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### Key Clinical Activities for Quality Asthma Care

#### Recommendations of the National Asthma Education and Prevention Program



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**On the cover:** Detail from illustration of René Laennec; courtesy National Library of Medicine History of Medicine collection.

René Théophile Hyacinthe Laennec (1781–1826), a French physician, is credited with inventing the stethoscope around 1816 while working at the Necker Hospital in Paris. His stethoscope was a perforated wooden cylinder 1 foot long, and he got the idea from watching children scratching one end of a wooden beam with a pin and listening to the transmitted sound at the other end. He gathered evidence on what the sounds meant by comparing the various noises heard in living patients with the type of disease seen after they died. In 1819 he published his findings in his classic book, *De l'auscultation médiate*, and the stethoscope soon came into general use.

# Key Clinical Activities for Quality Asthma Care

## Recommendations of the National Asthma Education and Prevention Program

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### Summary

*In 1997, the National Asthma Education and Prevention Program (NAEPP), coordinated by the National Heart, Lung, and Blood Institute, published the second Expert Panel Report (EPR-2): Guidelines for the Diagnosis and Management of Asthma (National Heart, Lung, and Blood Institute, National Asthma Education and Prevention Program. Expert Panel Report 2: Guidelines for the diagnosis and management of asthma. Bethesda MD: US Department of Health and Human Services, National Institutes of Health, 1997; publication no. 97-4051. Available at <http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf>). Subsequently, the NAEPP Expert Panel identified key questions regarding asthma management that were submitted to an evidence practice center of the Agency for Healthcare Research and Quality to conduct a systematic review of the evidence. The resulting evidence report was used by the Expert Panel to update recommendations for clinical practice on selected topics. These recommendations (EPR-Update 2002) were published in 2002. (National Heart, Lung, and Blood Institute, National Asthma Education and Prevention Program. Guidelines for the diagnosis and management of asthma—update on selected topics 2002. J Allergy Clin Immunol 2002;110[November 2002, part 2]. Available at <http://www.nhlbi.nih.gov/guidelines/asthma/index.htm>).*

*To improve the implementation of these guidelines, a working group of the Professional Education Subcommittee of the NAEPP extracted key clinical activities that should be considered as essential for quality asthma care in accordance with the EPR-2 guidelines and the EPR-Update 2002. The purpose was to develop a report that would help purchasers and planners of health care define the activities that are important to quality asthma care, particularly in reducing symptoms and preventing exacerbations, and subsequently reducing the overall national burden of illness and death from asthma. This report is intended to help employer health benefits managers and other health-care planners make decisions regarding delivery of health care for persons with asthma. Although this report is based on information directed to clinicians; it is not intended to substitute for recommended clinical practices for caring for persons with asthma, nor is it intended to replace the clinical decision-making required to meet individual patient needs. Readers are referred to the EPR-2 for the full asthma guidelines regarding diagnosis and management of asthma or to the abstracted Practical Guide (National Heart, Lung, and Blood Institute, National Asthma Education and Prevention Program. Practical guide for the diagnosis and management of asthma. Bethesda MD: US Department of Health and Human Services, National Institutes of Health, 1997; publication no. 97-4053. Available at <http://www.nhlbi.nih.gov/health/prof/lung/asthma/practgde.htm>) and to the EPR-Update 2002.*

*The 1997 EPR-2 guidelines and EPR-Update 2002 were derived from a consensus of leading asthma researchers from academic, clinical, federal, and voluntary institutions and based on scientific evidence supported by the literature. The 10 key activities highlighted here correspond to the four recommended-as-essential components of asthma management: assessment and monitoring, control of factors contributing to asthma severity, pharmacotherapy, and education for a partnership in care. The key*

*clinical activities are not intended for acute or hospital management of patients with asthma but rather for the preventive aspects of managing asthma long term. This report was developed as a collaborative activity between CDC and the NAEPP.*

The material in this report originated in the National Center for Environmental Health, Richard J. Jackson, M.D., Director; Division of Environmental Hazards and Health Effects, Michael A. McGeehin, Ph.D., Director.

## Background

The National Asthma Education and Prevention Program (NAEPP), administered and coordinated by the National Heart, Lung, and Blood Institute, began developing a consensus set of science-based guidelines for diagnosis and management of asthma shortly after its establishment in 1989. With wide participation of asthma specialists from academia, research, and clinical care, as well as representatives from voluntary health organizations and federal agencies, the first *Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma* was produced in 1991 (1); a revision, the *EPR-2*, was published in 1997 (2), and an update to the *EPR-2* was published in 2002 (3).

The *EPR-2* and *EPR-Update 2002* comprise the prevailing science-based consensus concerning accurate information for health-care providers regarding asthma diagnosis and management. The *EPR-2* has been disseminated nationwide and abstracted into a practical guide, a best practices pediatric guide, and a pocket guideline. However, although these asthma care principles have been widely endorsed, they have not been adequately applied (4–8).

This report is a companion to the NAEPP Expert Panel Reports. It identifies a core set of 10 key clinical activities essential for ensuring that health care delivered to patients with asthma emphasizes the prevention aspect of care and addresses the components of care recommended in the Expert Panel Reports. The action steps listed for each key clinical activity suggest specific ways to accomplish the respective activity.

The process of developing a core set of key clinical activities involved a detailed review of the *EPR-2* guidelines and input from persons researching their implementation (1–3, 9–11). These activities were identified in the context of the currently proposed asthma-specific measures for managed care (12), as well as the national health goals of *Healthy People 2010* (13) (Box 1) and the strategic plan of the U.S. Department of Health and Human Services (DHHS), *Action Against Asthma* (14). These reports complement each other to help health-care professionals, policymakers, patients, and the public work together to improve asthma care for the overall population and reduce asthma-related morbidity and mortality.

## Essential Components of Care and Associated Key Clinical Activities

The four essential components of asthma management—assessment and monitoring, controlling factors contributing to asthma severity, pharmacotherapy, and education for partnership in care—are distilled from the NAEPP *EPR-2 Guidelines for the Diagnosis and Management of Asthma* (Table 1). In

### BOX 1. *Healthy People 2010* asthma-related goals

#### Reduce

- asthma-related deaths, hospitalizations for asthma, hospital emergency room visits for asthma, and limitations among persons with asthma;
- the number of school days or workdays missed because of asthma.

#### Increase

- the proportion of persons with asthma who receive formal patient education, including information about community and self-help resources, as an essential part of the management of their condition;
- the proportion of persons with asthma who receive appropriate asthma care according to the NAEPP guidelines.

Establish in at least 25 states a surveillance system for tracking asthma deaths, illness, disability, the impact of occupational and environmental factors on asthma, access to medical care, and asthma management.

**Source:** US Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With *Understanding and Improving Health and Objectives for Improving Health* (2 vols). Washington, DC: US Department of Health and Human Services, 2000. Available at <http://www.healthypeople.gov>.

addition, 10 key clinical activities are described and listed, each according to the essential component it represents. Action steps are suggested to help accomplish each of the clinical activities. The intent of this report is to help employer health benefits managers and health-care planners make decisions regarding delivery of quality health care for persons with asthma.

## Assessment and Monitoring

### Key Clinical Activity 1. Establish Asthma Diagnosis

After a person seeks medical care for symptoms that suggest asthma, the diagnosis of asthma should be clearly established and the baseline severity of the disease classified to help establish the recommended course of therapy. For symptomatic adults and children aged >5 years who can perform spirometry, asthma can be diagnosed after a medical history and physical examination documenting an episodic pattern of respiratory symptoms and from spirometry that indicates partially reversible airflow obstruction (>12% increase and 200 mL in forced expiratory volume in 1 second [FEV<sub>1</sub>] after inhaling a short-acting bronchodilator or receiving a short [2–3 week] course of oral corticosteroids).

Alternative diagnoses of symptoms that suggest asthma, including conditions affecting the upper and lower airways (e.g., upper airway obstruction/foreign body, bronchitis, pneumonia/bronchiolitis, chronic obstructive pulmonary disease,

**TABLE 1. Components of care, key clinical activities, and action steps for providing quality asthma care**

Components of care	Key clinical activities	Action steps
Assessment and monitoring	1. Establish asthma diagnosis	Establish a pattern of symptoms and history of recurrent episodes. Document reversible airflow using spirometry. Rule out other conditions.
	2. Classify severity of asthma	Follow the NAEPP* classification system and recheck at every visit.
	3. Schedule routine follow-up care	See patients at least every 1–6 months according to severity. Perform spirometry at least every 1–2 years for the stable patient, more often for the unstable patient. Review medication use, care plan, and self-management skills at every visit.
	4. Assess for referral to specialty care	Refer to specialty care when referral criteria are met.
Control of factors contributing to asthma severity	5. Recommend measures to control asthma triggers	Determine exposures and sensitivities, including environmental and occupational triggers. Review ways to reduce exposure to allergens and irritants that provoke asthma symptoms. Discuss smoking avoidance with every patient who smokes or who is exposed to environmental tobacco smoke. Assess for EIB* if symptoms occur during exercise, and provide medication and advice to enable physical activity.
	6. Treat or prevent comorbid conditions	Consider, particularly, rhinitis, sinusitis, GERD,* or COPD.* Provide annual influenza vaccination for patients with persistent asthma.
Pharmacotherapy	7. Prescribe medications according to severity	Reduce inflammation in patients with persistent asthma with antiinflammatory medications. Increase medications if necessary; decrease when possible. Provide appropriate medication delivery and monitoring devices. Recommend spacers, nebulizers, or both if needed and consider PFM* for patients with moderate to severe asthma or a history of severe exacerbations.
	8. Monitor use of $\beta$ 2-agonist drugs	Reevaluate patients using more than one canister per month of short-acting $\beta$ 2-agonist drug.
Education for partnership in care	9. Develop a written asthma management plan	Agree on therapy goals. Outline daily treatment and monitoring measures. Prepare an action plan to handle worsening symptoms/exacerbations.
	10. Provide routine education on patient self-management	Teach/review: How and why to take long-term control and quick-relief medications. Correct technique for inhaler, spacer, PFM,* and nebulizer as indicated. Peak flow/symptom monitoring with patients when appropriate. Factors that worsen asthma and actions to take.

\* NAEPP: National Asthma Education and Prevention Program, EIB: exercise-induced bronchoconstriction, GERD: gastroesophageal reflux disease, COPD: chronic obstructive pulmonary disease, PFM: peak flow meter.

tumor/neoplasm, pulmonary embolism, congestive heart failure, vocal cord dysfunction, or viral lower respiratory tract infection) should be ruled out and may require additional tests. For the patient with a probable diagnosis of asthma after initial evaluation (i.e., symptomatic with normal spirometry and no alternative diagnosis), presumptive treatment may be necessary to reach a final diagnosis. Referral to a specialist (see Key Clinical Activity 4) may be necessary if the diagnosis is in doubt, other conditions are aggravating the asthma, or the

contribution of occupational or environmental exposures needs to be confirmed.

For infants and children aged <5 years, the diagnostic steps are the same except that spirometry, the most objective measure of lung function, is not feasible for this age group. Therefore, young children with asthma symptoms should be treated as having suspected asthma once alternative diagnoses are ruled out. Their medical histories and physical examinations should be expanded to look for factors associated with the develop-

ment of chronic persistent asthma: more than three episodes of wheezing in the past year that lasted more than 1 day and affected sleep, AND parental history of asthma or physician-diagnosed atopic dermatitis, or two of the following: physician-diagnosed allergic rhinitis, wheezing apart from colds, or peripheral blood eosinophilia (15). Over time, the diagnosis may become apparent or referral to a specialist may be necessary to perform additional testing to exclude other diagnoses.

Many children aged <6 years who wheeze with respiratory tract infections respond well to asthma therapy (16) even though the diagnosis may be unconfirmed until persistence or recurrence of signs and symptoms is established. Approximately one third of children who wheeze with respiratory infections develop asthma that persists after age 6 (17).

### Key Clinical Activity 2. Classify Severity of Asthma

Because asthma is characterized by varying signs and symptoms, for appropriate treatment and monitoring, the severity of such signs and symptoms must be classified at the initial and all subsequent visits. Initially and before treatment has been optimized, clinical signs, symptoms, and peak flow monitoring or spirometry are used to classify severity (Table 2) (Box 2). After the patient's asthma is stable, severity is subsequently classified according to the level of medication required to maintain treatment goals (Table 3).

Health-care providers should have the knowledge, equipment, staff or access to needed resources to aid in classification and proper management of all patients with asthma.

### Key Clinical Activity 3. Schedule Routine Follow-Up Care

Patients with asthma experience varying symptoms and severity because of the nature of asthma, their exposure to environmental allergens or irritants, or insufficient adherence to their medication regimen. For these reasons, they require adjustments in therapy and regular follow-up visits. The first follow-up visit should be scheduled within the month after

#### BOX 2. Questions to ask in assessing patients with asthma

##### Assessing and Monitoring Severity of Symptoms

In the past 2 weeks, how many times have you

- had problems with coughing, wheezing (whistling in your chest), shortness of breath, or chest tightness during the day?
- awakened at night from sleep because of coughing or other asthma symptoms?
- awakened in the morning with asthma symptoms?
- had asthma symptoms that did not improve within 15 minutes of inhaling a short-acting  $\beta_2$ -agonist?
- missed days from work/school?
- had symptoms while exercising or playing?

##### Assessing and Monitoring Lung Function

What is your highest and lowest peak flow rate since your last visit?

Has your peak flow dropped below \_\_\_\_\_ L/min (80% of personal best) since your last visit?

initial diagnosis. Routine visits thereafter should be scheduled every 1–6 months, depending on the severity of asthma and the patient's ability to maintain control of symptoms.

Routine care includes clinical assessment of airway function over time. Spirometry is recommended at the initial assessment and at least every 1–2 years after treatment is initiated and the symptoms and peak expiratory flow have stabilized. Spirometry as a monitoring measure may be performed more frequently, if indicated, on the basis of severity of symptoms and the disease's lack of response to treatment.

At all follow-up visits, the physician reviews the patient's medication use and management plan, including self-monitoring records. Also at each visit, the physician should assess the patient's self-management skills, including correct technique for use of inhalers, spacers, and peak flow meters, as applicable. See Education for Partnership in Care (Key Clinical Activities 9 and 10) for more detailed discussion regarding the asthma management plan and patient self-management.

All patients should have access to and be instructed in the use of devices needed to administer medication or monitor their asthma (e.g., inhalers, spacers, nebulizers, and peak flow meters [PFMs]). Several devices may be required to ensure optimal treatment. Patients who use inhaled corticosteroids delivered by metered-dose inhalers should use a spacer to increase consistency of the dose and to minimize the possibility of local side effects. Some patients cannot easily coordinate actuation and inhalation using a metered-dose inhaler; spacers enable easier and more effective administration of medica-

TABLE 2. Classification of asthma severity

Classification	Step	Days with symptoms	Nights with symptoms	For adults and children aged >5 years who can use a spirometer or peak flow meter	
				FEV1 or PEF* % predicted normal	PEF variability (%)
Severe persistent	4	Continual	Frequent	≤60	>30
Moderate persistent	3	Daily	>1/week	>60–<80	>30
Mild persistent	2	>2/week, but <1 time/day	>2/month	≥80	20–30
Mild intermittent	1	≤2/week	<2/month	≥80	<20

\*Percentage predicted values for forced expiratory volume in 1 second (FEV1) and percentage of personal best for peak expiratory flow (PEF).

**TABLE 3. Medications used in different levels of asthma severity\***

Classification	Step	Daily medication	Quick relief medication
Severe persistent	4	High-dose inhaled steroids (ICS) and long-acting inhaled $\beta_2$ -agonist  If needed, add oral steroids	Short-acting inhaled $\beta_2$ -agonist, as needed; oral steroids may be required
Moderate persistent	3	Low-to-medium-dose ICS and long-acting $\beta_2$ -agonist (preferred)  Or  Medium-dose ICS (another preferred option for children aged <5 years)  Or  Low-to-medium-dose ICS and either leukotriene modifier or theophylline	Short-acting inhaled $\beta_2$ -agonist, as needed; oral steroids may be required
Mild persistent	2	Low-dose inhaled steroids (preferred)  Or  Cromolyn, leukotriene modifier, or (except for children aged <5 years) nedocromil or sustained release theophylline to serum concentration of 5–15 $\mu\text{g/mL}$	Short-acting inhaled $\beta_2$ -agonist, as needed; oral steroids may be required
Mild intermittent	1	No daily medicine needed	Short-acting inhaled $\beta_2$ -agonist, as needed; oral steroids may be required

\* The medications listed here are appropriate for treating asthma at different levels of severity. The preferred treatments, dosage, and type of medication recommended vary for adults and children and are detailed in the *EPR-Update 2002* stepwise approach to therapy. The stepwise approach emphasizes that therapy should be stepped up as necessary and stepped down when possible to identify the least amount of medication required to achieve goals of therapy. The stepwise approach to care is intended to assist, not replace, the clinical decision making required to meet individual patient needs. **Sources:** National Heart, Lung, and Blood Institute, National Asthma Education and Prevention Program. Expert Panel Report 2: guidelines for the diagnosis and management of asthma. Bethesda MD: US Department of Health and Human Services, National Institutes of Health, 1997; pub. no. 97-4051. Available at <http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf>. National Heart, Lung, and Blood Institute, National Asthma Education and Prevention Program. Quick reference for the NAEPP Expert Panel Report: guidelines for the diagnosis and management of asthma—Update on selected topics 2002. Bethesda MD: US Department of Health and Human Services, National Institutes of Health, 2002; pub. no. 02-5075. Available at <http://www.nhlbi.nih.gov/guidelines/asthma/index.htm>.

tion. Spacers with face masks and nebulizers are both available for young children.

PFMs are recommended for patients with moderate or severe, persistent asthma and those with a history of severe exacerbations to help them monitor their symptoms during daily management as well as their response to home treatment during an exacerbation.

#### **Key Clinical Activity 4. Assess for Referral to Specialty Care**

Referral to an asthma specialist for consultation or comanagement is recommended in the following circumstances:

- A single life-threatening asthma exacerbation occurs.
- Treatment goals for the patient's asthma are not being met after 3 weeks to 6 months of treatment, or earlier if the physician concludes that the asthma is not responding to current therapy.
- Atypical signs and symptoms make asthma diagnosis unclear, or other conditions are complicating asthma or its diagnosis.
- The patient has a history suggesting that asthma is being provoked by occupational factors, an environmental inhalant, or an ingested substance.
- The initial diagnosis is severe, persistent asthma.
- Additional diagnostic testing is indicated.

- The patient is a child aged <3 years with moderate or severe persistent asthma.
- The patient is a candidate for immunotherapy.
- The patient or family requires additional education or guidance in managing asthma complications or therapy, following the treatment plan, or avoiding asthma triggers.
- The patient requires continuous oral corticosteroid therapy or high-dose inhaled corticosteroids, or has required more than two courses of oral corticosteroids in 1 year.

Specialty care for asthma may be provided by an allergist, pulmonologist, or other physician with expertise in asthma management. Patients undergoing specialty care may be comanaged by the referring physician or monitored by the referring physician in accordance with the specialty care physician's treatment regimen.

### **Identifying and Controlling Factors Contributing to Asthma Severity**

#### **Key Clinical Activity 5. Recommend Measures to Control Asthma Triggers**

Environmental tobacco smoke (ETS) and house dust mite, cockroach, and cat and dog allergens can worsen asthma (or

trigger asthma exacerbations) in sensitized and exposed persons (18). Irritant or allergen sensitivity can be determined by the patient's exposure and symptom history and confirmed with skin or blood testing. Allergy testing for perennial indoor allergens is recommended for persons with persistent asthma who are taking daily medications. After sensitivity is determined, avoidance of the trigger is recommended, and allergen abatement might be indicated. Ways to reduce allergen and irritant exposure should be reviewed and agreement sought with the patient to initiate measures. Examples of trigger avoidance include using dust mite impermeable pillow and mattress covers, removing furry pets, and taking measures to eliminate cockroaches (Box 3).

No patient with asthma should smoke or be exposed to ETS. Physicians should review smoking status at the initial visit and all subsequent visits and, if patients smoke or are regularly exposed to ETS, should encourage and refer them to stop smoking.

Exercise-induced bronchoconstriction describes the transient narrowing of airways associated with physical exertion in persons with asthma (17). Exercise-induced bronchoconstriction may be prevented with optimal long-term control of asthma. If the patient remains symptomatic during exercise, specific medications can be taken before exercise to prevent exercise-induced bronchoconstriction.

### Key Clinical Activity 6.

#### Treat or Prevent All Comorbid Conditions

Allergic rhinitis, sinusitis, gastroesophageal reflux, and sensitivity to certain medicines, including aspirin, nonsteroidal antiinflammatory drugs (NSAIDs), and beta blockers, can exacerbate asthma symptoms. Health-care providers should evaluate their asthma patients for these conditions and inquire about their medications, especially when asthma symptoms persist or worsen despite medication adjustments.

Health-care providers should provide annual influenza vaccinations to patients with persistent asthma to prevent a respiratory infection that can exacerbate asthma. However, patients who are clinically allergic to egg should not get the vaccine.

## Pharmacotherapy

### Key Clinical Activity 7.

#### Prescribe Medications According to Severity

Current evidence indicates that daily long-term control medications are necessary to prevent exacerbations and chronic symptoms for all patients with persistent asthma, whether the persistent asthma is mild, moderate, or severe. Inhaled corticosteroids are preferred because they are the most effective antiinflammatory medication available for treating the under-

### BOX 3. Steps to reduce asthma triggers

**Allergens** Reduce or eliminate exposure to allergens to which the patient is sensitive:

- **Animal dander:** Remove animals from the house or, at a minimum, keep animals out of the patient's bedroom; use a filter for the air ducts leading to the bedroom.
- **House dust mites:**
  - Essential: Encase mattress and pillow in an allergen-impermeable cover or wash pillow weekly as an alternative. Wash sheets and blankets from the patient's bed in hot water (>130°F) weekly.
  - Desirable: Reduce indoor humidity to <50%. Remove carpets from the bedroom. Avoid sleeping or lying on upholstered furniture. Remove wall-to-wall carpets that are laid on concrete.
- **Cockroaches:** Use poison bait or traps to control. Do not leave food or garbage exposed.
- **Pollens and outdoor molds:** To avoid exposure to outdoor allergens during their active season, persons with asthma should stay indoors with windows closed, especially in the afternoon.
- **Indoor molds:** Fix all leaks and eliminate water sources associated with mold growth; clean moldy surfaces. Consider reducing indoor humidity to <50%.
- **Work environment:** Identify and control exposures to allergens and chemical sensitizers.

#### Tobacco smoke

- Advise patients and others in the home who smoke to stop smoking or to smoke outside the home.
- Discuss ways to reduce exposure to other sources of tobacco smoke, such as from child care providers and the workplace.

**Indoor/outdoor pollutants and irritants** Discuss ways to reduce exposure at home and work to the following:

- Wood-burning stoves or fireplaces
- Unvented stoves or heaters
- Other irritants (e.g., perfumes, cleaning agents, sprays, dust, vapors)

lying inflammation characteristic of persistent asthma. For patients with mild persistent asthma, other long-term medications—cromolyn, leukotriene modifiers, nedocromil, and theophylline—are available but have not been demonstrated to be as effective as inhaled corticosteroids. Patients with moderate or severe disease usually require additional medication combined with inhaled corticosteroids for daily long-term control. All patients with asthma require a short-acting bronchodilator medication for managing acute symptoms or exacerbations when they occur; severe exacerbations require the addition of systemic (oral) corticosteroids to treat the increased inflammation present (see *EPR-2* for additional information about managing exacerbations of asthma).



The dosage and type of medications are crucial because asthma treatment is adjusted according to the level of asthma severity. Once therapy goals are achieved, a gradual reduction in treatment should be carefully undertaken to identify the minimum dose required to maintain control (Table 3).

On the basis of the severity of asthma in an individual patient, various medication delivery and monitoring devices may be necessary (see Key Clinical Activity 3 for discussion of spacers/holding chambers, nebulizers, and peak flow and symptom monitoring).

### **Key Clinical Activity 8. Monitor Use of $\beta$ 2-Agonist Drugs**

Patients whose need increases for short-acting inhaled  $\beta$ 2-agonist to control serious day and night symptoms probably have inadequately controlled asthma. Although patients may need short-acting inhaled  $\beta$ 2-agonist during upper respiratory viral infections and exercise-induced bronchoconstriction, using more than one canister of short-acting  $\beta$ 2-agonist drugs per month is usually considered above expected use. At every patient visit, the health-care provider should review  $\beta$ 2-agonist medication use, including the patient's understanding of the dosage instructions, inhaler technique, and reasons for increased use. For patients using more  $\beta$ 2-agonist drugs than expected, daily long-term control therapy should be increased as needed, either by initiating or increasing daily long-term control therapy (Table 3).

## **Education for Partnership in Care**

### **Key Clinical Activity 9. Develop a Written Asthma Management Plan**

As part of the overall management of patients with asthma, the health-care provider, in consultation with the patient or the parent or guardian of a child with asthma, should develop a written plan as part of educating patients regarding self-management, especially for patients with moderate or severe persistent asthma and those with a history of severe exacerbation. The National Heart, Lung, and Blood Institute provides more specific advice on asthma management plans, emphasizing the provider/patient partnership (available at <http://www.nhlbi.nih.gov/health/public/lung/asthma/asthma.htm#plan>). Writing the management plan helps clarify expectations for treatment (Box 4) and provides patients with an easy reference for remembering how to manage their asthma. The action plan should include written instructions on recognizing symptoms and signs of worsening asthma; taking appropriate medicines (type, dose, and frequency); recognizing when to seek medical care; and monitoring response to medications. Symptom-based plans may be equally effective as plans based

#### **BOX 4. Goals for asthma therapy**

- Minimal or no chronic asthma symptoms, day or night.
- No limitations on activities; no school/work missed because of asthma.
- Minimal or no recurrent exacerbations of asthma; minimal or no emergency department visits or hospitalizations.
- Minimal use of inhaled short-acting  $\beta$ 2-agonist (<1 time per day; <1 canister per month).
- Normal or near-normal lung function.
- Minimal or no adverse side-effects from medications.
- Satisfaction with asthma care.

on peak flow monitoring, although some patient preferences and circumstances (e.g., inability to recognize or report signs and symptoms of worsening asthma) may warrant a choice of peak flow monitoring. The management plan should be reviewed and adjusted, as needed, at every visit. For children, a copy of the plan should be given to each care giver and the child's school.

### **Key Clinical Activity 10. Provide Routine Education on Patient Self-Management**

Asthma education is essential for successful management of the disease. Effective asthma education is developed in a patient-provider partnership, tailored to the individual patient's needs relative to cultural or ethnic beliefs and practices. At a minimum, competent asthma education enlists and encourages family support, includes instructions on self-management skills (Box 5), and is integrated with routine ongoing care. It is provided, either as group or individual patient programs, to all patients and parents/guardians of children who have had a diagnosis of asthma.

A patient's ability to take asthma medications is a necessary skill of self-management. Patients and parents/guardians of children with asthma need to know the rationale behind daily long-term and quick-relief medications, how to take medications correctly, and how to adjust the dosage if asthma symptoms occur.

Instructions and verification on the proper use of any medication delivery devices and PFMs (for patients with moderate

#### **BOX 5. Patient self-management skills**

- Recognize signs and symptoms of worsening asthma.
- Take medicines appropriately.
- Use peak flow meters appropriately.
- Monitor response to medications.
- Follow a written action plan.
- Seek medical treatment as needed.

or severe persistent asthma) should be provided at the initial and each subsequent visit. Instruction should include how to interpret peak flow results and take action according to the asthma management plan.

To help patients avoid or control environmental factors that worsen their asthma, education should focus first on identifying simple measures. Once the patient notices improved asthma control, more complicated or extensive measures can be undertaken. Including members of the family in these discussions may be helpful because implementing avoidance and control measures often affects all family members. This is especially true with ETS education.

## Conclusion

The 10 key clinical activities for quality asthma care, derived from the NAEPP *EPR-2* and *EPR-Update 2002*, offer guidance for health-care managers and planners in making decisions regarding the resources necessary to ensure quality health care for persons with asthma. Managers and planners using these guides should understand the resources needed for appropriate diagnosis and treatment of asthma and the corresponding clinical activities recommended to ensure proper care and control of asthma. Action steps listed for each activity suggest specific ways to accomplish the respective activities. Adoption of the key clinical activities will lead to more appropriate health care for persons with asthma.

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## National Asthma Education and Prevention Program (NAEPP) Professional and Patient/Public Education Subcommittee

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