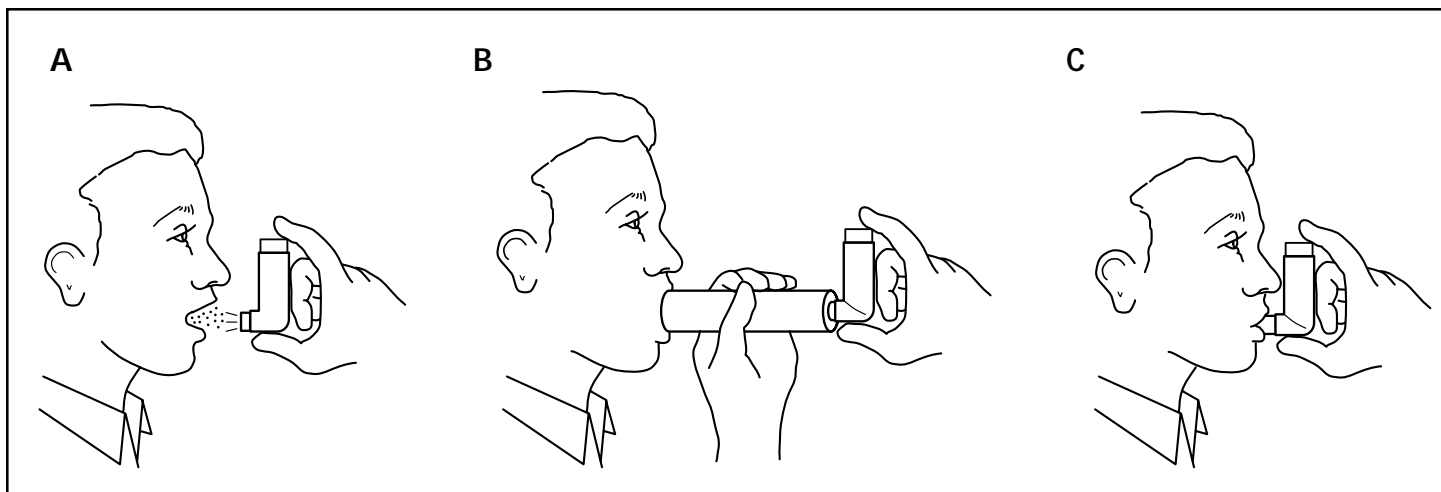
Using a metered-dose inhaler is a good way to take asthma medicines. There are few side effects because the medicine goes right to the lungs and not to other parts of the body. It takes only 5 to 10 minutes for inhaled beta₂-agonists to have an effect compared to the liquid or pill form, which can take 15 minutes to 1 hour. Inhalers can be used by all asthma patients age 5 and older. A spacer or holding chamber attached to the inhaler can help make taking the medicine easier.

The inhaler must be cleaned often to prevent buildup that will clog it or reduce how well it works.

- The guidelines that follow will help you use the inhaler the correct way.
- Ask your doctor or nurse to show you how to use the inhaler.

USING THE INHALER

1. Remove the cap and hold the inhaler upright.
 2. Shake the inhaler.
 3. Tilt your head back slightly and breathe out.
 4. Use the inhaler in any one of these ways. (A and B are the best ways. B is recommended for young children, older adults, and those taking inhaled steroids. C is okay if you are having trouble with A or B.)
 - A. Open mouth with inhaler 1 to 2 inches away.
 - B. Use spacer (ask for the handout on spacers).
 - C. Put inhaler in mouth and seal lips around the mouthpiece.
 5. Press down on the inhaler to release the medicine as you start to breathe in slowly.
 6. Breathe in *slowly* for 3 to 5 seconds.
 7. *Hold* your breath for 10 seconds to allow the medicine to reach deeply into your lungs.
 8. Repeat puffs as prescribed. Waiting 1 minute between puffs may permit the second puff to go deeper into the lungs.
- Note: Dry powder capsules are used differently. To use a dry powder inhaler, close your mouth tightly around the mouthpiece and inhale very fast.



CLEANING

1. Once a day clean the inhaler and cap by rinsing it in warm running water. Let it dry before you use it again. Have another inhaler to use while it is drying. Do not put the canister holding cromolyn or nedocromil in water.
2. Twice a week wash the L-shaped plastic mouthpiece with mild dishwashing soap and warm water. Rinse and dry well before putting the canister back inside the mouthpiece.

CHECKING HOW LONG A CANISTER WILL LAST

1. Check the canister label to see how many "puffs" it contains.
2. Figure out how many puffs you will take per day (e.g., 2 puffs, 4 times a day = 8 puffs a day). Divide this number into the number of puffs contained in the canister. That tells you how long the canister should last.

Example:

Canister contains 200 puffs.

You take 2 puffs, 4 times a day, which equal 8 puffs/day.

$200 \div 8 = 25$. The canister will last 25 days.

SPACERS: MAKING INHALED MEDICINES EASIER TO TAKE

Unless you use your inhaler the right way, much of the medicine may end up on your tongue, on the back of your throat, or in the air. Use of a spacer or holding chamber can help prevent this problem.

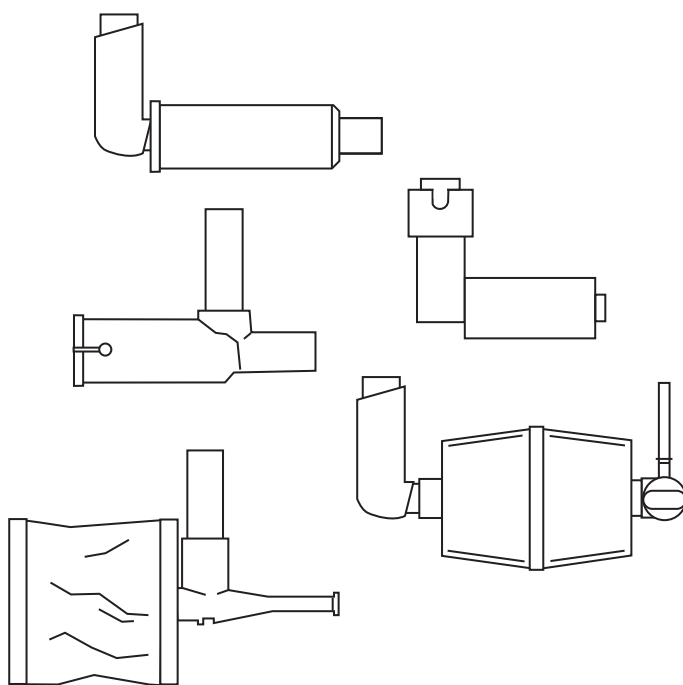
A spacer or holding chamber is a device that attaches to a metered-dose inhaler. It holds the medicine in its chamber long enough for you to inhale it in one or two slow deep breaths.

The spacer makes it easy to use the medicines the right way (especially if your child is young or you have a hard time using just an inhaler). It helps you not cough when using an inhaler. A spacer will also help prevent you from getting a yeast infection in your mouth (thrush) when taking inhaled steroid medicines.

There are many models of spacers or holding chambers that you can purchase through your pharmacist or a medical supply company. Ask your doctor about the different models.

HOW TO USE A SPACER

1. Attach the inhaler to the spacer or holding chamber as explained by your doctor or by using the directions that come with the product.
2. Shake well.
3. Press the button on the inhaler. This will put one puff of the medicine in the holding chamber.
4. Place the mouthpiece of the spacer in your mouth and inhale slowly. (A face mask may be helpful for a young child.)
5. Hold your breath for a few seconds and then exhale. Repeat steps 4 and 5.
6. If your doctor has prescribed two puffs, wait between puffs for the amount of time he or she has directed and repeat steps 2 through 5.



There are a variety of spacers.

HOW TO USE AND CARE FOR YOUR NEBULIZER

A nebulizer is a device driven by a compressed air machine. It allows you to take asthma medicine in the form of a mist (wet aerosol). It consists of a cup, a mouthpiece attached to a T-shaped part or a mask, and thin, plastic tubing to connect to the compressed air machine. It is used mostly by three types of patients:

- Children under age 5.
- Patients who have problems using metered-dose inhalers.
- Patients with severe asthma.

A nebulizer helps to make sure you get the right amount of medicine.

Routinely cleaning the nebulizer is important because an unclean nebulizer may cause an infection. A good cleaning routine keeps the nebulizer from clogging up and helps it last longer. (See instructions with nebulizer.)

Directions for using the compressed air machine may vary (check the machine's directions), but generally the tubing has to be put into the outlet of the machine before it is turned on.

HOW TO USE A NEBULIZER

- 1a. **If your medicine is premixed**, measure the correct amount of medicine using a clean dropper and put it into the cup. Go to step 2.
- 1b. **If your medicine is not premixed**, measure the correct amount of saline—using a clean dropper—and put it into the cup. Then measure the correct amount of medicine using a *different* clean dropper and put it into the cup with the saline. (Do NOT mix the droppers; use one for saline and another for the medicine.) Put an “S” for saline on one dropper with nail polish.
2. Fasten the mouthpiece to the T-shaped part and then fasten this unit to the cup **OR** fasten the mask to the cup. For a child over the age of 2, use a mouthpiece unit because it will deliver more medicine than a mask.
3. Put the mouthpiece in your mouth. Seal your lips tightly around it **OR** place the mask on your face.
4. Turn on the air compressor machine.
5. Take slow, deep breaths in through the mouth.

6. Hold each breath 1 to 2 seconds before breathing out.
7. Continue until the medicine is gone from the cup (approximately 10 minutes).
8. Store the medicine as directed after each use.

CLEANING THE NEBULIZER

Don't forget: Cleaning and getting rid of germs prevent infection. Cleaning keeps the nebulizer from clogging up and helps it last longer.

Cleaning Needed After Each Use

1. Remove the mask or the mouthpiece and T-shaped part from the cup. Remove the tubing and set it aside. The tubing should not be washed or rinsed. The outside should be wiped down. Rinse the mask or mouthpiece and T-shaped part—as well as the eyedropper or syringe—in warm running water for 30 seconds. Use distilled or sterile water for rinsing, if possible.
2. Shake off excess water. Air dry on a clean cloth or paper towel.

3. Put the mask or the mouthpiece and T-shaped part, cup, and tubing back together and connect the device to the compressed air machine. Run the machine for 10 to 20 seconds to dry the inside of the nebulizer.
4. Disconnect the tubing from the compressed air machine. Store the nebulizer in a ziplock plastic bag.
5. Place a cover over the compressed air machine.

Cleaning Needed Once Every Day

1. Remove the mask or the mouthpiece and T-shaped part from the cup. Remove the tubing and set it aside. The tubing should not be washed or rinsed.
2. Wash the mask or the mouthpiece and T-shaped part—as well as the eyedropper or syringe—with a mild dishwashing soap and warm water.
3. Rinse under a strong stream of water for 30 seconds. Use distilled (or sterile) water if possible.
4. Shake off excess water. Air dry on a clean cloth or paper towel.
5. Put the mask or the mouthpiece and T-shaped part, cup, and tubing back together and connect the device to the compressed air machine. Run the machine for 10 to 20 seconds to dry the inside of the nebulizer.
6. Disconnect the tubing from the compressed air machine. Store the nebulizer in a ziplock plastic bag.
7. Place a cover over the compressed air machine.

Cleaning Needed Once or Twice a Week

1. Remove the mask or the mouthpiece and T-shaped part from the cup. Remove the tubing and set it aside. The tubing should not be washed or rinsed. Wash the mask or the mouthpiece and T-shaped part—as well as the eyedropper or syringe—with a mild dishwashing soap and warm water.
2. Rinse under a strong stream of water for 30 seconds.
3. Soak for 30 minutes in a solution that is one part distilled white vinegar and two parts distilled water. Throw out the vinegar water solution after use; do not reuse it.
4. Rinse the nebulizer parts and the eyedropper or syringe under warm running water for 1 minute. Use distilled or sterile water, if possible.
5. Shake off excess water. Air dry on a clean cloth or paper towel.
6. Put the mask or the mouthpiece and T-shaped part, cup, and tubing back together and connect the device to the compressed air machine. Run the machine for 10 to 20 seconds to dry the inside of the nebulizer thoroughly.
7. Disconnect the tubing from the compressed air machine. Store the nebulizer in a ziplock plastic bag.
8. Clean the surface of the compressed air machine with a well-wrung, soapy cloth or sponge. You could also use an alcohol or disinfectant wipe. **NEVER PUT THE COMPRESSED AIR MACHINE IN WATER.**
9. Place a cover over the compressed air machine.