Asthma: Pediatric and Adult

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• Dr Americo Fraboni returned disclosures indicating that he has no affiliation or financial interest in any organization(s).

Learning Objectives
1. Identify a treatment rationale for the patient who presents with status asthmaticus.
2. Describe the medical treatment of the allergic patient.
3. Recognize a pharmacologic therapy in the treatment of asthma.
4. State the current NIH guidelines for the treatment of chronic asthma.

Asthma
• National Heart Lung and Blood Institute Practice guidelines (NHLBI)
• National Asthma Education and Prevention Program (NAEPP) Third Expert Panel Report (EPR-3)
  • Initial report in 1991
  • Second report in 1997
  • Updated in 2002
  • Third report in 2007
  • Most comprehensive EB guidance for Dx and Rx to date

EPR-3: What’s Changed?
• The 2007 Guidelines:
• Recommend assessing asthma severity before starting Rx and assessing asthma control to guide adjustments in Rx (SOR B,C)
• Address both severity and control in terms of impairment and risk (SOR A)
• Feature 3 age breakdowns (0-4 yrs, 5-11 yrs, ≥12 yrs) and a 6-step approach to management (SOR C)
• Make it easier to individualize and adjust Rx (SOR B)

1. & 2. A 24-year-old female with no chronic illnesses arrives in your office relating a history of several episodes of shortness of breath associated with a hacky cough and chest tightness. She recently developed nasal congestion, sinus pressure, and muscle aches and thinks she has a cold. She has never before been short of breath, does not smoke, and has no family history of respiratory disease. She has taken over-the-counter decongestants with little relief of the coughing. She takes no prescription drugs.

VS: BP 108/65, HR 80, RR 14, T 37.2 degrees C, O2 sats 95% on RA.

PE: is remarkable for clear rhinorrhea, mild scattered expiratory wheezes, a normal cardiac exam, and non-tender maxillary and frontal sinuses.

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1. What is the most likely trigger for her current symptoms?

A. Viral upper respiratory tract infection
B. Sinusitis
C. Acute bacterial bronchitis
D. Gastroesophageal reflux

2. What initial treatment would you prescribe for her at this time?

A. Codeine
B. A steroid nasal spray
C. Corticosteroid inhaler
D. Albuterol inhaler

What Is Asthma?

Clinical symptoms
- Intermittent Sxs
  - Cough
  - Wheeze
  - SOB/Breathlessness
  - Chest pain
  - Rescue med use
  - Diurnal variation
  - Varying triggers

- Exacerbations
  - Perennial/seasonal
  - Episodic/continual
  - Diurnal

Biological indicators, pathophysiology
- Chronic airway inflammation
- Bronchial hyper-responsiveness (BHR)
- Airflow limitation
  - Airway smooth muscle broncho-constriction
  - Airway edema
  - Mucus plug formation
  - Bronchiolar obstruction
  - Airway remodeling
Asthma Differential Dx
- Viral pneumonitis
- Pneumothorax
- Pulmonary embolism
- Vocal cord dysfunction syndrome
- COPD
- Pulmonary edema
- Endobronchial obstruction (tumor or FB)
- Acute hypersensitivity pneumonitis
- Epiglottitis

COPD vs Asthma

<table>
<thead>
<tr>
<th>Symptom</th>
<th>COPD</th>
<th>Asthma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic cough &amp; sputum</td>
<td>persistent, slowly, variable, intermittently, largely reversible</td>
<td>variable</td>
</tr>
<tr>
<td>Breathless on exertion or poor lung function</td>
<td>progressive</td>
<td>intermittent, largely reversible</td>
</tr>
<tr>
<td>Onset prior to 40 yrs</td>
<td>less common</td>
<td>common</td>
</tr>
<tr>
<td>Tobacco use</td>
<td>almost always</td>
<td>sometimes</td>
</tr>
<tr>
<td>Airway hyper-responsiveness</td>
<td>common</td>
<td>always</td>
</tr>
<tr>
<td>Progression of Sxs</td>
<td>slowly, little variability</td>
<td>episodic and variable</td>
</tr>
<tr>
<td>Identifiable triggers</td>
<td>uncommon</td>
<td>common</td>
</tr>
<tr>
<td>Bronchodilator response</td>
<td>modest</td>
<td>often marked</td>
</tr>
</tbody>
</table>

3. Which of the following tests would you use to better categorize this patient’s condition?

A. Spirometry
B. CXR
C. ABG
D. Methacholine challenge

C. ABG

Establishing a Diagnosis
- Based on a patient’s
  - Medical history
  - Physical exam
  - Pulmonary function tests (PFTs)
  - Laboratory tests
- Spirometry is recommended in order to make the Dx
- Level of severity based on
  - Impairment
  - Risk

Clinical Testing
- Spirometry
  - Recommended for every pt ≥5 yrs of age
    - If pt <5 yrs of age, a therapeutic trial of medication is recommended
- Studies specific to individual patients
  - Allergy testing
  - CXR
  - Bronchial provocation testing
  - Sinus x-rays or CT scan
  - GERD evaluation
  - CBC with eosinophils, total IgE, sputum exam
4. Which of the following PFT results is most likely to be below the normal predicted range in this patient with asthma?

A. FVC (Forced Vital Capacity)
B. FEV1 (Forced Expiratory Volume in 1 second)
C. TLC (Total Lung Capacity)
D. FRC (Functional Residual Capacity)

5. At least what percentage of airway reversibility do you need in order to confirm the diagnosis of asthma?

A. 10%
B. 25%
C. 12%
D. 18%

Spirometry

- Measurements pre and post a short-acting beta2-agonist (SABA)
  - FEV1
  - FVC
  - FEV1/FVC
- Airflow obstruction
  - Reduced FEV1 and FEV1/FVC values relative to predicted values (FEV1 <80% predicted)
- Significant reversibility after inhaling a SABA
  - Increase by ≥12% and
  - 200 mL in FEV1

Spirometry

- Mild asthmatics
  - Repeat every 1-2 yrs
  - Confirms dx and objectifies serial change and level of control
- Moderate and severe asthmatics
  - More frequently depending on their response to therapy
Pulmonary Function Tests

Asthmatic patient
- FEV1 is decreased
- FVC may fall, but FEV1 is much more common to be below predicted
- TLC is normal to elevated
- FRC is usually elevated

Asthma Triggers

<table>
<thead>
<tr>
<th>URI</th>
<th>Environmental</th>
<th>Occupational or Recreational</th>
<th>Drug</th>
<th>CHF</th>
<th>GERD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viral</td>
<td>Allergens</td>
<td>Allergens</td>
<td>ASA</td>
<td>Cardiac Asthma</td>
<td>Trigger for bronchospasm</td>
</tr>
<tr>
<td>Irritants</td>
<td>Perfume</td>
<td>Tobacco smoke</td>
<td>Irritants</td>
<td>NISAIDS</td>
<td>Consider in both peds and adult patients</td>
</tr>
<tr>
<td>Temperature</td>
<td>Beta Blockers</td>
<td>Humidity</td>
<td>Sulfites (food)</td>
<td>Exercise</td>
<td></td>
</tr>
</tbody>
</table>

6. In considering the atopic patient and asthma. Which of the following is true?

A. Atopy is one of the strongest predisposing factors for the patient with asthma
B. A peripheral eosinophil count is sufficiently sensitive to be used alone in the diagnosis of asthma
C. The CXR is usually abnormal in asthma
D. Skin allergy tests are rarely positive in the atopic patient

The Atopic Patient

- Atopy is one of the strongest predisposing factors for the patient with asthma
  - Genetic predisposition for the development of an IgE mediated response
- Investigation into the role of allergy
  - Complete history in every patient is indicated
    • Given the high prevalence of positive skin tests among individuals with asthma
    • And the benefits of limiting exposure to known allergens
- History may help to distinguish seasonal allergies but may be inadequate for perennial allergies

The Atopic Patient

- Eosinophil count and IgE may be elevated in asthma
  - Neither test has sufficient specificity or sensitivity to be used alone in a diagnosis
- The chest x-ray and electrocardiogram are usually normal in asthma
  - May be useful to exclude other pulmonary or cardiac conditions
- Sputum examination may be helpful if sputum eosinophilia or infection are suspected
Allergy Treatment Can Improve Asthma Sxs

- Key to Control
  - Avoidance of allergens or environmental control
- Intranasal corticosteroids
  - Reduce both allergic rhinitis and asthma sx in pts with mild asthma
- Antihistamines alone or combined with a decongestant
  - May reduce asthma and rhinitis sx
- Leukotriene modulators
  - Treat sx of asthma and allergic rhinitis at the same time
- Immunotherapy
  - May reduce development of asthma in pts with seasonal rhinoconjunctivitis

Control of House Mites

Essential actions

- Encase the mattress in an allergen impermeable cover
- Encase the pillow in an allergen impermeable cover or wash it weekly
- Wash the sheets and blankets on the patient's bed weekly in hot water
  - A temperature of 130°F is necessary for killing house-dust mites

Severity and Control

Severity

- A measure of the intrinsic intensity of the disease process established ideally before initiating treatment

Control

- Monitored over time to guide adjustments to therapy

Assess Severity and Control

- Predictors of increased risk for exacerbations or death:
  - Persistent and/or severe airflow obstruction
  - At least 2 visits to the ED or hospitalizations for asthma within the past year
  - And a history of intubation or admission to the ICU, especially within the past 5 years

Components of Severity

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Classification of Asthma Severity (0-4 years of age)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intermittent</td>
</tr>
<tr>
<td>Symptoms</td>
<td></td>
</tr>
<tr>
<td>0-2 sx/wk</td>
<td>3 sx/wk</td>
</tr>
<tr>
<td>2-4 sx/wk</td>
<td>Daily</td>
</tr>
<tr>
<td>Persistent</td>
<td></td>
</tr>
<tr>
<td>Nonspecific</td>
<td></td>
</tr>
<tr>
<td>0-2 sx/wk</td>
<td>3 sx/wk</td>
</tr>
<tr>
<td>2-4 sx/wk</td>
<td>Daily</td>
</tr>
<tr>
<td>Risk</td>
<td></td>
</tr>
<tr>
<td>Exacerbations requiring hospitalization</td>
<td>0-3, 0-60/yr</td>
</tr>
<tr>
<td>3-6 exacerbations requiring intubation or hospitalization</td>
<td>3-6 exacerbations requiring intubation or hospitalization</td>
</tr>
<tr>
<td>6 exacerbations requiring intubation or hospitalization</td>
<td>6 exacerbations requiring intubation or hospitalization</td>
</tr>
<tr>
<td>Recommended Step for Initiating Therapy: (See figure 4-14 for treatment steps.)</td>
<td></td>
</tr>
<tr>
<td>Step 1:</td>
<td>0-3 exacerbations ≤ 3 months requiring &gt;1 hospitalization or ≥ 1 ED visit; can include ≥ 3 if AHR or persistent cough</td>
</tr>
<tr>
<td>Step 2:</td>
<td>3-6 exacerbations ≤ 3 months requiring &gt;1 hospitalization or ≥ 1 ED visit; can include ≥ 3 if AHR or persistent cough</td>
</tr>
<tr>
<td>Step 3:</td>
<td>≥ 6 exacerbations ≤ 3 months requiring &gt;1 hospitalization or ≥ 1 ED visit; can include ≥ 3 if AHR or persistent cough</td>
</tr>
<tr>
<td>Step 4:</td>
<td>≥ 3 exacerbations per 3 months requiring &gt;1 hospitalization or ≥ 1 ED visit; can include ≥ 3 if AHR or persistent cough</td>
</tr>
<tr>
<td>Step 5:</td>
<td>≥ 1 exacerbation per 3 months requiring &gt;1 hospitalization or ≥ 1 ED visit; can include ≥ 3 if AHR or persistent cough</td>
</tr>
</tbody>
</table>

Assess Severity and Control Within the Domains of:

Impairment - Based on

- Asthma symptoms (identified by patient or caregiver recall of the past 2-4 weeks),
- Quality of life
- Functional limitations

Risk - of

- Asthma exacerbations
- Progressive decline in pulmonary function (or reduced lung growth in children)
- Adverse events
7. In classifying the asthmatic patient, an individual with symptoms greater than two times per week, but less than one time per day OR with nocturnal symptoms greater than two times per month would be classified as:

A. Mild Intermittent
B. Mild Persistent
C. Moderate Persistent
D. Severe Persistent

Asthma Classification

<table>
<thead>
<tr>
<th>Mild Intermittent</th>
<th>Mild Persistent</th>
<th>Moderate Persistent</th>
<th>Severe Persistent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sxs &lt;2x/wk.</td>
<td>Sxs &gt;2x/wk, but &lt;1x/d exacerbations may affect activity</td>
<td>Daily sxs, daily use of inhaled SABA, exacerbations affect activity, exacerbations &gt;2x/wk. may last days</td>
<td>Continual sxs, limited physical activity, frequent exacerbations</td>
</tr>
<tr>
<td>Nocturnal sxs &lt;2x/night</td>
<td>Nocturnal sxs &gt;2x/night</td>
<td>Nocturnal sxs &gt;1x/night</td>
<td>Frequent nocturnal sxs</td>
</tr>
<tr>
<td>FEV1 or PEF &gt;80% predicted</td>
<td>FEV1 or PEF &gt;80% predicted</td>
<td>FEV1 or PEF 60%-80% predicted</td>
<td>FEV1 or PEF &lt;60% predicted</td>
</tr>
<tr>
<td>PEF variability 20%-30%</td>
<td>PEF variability &gt;30%</td>
<td>PEF variability &gt;30%</td>
<td>PEF variability &gt;30%</td>
</tr>
</tbody>
</table>

6 Steps of Care

- Step 1-Intermittent
- Step 2-Mild persistent
- Step 3-Moderate persistent
- Step 4-Moderate persistent
- Step 5-Severe persistent
- Step 6-Severe persistent

*See the “Stepwise approach for managing asthma” chart (figure 3) at the end of these slides for more details*
Stepwise “Preferred” Treatment

0-4 Years of Age

Most recommendations are based on limited data.

Step 1: SABA PRN
Step 2: Low dose ICS
Step 3: Medium dose ICS
Step 4: Medium dose ICS and LABA or montelukast (Singulair)
Step 5: High dose ICS and LABA or Singulair
Step 6: High dose ICS and oral corticosteroid and LABA or Singulair

5-11 Years of Age

Step 1: SABA PRN
Step 2: Low dose ICS
Step 3: Low dose ICS and LABA, LTRA or theophylline, OR medium dose ICS
Step 4: Medium dose ICS and LABA
Step 5: High dose ICS and LABA
Step 6: High dose ICS and LABA and oral corticosteroids

≥12 Years of Age

Step 1: SABA PRN
Step 2: Low dose ICS
Step 3: Low dose ICS and LABA OR medium dose ICS
Step 4: Medium dose ICS and LABA
Step 5: High dose ICS and LABA; consider omalizumab (Xolair) if allergies
Step 6: High dose ICS and LABA and oral corticosteroid; consider Xolair if allergies

8. Which of the following is NOT true?

A. Long acting beta agonists like salmeterol can increase mortality if used alone
B. ICS use is indicated if PRN use of albuterol exceeds >2 times/wk
C. Oral corticosteroids are as effective as IV
D. Cromolyn is a first line drug to control acute asthma symptoms

89%
4%
7%
3%
89%

Treatment

Albuterol

• The most appropriate treatment for acute bronchospasm is an inhaled SABA
  – Use a spacer.
• Codeine or other cough suppressants are basically ineffective.
• Nasal and inhaled steroids have an onset that is too slow.
Treatment

Inhaled corticosteroids (ICS)
- Most potent and effective long-term controller therapy
- Foundation of therapy for patients of all ages who have persistent asthma (SOR A)
- ICS improve long-term outcomes in children with mild to moderate persistent asthma (SOR A)
- Studies are limited comparing them to other alternative treatments

The Expert Panel Recommends

- For patients ≥5 years of age with mild or moderate persistent asthma, the preferred therapy is inhaled corticosteroids (low dose) (SOR A)
- Alternative therapies (listed alphabetically due to insufficient data to rank)
  - Cromolyn
  - LTRAs (Leukotriene Receptor Antagonists)
  - Nedocromil (Alocril) (production ceased in 2008)
  - Sustained-release theophylline

Strong Evidence From Clinical Trials Following Children for Up to 6 Years
- Suggests that the use of inhaled corticosteroids at recommended doses
  - Does not have long-term, clinically significant, or irreversible effects on any of the outcomes reviewed, (Vertical growth, Bone mineral density (BMD), Ocular toxicity, Suppression of adrenal/pituitary axis)
- Inhaled corticosteroids do improve health outcomes (SOR A, B)
  - For children with mild or moderate persistent asthma
  - The potential but small risk of delayed growth is well balanced by their effectiveness

Patients With Moderate Persistent Asthma
- The addition of another long-term control agent to inhaled corticosteroids improves outcomes
  - LABA added to low-medium-dose inhaled corticosteroids (SOR A)

Preventing Progression of Asthma?
- Does Early Intervention of Long-Term Control Therapy (Inhaled Corticosteroids) Prevent Progression of Asthma?
- Evidence is insufficient to draw conclusions
  - Early intervention with inhaled steroids likely will improve overall asthma management, but its effect on preventing irreversible airway injury remains to be determined (SOR A, B)

Treatment - Key Points
- Long-acting inhaled Beta2-agonists (LABA):
  - Used concomitantly with inhaled corticosteroids are the preferred combination therapy for long-term control and prevention of symptoms in moderate and severe persistent asthma (SOR A, B)
Treatment - Key Points

- Cromolyn and nedocromil
  - Used as alternative (not preferred) medications for the treatment of mild persistent asthma (SOR A, B)
- Leukotriene modifiers
  - Again as an alternative (not preferred) medication for the treatment of mild persistent asthma (SOR B)

Treatment - Key Points

- Safety is a key consideration
- Weigh the benefits and risks of therapy
  - Systemic effects of higher doses of ICS
  - “Rare” but potential risk of life-threatening or fatal exacerbations with daily LABA Rx
  - Oral corticosteroid use regardless of age

Reassessment

- Follow-up
  - Every 2-6 wk intervals for starting Rx or those that require a step up to regain control
  - Once controlled, reassess at least every 1-6 mo
    - Measures of control are the same as those to assess severity plus use of
      - Validated multidimensional questionnaires like the asthma control test (ACT)
    - A step down is recommended for patients whose asthma is well controlled for 3 months or more.
    - Decrease dose of ICS gradually
      - 25% to 50% q3mo
      - deterioration in asthma control is highly variable

9. In considering the use of an asthma action plan, which of the following are true?

A. Data is sufficient to support the benefits of written action plans.
B. A PEF of 80% or more defines the Yellow Zone.
C. The use of written action plans is recommended.
D. It is recommended that Home Peak Expiratory Monitoring be used in patients with mild intermittent asthma.

Asthma Action Plans

- Data are insufficient to support or refute the benefits of written action plans (SOR B)
- Expert Panel opinion
  - Use of written action plans is recommended (SOR B, C)
    - Especially for patients with moderate or severe persistent asthma
      - Patients with a history of severe exacerbations
    - Action plans should
      - Address individual sx's, and/or PEF measurements
      - Self-management instructions

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Asthma Action Plan

**Green Zone:**
- Usual activity
- PEF 80% or more of personal best

**Yellow Zone:**
- Some of usual activity
- PEF 50%-80% of personal best

**Red Zone:**
- Cannot do usual activities
- PEF less than 50% of personal best

Home Peak Expiratory Flow (PEF) Monitoring

- Evidence neither supports nor refutes the benefits of peak flow monitoring
  - Expert Panel opinion (SOR B)
- PEF monitoring should be considered for
  - Patients with moderate or severe persistent asthma
  - Difficulty recognizing signs of exacerbations
  - History of severe exacerbations
- It may enhance clinician-patient communication
- It may increase patient and caregiver awareness of the disease status and control

Patient Education

- Control is enhanced
  - Ensuring access to education about asthma
  - Skills necessary to manage it
    - Self-monitoring
    - Correct use of inhalers
    - Following a plan for managing asthma long-term
    - Promptly handling signs of worsening asthma

10. A patient who comes to the Emergency Department in acute respiratory distress caused by a severe attack of asthma should be treated with all of the following EXCEPT:

   A. IV fluids
   B. Humidified, high-flow-rate oxygen
   C. IV corticosteroids
   D. IV antibiotics

Acute Asthma Exacerbation

- Symptoms
  - Progressive breathlessness
  - Cough
  - Wheezing
  - Chest tightness
- Severity assessment is critical
  - Using objective measures
  - Focused H&P
  - Measurement of airflow
    - FEV1
    - PEF
Acute Asthma Exacerbation

- Characterized by
  - Decreased PEF (<50% predicted normal)
  - FEV1 may be more useful in predicting exacerbations
  - Failure to respond to a beta2-agonist
  - Extreme anxiety due to breathlessness
  - Gasping for air, sweaty, or cyanotic
  - Rapid deterioration over a few hours
  - Severe retractions and nasal flaring
  - Hunched forward

Risk factors for death from asthma

- History of sudden severe exacerbations
- Prior intubation for asthma
- Prior admission for asthma to ICU
- ≥3 emergency care visits for asthma in the past year
- Hospitalization or an emergency care visit for asthma within past month
- >2 canisters per month of inhaled short-acting beta2-agonist

Exacerbation Management

- SABA by MDI or nebulizer
- Corticosteroids – Oral or IV
  - Strongly consider systemic use
  - Aids symptom resolution
  - Prevents asthma relapse

Alternatives

- Epinephrine (1:1000)
- Ipratropium added to nebulized SABA
  - Improves lung function and decreases hospitalizations in children 1-18 yrs of age with mild moderate or severe exacerbations
- Levalbuterol
- Corticosteroids
  - Initiate or increase anti-inflammatory medication
    - ICS
    - Cromolyn
    - Consider leukotriene modifiers
Exacerbation Management

**ED or inpatient management**

- Most children who require hospitalization can be identified by a repeat assessment 1 hr after initial treatment.
- If a patient meets -
  - Criteria for severe exacerbation, >86% chance require hospitalization
  - Criteria for moderate exacerbation, 84% chance require hospitalization
  - Criteria dropped to the mild level, 18% chance of hospitalization

**Poor response to treatment -**

- Early intervention with Bi-PAP may prevent mechanical intubations
- Heliox may be a secondary therapy if no response to first-line Rx
- Ketamine - Consider for use only in severe exacerbations
- Magnesium sulfate IV for severe exacerbations
- Decreases hospitalization in children 1-18 yrs of age, not adults
- Decision when to D/C from ED or admit must be individualized and depends on response to treatment, pulmonary function, and socioeconomic factors

Exacerbation Management

**Intermittent nebs vs continuous nebs?**

- Data suggests they are equally efficacious
- FEV1 <50% predicted
  - Statistically significant improvement in FEV1 with continuous nebs in one study, not in another
- PEF <200
  - Statistically significant improvement in PEF and decrease in hospitalizations with continuous nebs

**Antibiotics?**

- Does routinely adding antibiotics to a patient’s regimen without signs and symptoms of bacterial infection improve the outcomes of treatment for acute exacerbation of asthma?
- **No!** Benefit from antibiotic therapy for asthma exacerbations has not been demonstrated:
  - Whether administered routinely
  - Or when suspicion of bacterial infection is low (SOR B)

Exercise-Induced Bronchospasm (EIB)

- Occurs in
  - 90% of pts with asthma
  - >10% of general population
- Often indicates poorly controlled asthma
  - Use long-term control therapy if appropriate
- Pretreatment prior to exercise
  - SABAs, LABAs are effective in up to 80% of pts
  - LTRAs are effective in up to 50% of pts
- Encourage pts to warm up prior to exercise and consider wearing a mask or scarf in cold weather

**Goals of Therapy – Asthma Control Summary**

- Minimal or no chronic symptoms day or night
- Minimal or no exacerbations
- No limitations on activities; no school or work missed
- Maintain (near) normal pulmonary function
- Minimal use of short-acting inhaled beta2 agonist
- Minimal or no adverse effects from medications

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Answers
1. A
2. D
3. A
4. B
5. C
6. A
7. B
8. D
9. C
10. D

Websites
Expert Panel Report 3 (EPR3): Guidelines for the Diagnosis and Management of Asthma (440 pgs)
http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm

ICSI Health Care Guidelines: Diagnosis and Management of Asthma (70 pgs)
http://www.icsi.org

The Journal of Family Practice: Help patients gain better asthma control (10 pgs)
http://www.jfponline.com/Pages.asp?AID=6634