

# Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma Full Report 2007

## RECOMMENDATIONS

### Recommendation

#### Selecting Initial Therapy

**Conditional:** 0–4 Years of Age: Initiating Long-Term Control Therapy. The Expert Panel concludes that initiating daily long-term control therapy: and#14; Is recommended for reducing impairment and risk of exacerbations in infants and young children who had four or more episodes of wheezing in the past year that lasted more than 1 day and affected sleep AND who have risk factors for developing persistent asthma: either (1) one of the following: parental history of asthma, a physician diagnosis of atopic dermatitis, or evidence of sensitization to aeroallergens OR (2) two of the following: evidence of sensitization to foods, 4 percent peripheral blood eosinophilia, or wheezing apart from colds (Evidence A).

Rec\_1: Cond\_1

### Recommendation

#### Selecting Initial Therapy (2)

**Conditional:** 0–4 Years of Age: Initiating Long-Term Control Therapy. The Expert Panel concludes that initiating daily long-term control therapy: Should be considered for reducing impairment in infants and young children who consistently require symptomatic treatment more than 2 days per week for a period of more than 4 weeks (Evidence D).

Rec\_2: Cond\_2

### Recommendation

#### Selecting Initial Therapy (3)

**Conditional:** 0–4 Years of Age: Initiating Long-Term Control Therapy. The Expert Panel concludes that initiating daily long-term control therapy: Should be considered for reducing risk in infants and young children who have a second asthma exacerbation requiring systemic corticosteroids within 6 months (Evidence D). Recognition of these children and treatment with daily low-dose ICS therapy can significantly reduce overall symptom burden and the frequency of exacerbations, even though such treatment will not alter the

underlying severity of asthma in later childhood

Rec\_3: Cond\_3

### **Recommendation**

#### Selecting Initial Therapy (4)

**Conditional:** 0–4 Years of Age: Initiating Long-Term Control Therapy. The Expert Panel concludes that initiating daily long-term control therapy: May be considered for use only during periods of previously documented risk for a child (Evidence D). If daily long-term control therapy is discontinued after the season of increased risk, written asthma action plans indicating specific signs of worsening asthma and actions to take should be reviewed with the caregivers, and a clinic contact should be scheduled 2–6 weeks after discontinuation of therapy to ascertain whether adequate control is maintained satisfactorily (Evidence D).

Rec\_4: Cond\_4

### **Recommendation**

#### 5–11 Years of Age: Initiating Long-Term Control Therapy.

**Conditional:** 5–11 Years of Age: Initiating Long-Term Control Therapy. The Expert Panel recommends daily long-term control therapy for children who have persistent asthma

Rec\_5: Cond\_5

### **Recommendation**

#### Adjusting Therapy

**Conditional:** The Expert Panel recommends that, if a child is already taking long-term control medication, treatment decisions are based on the level of asthma control that has been achieved: therapy should be stepped up if necessary to achieve control

Rec\_6: Cond\_6

### **Recommendation**

#### control of the impairment domain is not achieved and maintained

**Conditional:** The Expert Panel recommends the following actions if control of the impairment domain is not achieved and maintained at any step of care: Patient adherence and technique in using medications correctly should be assessed and addressed as appropriate (Evidence C).

Rec\_7: Cond\_7

**Conditional:** If patient adherence, inhaler technique, and environmental control measures are adequate, and asthma is not well controlled, a step up in treatment may be needed

Rec\_7: Cond\_8

## **Recommendation**

Address the risk domain (0-4 years)

**Conditional:** The Expert Panel recommends the following actions if control of the risk of exacerbations is not achieved or maintained (Evidence D): 0–4 years of age: If there is a history of one or more exacerbations, review adherence to medications and control of environmental exposures, review the patient’s written asthma action plan to confirm that it includes oral prednisone for patients who have histories of severe exacerbations, and consider stepping up therapy to the next level (Evidence D)

Rec\_8: Cond\_9

## **Recommendation**

Address the risk domain.(5-11 years)

**Conditional:** The Expert Panel recommends the following actions if control of the risk of exacerbations is not achieved or maintained (Evidence D) 5–11 years of age: If the history of exacerbations suggests poorer control than does the assessment of impairment, the following actions are recommended: reassess the impairment domain, review adherence to medications and control of environmental exposures, review the patient’s written asthma action plan to confirm that it includes oral prednisone for patients who have a history of severe exacerbations, and consider a step up in therapy, especially for children who have reduced lung function

Rec\_9: Cond\_10

## **Recommendation**

Address the risk domain with regard to side effects

**Conditional:** The Expert Panel recommends consideration of alternative and/or adjunctive therapies within the step of care the patient is receiving if the patient experiences troublesome or debilitating side effects. In addition, confirm efforts to control environmental exposures

Rec\_10: Cond\_11

## **Recommendation**

Consider referral to an asthma specialist.

**Conditional:** The Expert Panel recommends referral to an asthma specialist for consultation or comanagement of the patient if (Evidence D): — There are difficulties achieving or maintaining control of asthma. — A child 0–4 years of age requires step 3 care or higher (step 4 care or higher for children 5–11 years of age)

to achieve and maintain control or if additional education is indicated to improve the patients' management skills or adherence. Referral may be considered if a child 0–4 years of age requires step 2 care or a child 5–11 years of age requires step 3 care. — The patient has had an exacerbation requiring hospitalization. — Immunotherapy or other immunomodulators are considered, or additional tests are indicated, to determine the role of allergy.

Rec\_11: Cond\_12

**Conditional:** A child 0–4 years of age requires step 3 care or higher (step 4 care or higher for children 5–11 years of age) to achieve and maintain control or if additional education is indicated to improve the patients' management skills or adherence. Referral may be considered if a child 0–4 years of age requires step 2 care or a child 5–11 years of age requires step 3 care

Rec\_11: Cond\_13

**Conditional:** A child 0–4 years of age requires step 3 care or higher (step 4 care or higher for children 5–11 years of age) to achieve and maintain control or if additional education is indicated to improve the patients' management skills or adherence. Referral may be considered if a child 0–4 years of age requires step 2 care or a child 5–11 years of age requires step 3 care

Rec\_11: Cond\_14

**Conditional:** Referral may be considered if a child 0–4 years of age requires step 2 care or a child 5–11 years of age requires step 3 care.

Rec\_11: Cond\_15

**Conditional:** Referral may be considered if a child 0–4 years of age requires step 2 care or a child 5–11 years of age requires step 3 care

Rec\_11: Cond\_16

## **Recommendation**

### Followup

**Imperative:** The Expert Panel recommends that regular followup contact is essential (Evidence B).

Rec\_12: Imp\_1

## **Recommendation**

### Maintaining control

**Conditional:** The Expert Panel recommends that once well-controlled asthma is achieved and maintained for at least 3 months, a reduction in pharmacologic therapy—a step down— can be considered helpful to identify the minimum therapy for

maintaining well-controlled asthma (Evidence D).

Rec\_13: Cond\_17

### **Recommendation**

Pharmacologic Issues for Children 0–4 Years of Age

**Conditional:** If there is no clear response within 4–6 weeks, the therapy should be discontinued and alternative therapies or alternative diagnoses considered

Rec\_14: Cond\_18

**Conditional:** If there is a clear and positive response for at least 3 months, a step down in therapy should be undertaken to the lowest possible doses of medication required to maintain asthma control

Rec\_14: Cond\_19

### **Recommendation**

Step 1 Care, Children 0–4 Years of Age

**Conditional:** The Expert Panel recommends the following treatment for intermittent asthma: SABA taken as needed to treat symptoms is usually sufficient therapy for intermittent asthma (EPR2 1997). If effective in relieving symptoms, intermittent use of SABA can continue on an as-needed basis. Increasing use, however, may indicate more severe or inadequately controlled asthma and thus a need to step up therapy.

Rec\_15: Cond\_20

### **Recommendation**

managing exacerbations due to viral respiratory infections

**Conditional:** If the symptoms are mild, SABA (every 4–6 hours for 24 hours, longer with a physician consult) may be sufficient to control symptoms and improve lung function.

Rec\_16: Cond\_21

**Conditional:** If this therapy needs to be repeated more frequently than every 6 weeks, consider a step up in long-term care.

Rec\_16: Cond\_22

**Conditional:** If the viral respiratory infection provokes a moderate-to-severe exacerbation, a short course of oral systemic corticosteroids should be considered (1 mg/kg/day prednisone or equivalent for 3–10 days)

Rec\_16: Cond\_23

**Conditional:** For those patients who have a history of severe exacerbations with viral respiratory infections, consider initiating oral systemic corticosteroids at the first sign of the infection.

Rec\_16: Cond\_24

## Recommendation

asthma action plan

**Conditional:** The Expert Panel recommends that a detailed written asthma action plan be developed for those patients who have intermittent asthma and a history of severe exacerbations

Rec\_17: Cond\_25

## Recommendation

PERSISTENT ASTHMA

**Conditional:** Daily long-term control medication at step 2 or above is recommended for children who had four or more wheezing episodes in 1 year and risk factors for persistent asthma

Rec\_18: Cond\_26

**Conditional:** Consider daily therapy for children who have a second exacerbation requiring oral systemic corticosteroids in 6 months or children who consistently require symptomatic treatment andgt;2 days a week for andgt; 4 weeks

Rec\_18: Cond\_27

**Conditional:** To gain more rapid control of asthma, a course of oral systemic corticosteroids may be necessary for the patient who has an exacerbation at the time long-term control therapy is started or in patients who have moderate or severe asthma with frequent interference with sleep or normal activity

Rec\_18: Cond\_28

**Conditional:** If no clear response occurs within 4–6 weeks and medication technique and adherence are satisfactory, the treatment should be discontinued and a change in therapy or alternative diagnoses should be considered.

Rec\_18: Cond\_29

**Conditional:** If there is a clear and positive response for at least 3 months, a step down in therapy should be undertaken to the lowest possible doses of medication required to maintain asthma control (

Rec\_18: Cond\_30

**Imperative:** SABA should be taken as needed to relieve symptoms

Rec\_18: Imp\_2

**Imperative:** Giving daily therapy only during specific periods of previously documented risk for a child may be considered

Rec\_18: Imp\_3

## Recommendation

Step 2 Care, Children 0–4 Years of Age

**Conditional:** If an alternative treatment is selected and adequate asthma

control is not achieved and maintained in 4–6 weeks, then discontinue that treatment and use the preferred medication before stepping up therapy.

Rec\_19: Cond\_31

**Conditional:** Therefore, it is the opinion of the Expert Panel that low-dose ICS is the preferred daily long-term control therapy for infants and young children who have never before been treated with long-term control therapy. This medication should be prescribed in the form of a therapeutic trial, and response should be monitored carefully. Treatment should be stopped if a clear beneficial effect is not obvious within 4–6 weeks and the patient/family medication technique and adherence are satisfactory. If a clear and positive response exists for at least 3 months (and given the high rates of spontaneous remission of symptoms in this age group), the need for ICS therapy should be reevaluated. A step down to intermittent therapy, as needed for symptoms, may then be considered

Rec\_19: Cond\_32

**Conditional:** A trial of montelukast in children 2 years of age or older can be considered in situations in which inhaled medication delivery is suboptimal due to poor technique or adherence.

Rec\_19: Cond\_33

**Imperative:** Preferred treatment for step 2 care is daily ICS at a low dose

Rec\_19: Imp\_4

**Imperative:** Alternative, but not preferred, treatments include (listed in alphabetical order) cromolyn (Evidence B—extrapolated from studies in older children) and montelukast (Evidence A). If an alternative treatment is selected and adequate asthma control is not achieved and maintained in 4–6 weeks, then discontinue that treatment and use the preferred medication before stepping up therapy.

Rec\_19: Imp\_5

**Imperative:** Theophylline is not recommended as alternative treatment (EPR2 1997) because of its erratic metabolism during viral infections and febrile illness in children less than 5 years of age and the need to closely monitor and control serum concentrations.

Rec\_19: Imp\_6

## **Recommendation**

### Step 3 Care, Children 0–4 Years of Age

**Conditional:** The Expert Panel recommends increasing the dose of ICS, for children 0–4 years of age whose asthma is not well controlled on low doses of ICS, to ensure that an adequate dose is delivered (due to the inherent difficulty and variability of

delivering aerosols) before adding adjunctive therapy

Rec\_20: Cond\_34

**Imperative:** Medium-dose ICS is the preferred step 3 treatment

Rec\_20: Imp\_7

### **Recommendation**

Step 4 Care, Children 0–4 Years of Age

**Imperative:** Medium-dose ICS AND either (listed in alphabetical order) LABA or montelukast is the preferred treatment for step 4

Rec\_21: Imp\_8

**Imperative:** Theophylline is not recommended as add-on therapy

Rec\_21: Imp\_9

### **Recommendation**

Step 5 Care, Children 0–4 Years of Age

**Imperative:** High-dose ICS AND either LABA or montelukast is the preferred treatment

Rec\_22: Imp\_10

### **Recommendation**

Step 6 Care, Children 0–4 Years of Age

**Imperative:** High-dose ICS AND either LABA or montelukast AND oral systemic corticosteroids may be given for step 6

Rec\_23: Imp\_11

### **Recommendation**

Treatment: Special Issues for Children 5–11 Years of Age

**Conditional:** The Expert Panel recommends that, when initiating daily long-term control therapy for mild or moderate persistent asthma, the choice of medication includes consideration of treatment effectiveness, the domain of particular relevance to the patient's asthma (impairment, risk, or both), the individual patient's history of previous response to therapies, the ability of the patient and family to use the medication correctly, anticipated patient and family adherence to the treatment regimen, and cost

Rec\_24: Cond\_35

**Imperative:** The Expert Panel recommends that the clinician prepare a written asthma action plan for the student's school or childcare setting.

Rec\_24: Imp\_12

**Imperative:** The Expert Panel recommends that physical activity at play or in organized sports is an essential part of a child's life, and full participation in physical activities should be encouraged



Rec\_24: Imp\_13

## **Recommendation**

### Step 1 Care, Children 5–11 Years of Age

**Conditional:** Manage moderate or severe exacerbations due to viral respiratory infections, especially common in children, with a short course of oral systemic corticosteroids.

Rec\_25: Cond\_36

**Conditional:** Consider initiating systemic corticosteroids at the first sign of infection in children who have a history of severe exacerbations with viral respiratory infections

Rec\_25: Cond\_37

**Conditional:** Provide a detailed written asthma action plan for those patients who have intermittent asthma and a history of severe exacerbations

Rec\_25: Cond\_38

**Imperative:** The Expert Panel recommends the following therapy for intermittent asthma (step 1 care): SABA, taken as needed to treat symptoms, is usually sufficient therapy for intermittent asthma.

Rec\_25: Imp\_14

## **Recommendation**

### PERSISTENT ASTHMA

**Conditional:** To gain more rapid control of asthma, consider a course of oral systemic corticosteroids for the patient who has an exacerbation at the time long-term control therapy is started or in patients who have moderate or severe asthma with frequent interference with sleep or normal activity

Rec\_26: Cond\_39

**Conditional:** Consider treating patients who had two or more exacerbations requiring oral systemic corticosteroids in the past year the same as patients who have persistent asthma, even in the absence of an impairment level consistent with persistent asthma

Rec\_26: Cond\_40

**Imperative:** Use daily long-term control medication.

Rec\_26: Imp\_15

**Imperative:** SABA, taken as needed to relieve symptoms, is recommended

Rec\_26: Imp\_16

**Imperative:** Giving daily therapy only during specific periods of previously documented risk for a child may be considered

Rec\_26: Imp\_17

## **Recommendation**

### Step 2 Care, Children 5–11 Years of Age

**Imperative:** Daily low-dose ICS is the preferred step 2 treatment

Rec\_27: Imp\_18

**Imperative:** Alternative treatments at this step include (listed in alphabetical order) cromolyn, LTRA, nedocromil, and theophylline

Rec\_27: Imp\_19

## **Recommendation**

### Step 3 Care, Children 5–11 Years of Age

**Imperative:** Low-dose ICS plus the addition of some form of adjunctive therapy or medium-dose ICS are equivalent options in step 3 care, based on extrapolation from studies in adults

Rec\_28: Imp\_20

**Imperative:** Increasing the dose of ICS to medium dose

Rec\_28: Imp\_21

## **Recommendation**

### Step 4 Care, Children 5–11 Years of Age

**Conditional:** In the opinion of the Expert Panel, if the add-on therapy initially administered does not lead to improvement in asthma control, discontinue it and use a trial of a different add-on therapy before stepping up.

Rec\_29: Cond\_41

**Imperative:** Medium-dose ICS AND LABA is the preferred step 4 treatment

Rec\_29: Imp\_22

**Imperative:** Alternative, but not preferred, treatment is medium-dose ICS AND either LTRA or theophylline

Rec\_29: Imp\_23

## **Recommendation**

### Step 5 Care, Children 5–11 Years of Age

**Imperative:** High-dose ICS AND LABA is the preferred step 5 treatment

Rec\_30: Imp\_24

**Imperative:** Alternative, but not preferred, add-on treatments include LTRA or theophylline

Rec\_30: Imp\_25

## **Recommendation**

### Step 6 Care, Children 5–11 Years of Age

**Conditional:** When well-controlled asthma is achieved, make persistent attempts to reduce oral systemic corticosteroids. High-dose ICS therapy is preferable to oral systemic corticosteroids.

Rec\_31: Cond\_42

**Imperative:** High-dose ICS AND LABA AND oral systemic corticosteroids long term is the preferred treatment

Rec\_31: Imp\_26

**Imperative:** Alternative, but not preferred, add-on treatments are either an LTRA or theophylline AND oral systemic corticosteroids

Rec\_31: Imp\_27

**Imperative:** Recommend consultation with an asthma specialist.

Rec\_31: Imp\_28

## Recommendation

### PULMONARY FUNCTION TESTING (SPIROMETRY)

**Conditional:** The Expert Panel recommends that spirometry measurements—FEV1, forced expiratory volume in 6 seconds (FEV6 ), FVC, FEV1 /FVC—before and after the patient inhales a short-acting bronchodilator should be undertaken for patients in whom the diagnosis of asthma is being considered, including children 5 years of age

Rec\_32: Cond\_43

**Conditional:** The Expert Panel recommends that office-based physicians who care for asthma patients should have access to spirometry, which is useful in both diagnosis and periodic monitoring. Spirometry should be performed using equipment and techniques that meet standards developed by the ATS

Rec\_32: Cond\_44

**Conditional:** The Expert Panel recommends that when office spirometry shows severe abnormalities, or if questions arise regarding test accuracy or interpretation, further assessment should be performed in a specialized pulmonary function laboratory

Rec\_32: Cond\_45

## Recommendation

### CLASSIFY ASTHMA SEVERITY

**Imperative:** The Expert Panel recommends that clinicians classify asthma severity by using the domains of current impairment and future risk (Evidence B—secondary analyses of clinical trials, and Evidence C—observational studies, for assessing impairment; Evidence C, for distinguishing intermittent versus persistent asthma by risk of exacerbations; Evidence D, for distinguishing different categories of persistent asthma by varying frequencies of exacerbations).

Rec\_33: Imp\_29

**Imperative:** Assessment of severity requires assessing the following components of current impairment: Symptoms — Nighttime awakenings — Need for SABA for quick relief of symptoms — Work/school days missed — Ability to engage in normal daily activities or in desired activities — Quality-of-life assessments Lung function, measured by spirometry: FEV1, FVC (or FEV6), FEV1/FVC (or FEV6 in adults).

Rec\_33: Imp\_30

## Recommendation

### MEASURES FOR PERIODIC ASSESSMENT AND MONITORING OF ASTHMA CONTROL

**Imperative:** The Expert Panel recommends that ongoing monitoring of asthma control be performed to determine whether all the goals of therapy are met—that is, reducing both impairment and risk (Evidence B); see figures 3–5 a, b, and c for assessing asthma control for different age groups

Rec\_34: Imp\_31

**Imperative:** The Expert Panel recommends that the frequency of visits to a clinician for review of asthma control is a matter of clinical judgment; in general, patients who have intermittent or mild persistent asthma that has been under control for at least 3 months should be seen by a clinician about every 6 months, and patients who have uncontrolled and/or severe persistent asthma and those who need additional supervision to help them follow their treatment plan need to be seen more often

Rec\_34: Imp\_32

## Recommendation

### Monitoring Signs and Symptoms of Asthma

**Conditional:** The Expert Panel recommends the following: If peak flow monitoring is performed, the written asthma action plan should use the patient's personal best peak flow as the reference value

Rec\_35: Cond\_46

**Imperative:** The Expert Panel recommends that every patient who has asthma should be taught to recognize symptom patterns that indicate inadequate asthma control (Evidence A) (See also “Component 2: Education for a Partnership in Asthma Care.”). Either symptom and/or PEF monitoring should be used as a means to determine the need for intervention, including additional medication, in the context of a written asthma action plan.

Rec\_35: Imp\_33

**Imperative:** The Expert Panel recommends that symptoms and clinical signs of asthma should be assessed at each health care visit

through physical examination and appropriate questions

Rec\_35: Imp\_34

**Imperative:** The Expert Panel recommends that the detailed symptoms history should be based on a short (2–4 weeks) recall period

Rec\_35: Imp\_35

**Imperative:** The Expert Panel recommends that assessment of the patient’s symptom history should include at least four key symptom expressions

Rec\_35: Imp\_36

**Imperative:** The Expert Panel recommends that, in addition to assessing symptoms, it is also important to assess pulmonary function periodically (Evidence B, extrapolation from clinical trials; and Evidence C, from observational studies).

Rec\_35: Imp\_37

**Imperative:** The Expert Panel recommends the following frequencies for spirometry measurements: (1) at the time of initial assessment (Evidence C); (2) after treatment is initiated and symptoms and PEF have stabilized, to document attainment of (near) “normal” airway function; (3) during a period of progressive or prolonged loss of asthma control; and (4) at least every 1–2 years to assess the maintenance of airway function (Evidence B, extrapolation from clinical trials). Spirometry may be indicated more often than every 1– 2 years, depending on the clinical severity and response to management (Evidence D). These spirometry measures should be followed over the patient’s lifetime to detect potential for decline and rate of decline of pulmonary function over time (Evidence C).

Rec\_35: Imp\_38

**Imperative:** Consider long-term daily peak flow monitoring for: — Patients who have moderate or severe persistent asthma (Evidence B). — Patients who have a history of severe exacerbations (Evidence B). — Patients who poorly perceive airflow obstruction and worsening asthma (Evidence D). — Patients who prefer this monitoring method (Evidence D).

Rec\_35: Imp\_39

**Imperative:** Provide to all patients a written asthma action plan that includes daily treatment and recognizing and handling worsening asthma, including self-adjustment of medications in response to acute symptoms or changes in PEF measures. Written action plans are particularly recommended for patients who have moderate or severe persistent asthma, a history of severe exacerbations, or poorly controlled asthma (Evidence B)

Rec\_35: Imp\_40

**Imperative:** The Expert Panel recommends that several key areas of

quality of life and related loss of physical function should be assessed periodically for each person who has asthma (Evidence C). These include: Any work or school missed because of asthma Any reduction in usual activities (either home/work/school or recreation/exercise) Any disturbances in sleep due to asthma Any change in caregivers' activities due to a child's asthma (for caregivers of children who have asthma)

Rec\_35: Imp\_41

**Imperative:** The Expert Panel recommends that, during periodic assessments, clinicians should question the patient and evaluate any records of patient self-monitoring (figure 3–7) to detect exacerbations, both those that are self-treated and those treated by other health care providers (Evidence C).

Rec\_35: Imp\_42

**Imperative:** The Expert Panel recommends monitoring the following factors at each visit: patient's adherence to the regimen, inhaler technique, and side effects of medications (Evidence C)

Rec\_35: Imp\_43

**Imperative:** The Expert Panel recommends that health care providers should routinely assess the effectiveness of patient–clinician communication (Evidence D).

Rec\_35: Imp\_44

**Imperative:** The Expert Panel recommends that two aspects of patient satisfaction should be monitored: satisfaction with asthma control and satisfaction with the quality of care (Evidence D)

Rec\_35: Imp\_45

## **Recommendation**

Referral to an Asthma Specialist for Consultation or Comanagement

**Conditional:** The Expert Panel recommends referral for consultation or care to a specialist in asthma care (usually, a fellowship-trained allergist or pulmonologist; occasionally, other physicians who have expertise in asthma management, developed through additional training and experience) when (Evidence D): Patient has had a life-threatening asthma exacerbation. Patient is not meeting the goals of asthma therapy after 3–6 months of treatment. An earlier referral or consultation is appropriate if the physician concludes that the patient is unresponsive to therapy. Signs and symptoms are atypical, or there are problems in differential diagnosis. Other conditions complicate asthma or its diagnosis (e.g., sinusitis, nasal polyps, aspergillosis, severe rhinitis, VCD, GERD, COPD). Additional diagnostic testing is indicated (e.g., allergy skin testing, rhinoscopy, complete pulmonary function studies, provocative challenge, bronchoscopy).

Patient requires additional education and guidance on complications of therapy, problems with adherence, or allergen avoidance. Patient is being considered for immunotherapy. Patient requires step 4 care or higher (step 3 for children 0–4 years of age). Consider referral if patient requires step 3 care (step 2 for children 0–4 years of age). Patient has required more than two bursts of oral corticosteroids in 1 year or has an exacerbation requiring hospitalization. Patient requires confirmation of a history that suggests that an occupational or environmental inhalant or ingested substance is provoking or contributing to asthma. Depending on the complexities of diagnosis, treatment, or the intervention required in the work environment, it may be appropriate in some cases for the specialist to manage the patient over a period of time or to comanage with the PCP. In addition, patients who have significant psychiatric, psychosocial, or family problems that interfere with their asthma therapy may need referral to an appropriate mental health professional for counseling or treatment.

Rec\_36: Cond\_47

**Imperative:** r

Rec\_36: Imp\_46

### **Recommendation**

#### **COST-EFFECTIVENESS**

**Imperative:** The Expert Panel recommends that asthma self-management education that is provided by trained health professionals be considered for policies and reimbursements as an integral part of effective asthma care; the education improves patient outcomes (Evidence A) and can be cost-effective (Evidence B).

Rec\_37: Imp\_47

### **Recommendation**

#### **Clinical Decision Supports**

**Imperative:** The Expert Panel recommends that: Prompts encouraging guideline-based care be integrated into system-based interventions focused on improving the overall quality of care rather than used as a single intervention strategy

Rec\_38: Imp\_48

**Imperative:** System-based interventions that address multiple dimensions of the organization and delivery of care and clinical decision support be considered to improve and maintain quality of care for patients who have asthma

Rec\_38: Imp\_49