Asthma is a complex disorder characterized by variable and recurring symptoms, airflow obstruction, bronchial hyperresponsiveness, and an underlying inflammation. The interaction of these features determines the clinical manifestations and severity of asthma.

**Key Symptoms for Considering a Diagnosis of Asthma**

*Wheeze* – high pitched whistling sounds when exhaling, especially in children.

*History of* – a cough that worsens at night, recurrent wheeze, recurrent difficulty in breathing, recurrent chest tightness.

*Symptoms occur or worsen in the presence of* – exercise, viral infection, inhaled allergens such as animals with fur or hair, house dust mites, mold, pollen, irritants such as tobacco or wood smoke, airborne chemicals, changes in the weather, strong emotional expression such as laughing or crying hard, stress, menstrual cycle.

**Recommended Methods to Establish the Diagnosis:**

*Detailed medical history* – pattern of symptoms, precipitating and/or aggravating factors, onset and progression, present management and response, history of exacerbations, family/social history, impact of asthma on patient and family including perceptions of the disease.

*Physical examination* - focus on upper respiratory tract, chest, and skin (dermatitis, eczema).

*Spirometry* – generally recommended over peak flow meters, due to the wide variability in peak flow meters and reference values.

*Diagnosing Children ages 0 to 4 years* – diagnosis in infants and young children is challenging and complicated by the difficulty in obtaining objective measurements of lung function. Caution is needed to avoid giving young children inappropriate prolonged asthma therapy. However, it is important to avoid underdiagnosing asthma by labeling as “wheezy bronchitis,” “recurrent pneumonia,” or “reactive airway disease.” The chronic airway inflammatory response and structural changes that are characteristic of asthma can develop in the preschool years, and appropriate asthma treatment will reduce morbidity.
**Stepwise Approach for Managing Asthma**

This document strongly encourages classifying severity prior to initiating therapy. After therapy is initiated, the focus should be on whether the condition is controlled or uncontrolled. See diagrams that follow for greater detail.

A stepwise approach to managing asthma is recommended to gain and maintain control of asthma in both the impairment and risk domains. For children, see figure 11: “Classifying Asthma Severity and Initiating Therapy in Children,” figure 12: “Assessing Asthma Control and Adjusting Therapy in Children,” and figure 13: “Stepwise Approach for Managing Asthma Long Term in Children, 0-4 Years of Age and 5-11 Years of Age.”

For youths 12 & older, and adults: figure 14: “Classifying Asthma Severity and Initiating Treatment in Youths 12 Years of Age and Adults,” figure 15: “Assessing Asthma Control and Adjusting Therapy in Youths ≥ 12 Years of Age and Adults,” and figure 16: “Stepwise Approach for Managing Asthma ≥ 12 Years of Age and Adults.”

**Goals of Therapy**

1. Maintain normal activity levels (including exercise and other physical activity)
2. Maintain (near) normal PFTs
3. Prevent chronic & troublesome symptoms (e.g., coughing, breathlessness)
4. Prevent recurrent exacerbation of asthma and minimize the need for ER visits or hospitalizations or unscheduled office visits.
5. Provide optimal pharmacotherapy with minimal or no adverse effects
6. Meet patient and family expectations for asthma care

Categories of medication treatment include: short acting bronchodilators, long acting bronchodilators (LABA), inhaled and oral glucocorticoids, and leukotriene inhibitors. Short acting bronchodilators are for rescue only. LABA are useful for prevention of symptoms, but may be associated with increased risk of asthma related death in one study. Inhaled steroids are indicated in those with persistent asthma alone or in combination with LABA. Oral steroids are used for severe acute exacerbations. Leukotriene inhibitors are useful as a preventative or for treatment in selected patients.

Short-acting bronchodilators are to be used for rescue and not on a regular basis (see classifications of asthma). If patients develop persistent asthma, anti-inflammatory agents are required. Initially this includes inhaled corticosteroids and occasionally oral corticosteroids. Alternatives include inhaled long-acting Beta-agonist and/or leukotriene modifiers. Long acting bronchodilators should not be used without inhaled corticosteroid. Peak expiratory flow rate (PEFR) monitoring by the patient at home may be helpful in certain situations. Respiratory effort must be optimal to get reproducible and valid results. Spacing devices may be considered in those patients having difficulty with metered-dose inhaler technique.

*Obvious indications for referral of asthmatic patients are:* 1) patients with severe asthma, 2) patients with moderate asthma who have failed to attain goals of therapy, 3) patients with
uncertain diagnosis, 4) all patients with *suspicions of allergic asthma*, 5) patients with excessive use of Bronchodilator Meter Dose Inhalers (MDI), 6) patients who *had* numerous visits to ER/Acute Care for attacks requiring nebulizer *treatment or Adrenaline*, 7) *patients who have required multiple doses of oral steroids for exacerbation of asthma*, 8) patients who have been hospitalized for *any bout of asthma*.

Repeat attacks, emergency room visits, or unscheduled office visits are signs and symptoms of poorly controlled asthma, whether it is allergic or non-allergic type.

*The AAAAI (American Academy of Allergy, Asthma and Immunology) recommends that anyone with the diagnosis of asthma be seen by an allergy specialist at least once for diagnostic evaluation and skin testing to exclude allergy as a cause or etiology of their asthma.*

*Identification of allergens in the environment may allow modification of that environment which in and of itself may allow management and excellent control without life long chronic use of medications.*

**References**

- Pediatrics in Review, Volume 30, Number 10, October 2009
<table>
<thead>
<tr>
<th>Original</th>
<th>Revised</th>
<th>Reviewed</th>
<th>Revised</th>
<th>Reviewed</th>
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<tbody>
<tr>
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<td>06/04</td>
<td>07/08</td>
<td>06/07</td>
<td>02/12</td>
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<tr>
<td>01/01</td>
<td>01/05</td>
<td>10/09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03/02</td>
<td>03/06</td>
<td>02/11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/03</td>
<td>06/07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revised: 01/01</td>
<td>Revised: 03/02</td>
<td>Revised: 02/11</td>
<td>Revised: 06/07</td>
<td>Revised: 02/12</td>
</tr>
</tbody>
</table>
### FIGURE 11. CLASSIFYING ASTHMA SEVERITY AND INITIATING THERAPY IN CHILDREN

#### Components of Severity

<table>
<thead>
<tr>
<th></th>
<th>Intermittent</th>
<th>Persistent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ages 0–4</td>
<td>Ages 5–11</td>
<td>Ages 0–4</td>
</tr>
<tr>
<td><strong>Impairment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nighttime</td>
<td>&lt;2 days/week</td>
<td>&gt;2 days/week but not daily</td>
</tr>
<tr>
<td>Short-acting</td>
<td>0</td>
<td>&gt;2 days/month</td>
</tr>
<tr>
<td>Beta-agonist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>use for symptom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interference</td>
<td>None</td>
<td>Minor limitation</td>
</tr>
<tr>
<td>with normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung Function</td>
<td></td>
<td>Normal FEV1</td>
</tr>
<tr>
<td>• FEV1 (predicted) or peak flow</td>
<td>N/A</td>
<td>Normal FEV1</td>
</tr>
<tr>
<td>(personal best)</td>
<td></td>
<td>Normal FEV1</td>
</tr>
<tr>
<td>• FEV1/FVC</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td></td>
<td>&gt;85%</td>
</tr>
<tr>
<td>Exacerbations</td>
<td>0–1/year (see notes)</td>
<td>&gt;2 exacerbations in 6 months requiring oral systemic corticosteroids, or 4 wheezing episodes/1 year lasting &gt;1 day AND risk factors for persistent asthma</td>
</tr>
<tr>
<td>(consider severity and interval since last exacerbation)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Recommended Step for Initiating Therapy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(See &quot;Stepwise Approach for Managing Asthma&quot; for treatment steps.)</td>
<td>Step 1 (for both age groups)</td>
<td>Step 2 (for both age groups)</td>
</tr>
</tbody>
</table>

#### Key

- FEV₁: Forced expiratory volume in 1 second; FVC: Forced Vital Capacity; ICS: Inhaled Corticosteroids; ICU: Intensive Care Unit; N/A: Not applicable

#### Notes

- Level of severity is determined by both impairment and risk. Assess impairment domain by caregiver’s recall of previous 2–4 weeks. Assign severity to the most severe category in which any feature occurs.

- Frequency and severity of exacerbations may fluctuate over time for patients in any severity category. At present, there are inadequate data to correspond frequencies of exacerbations with different levels of asthma severity. In general, more frequent and severe exacerbations (e.g., requiring urgent, unscheduled care, hospitalization, or ICU admission) indicate greater underlying disease severity. For treatment purposes, patients with ≥2 exacerbations described above may be considered the same as patients who have persistent asthma, even in the absence of impairment levels consistent with persistent asthma.

---

In 2–6 weeks, depending on severity, evaluate level of asthma control that is achieved.

- Children 0–4 years old: If no clear benefit is observed in 4–6 weeks, stop treatment and consider alternative diagnoses or adjusting therapy.
- Children 5–11 years old: Adjust therapy accordingly.
**FIGURE 12. ASSESSING ASTHMA CONTROL AND ADJUSTING THERAPY IN CHILDREN**

<table>
<thead>
<tr>
<th>Components of Control</th>
<th>Assessing Asthma Control and Adjusting Therapy in Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impairment</td>
<td>Well Controlled</td>
</tr>
<tr>
<td>Ages 0–4</td>
<td>Ages 5–11</td>
</tr>
<tr>
<td>Symptoms</td>
<td>&gt;2 days/week but not more than once on each day</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>&lt;1x/month</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
</tr>
<tr>
<td>Short-acting beta-agonist use for symptom control (not prevention of EIB)</td>
<td>&gt;2 days/week</td>
</tr>
<tr>
<td>Lung function</td>
<td>N/A</td>
</tr>
<tr>
<td>• FEV₁ (predicted) or peak flow personal best</td>
<td>N/A</td>
</tr>
<tr>
<td>• FEV₁/FVC</td>
<td>N/A</td>
</tr>
<tr>
<td>Exacerbations requiring oral systemic corticosteroids</td>
<td>0–1x/year</td>
</tr>
<tr>
<td>Reduction in lung growth</td>
<td>N/A</td>
</tr>
<tr>
<td>Treatment-related adverse effects</td>
<td>Medication side effects can vary in intensity from none to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control but should be considered in the overall assessment of risk.</td>
</tr>
</tbody>
</table>

**Recommended Action for Treatment**

(See "Stepwise Approach for Managing Asthma" for treatment steps.)

The stepwise approach is meant to assist, not replace, clinical decision-making required to meet individual patient needs.

- **Maintain current step.**
- **Regular followup every 1–6 months.**
- **Consider step down if well controlled for at least 3 months.**

- **Step up 1 step**
- **Step up at least 1 step**
- **Consider short course of oral systemic corticosteroids, Step up 1–2 steps**

- **Before step up:**
  - Review adherence to medication, inhaler technique, and environmental control.
  - If alternative treatment was used, discontinue it and use preferred treatment for that step.
  - Reevaluate the level of asthma control in 2–6 weeks to achieve control; every 1–6 months to maintain control.

  - **Children 6–11 years old:** If no clear benefit is observed in 4–6 weeks, consider alternative diagnoses or adjusting therapy.
  - **Children 5–11 years old:** Adjust therapy accordingly.
  - For side effects, consider alternative treatment options.

**Key:** EIB, exercise-induced bronchoconstriction; FEV₁, forced expiratory volume in 1 second; FVC, forced vital capacity; ICU, intensive care unit; N/A, not applicable.

**Notes:**
- The level of control is based on the most severe impairment or risk category. Assess impairment domain by patient's or caregiver's recall of previous 2–4 weeks. Symptom assessment for longer periods should reflect a global assessment, such as whether the patient's asthma is better or worse since the last visit.
- At present, there are inadequate data to correspond frequencies of exacerbations with different levels of asthma control. In general, more frequent and intense exacerbations (e.g., requiring urgent, unscheduled care, hospitalization, or ICU admission) indicate poorer disease control.
### Figure 13. Stepwise Approach for Managing Asthma Long Term in Children, 0–4 Years of Age and 5–11 Years of Age

#### Children 0–4 Years of Age

**Step 1: Intermittent Asthma**
- Consult with asthma specialist if step 2 care or higher is required. Consider consultation at step 2.

**Preferred**
- SABA PRN
- Low-dose ICS
- Medium-dose ICS
- LABA or Montelukast
- High-dose ICS
- LABA or Montelukast
- Oral corticosteroids

**Alternative**
- Corticosteroids
- Montelukast

**Quick-Relief Medication**
- SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms.
- With oral respiratory symptoms: SABA a 4–6 hours up to 24 hours (longer with physician consent). Consider short course of oral systemic corticosteroids if exacerbation is severe or patient has history of previous severe exacerbations.

**Notes**
- The stepwise approach is meant to assist, not replace, the clinical decision-making required to meet individual patient needs.
- If an alternative treatment is used and response is inadequate, discontinue it and use the preferred treatment before stepping up.
- If clear benefit is not observed within 4–6 weeks, and patient/clinician's medication tolerability and adherence are satisfactory, consider adjusting therapy or an alternative diagnosis.
- Studies on children 0–4 years of age are limited. Step 2 preferred therapy is based on Evidence A. All other recommendations are based on expert opinion and extrapolation from studies in older children.
- Clinicians who administer immunotherapy should be prepared and equipped to identify and treat anaphylaxis that may occur.

**Key**
- Alphabetical listing is used when more than one treatment option is listed within either preferred or alternative therapy. ICS, inhaled corticosteroid; LABA, inhaled long-acting beta-agonist; LTRA, leukotriene receptor antagonist; oral corticosteroids, oral systemic corticosteroids; SABA, inhaled short-acting beta-agonist.

#### Children 5–11 Years of Age

**Step 1: Intermittent Asthma**
- Consult with asthma specialist if step 2 care or higher is required. Consider consultation at step 2.

**Preferred**
- SABA PRN
- Low-dose ICS
- Medium-dose ICS
- LABA
- High-dose ICS
- LABA
- Oral corticosteroids

**Alternative**
- Cetirizine, LTRA, Nedocromil, or Theophylline
- Medium-dose ICS
- LABA, LTRA, or Theophylline
- High-dose ICS
- LTRA or Theophylline
- Oral corticosteroids

**Quick-Relief Medication**
- SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms; up to 3 treatments at 20-minute intervals as needed. Short course of oral systemic corticosteroids may be needed.

**Notes**
- The stepwise approach is meant to assist, not replace, the clinical decision-making required to meet individual patient needs.
- If an alternative treatment is used and response is inadequate, discontinue it and use the preferred treatment before stepping up.
- Theophylline is a less desirable alternative due to the need to monitor serum concentration levels.
- Steps 1 and 2 medications are based on Evidence A. Step 3 ICS and ICS plus adjuvant therapy are based on Evidence B for efficacy of each treatment and extrapolation from comparator trials in older children and adults—comparator trials are not available for this age group; steps 4–6 are based on expert opinion and extrapolation from studies in older children and adults.
- Immunotherapy for steps 2–4 is based on Evidence B for house-dust mites, animal danders, and pollens; evidence is weak or lacking for molds and cockroaches. Evidence is strongest for immunotherapy with single allergens. The role of allergy in asthma is greater in children than adults.
- Clinicians who administer immunotherapy should be prepared and equipped to identify and treat anaphylaxis that may occur.

**Key**
- Alphabetical listing is used when more than one treatment option is listed within either preferred or alternative therapy. ICS, inhaled corticosteroid; LABA, inhaled long-acting beta-agonist; LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting beta-agonist.
**FIGURE 14. CLASSIFYING ASTHMA SEVERITY AND INITIATING TREATMENT IN YOUTHS 12 YEARS OF AGE AND ADULTS**

Assessing severity and initiating treatment for patients who are not currently taking long-term control medications.

<table>
<thead>
<tr>
<th>Components of Severity</th>
<th>Classification of Asthma Severity</th>
<th>Intermittent</th>
<th>Persistent</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td>&gt;2 days/week but not daily</td>
<td>Daily</td>
<td>Throughout the day</td>
<td></td>
</tr>
<tr>
<td><strong>Nighttime awakenings</strong></td>
<td>≤2x/month</td>
<td>Daily</td>
<td>Often 7x/week</td>
<td></td>
</tr>
<tr>
<td><strong>Short-acting beta₂-agonist use for symptom control (not prevention of EIB)</strong></td>
<td>≤2 days/week but not daily, and not more than 1x on any day</td>
<td>Daily</td>
<td>Several times per day</td>
<td></td>
</tr>
<tr>
<td><strong>Interference with normal activity</strong></td>
<td>None</td>
<td>Minor limitation</td>
<td>Some limitation</td>
<td>Extremely limited</td>
</tr>
<tr>
<td><strong>Lung function</strong></td>
<td>Normal FEV₁ between exacerbations</td>
<td>FEV₁ &gt;80% predicted</td>
<td>FEV₁ &gt;60% but &lt;80% predicted</td>
<td>FEV₁ &lt;60% predicted</td>
</tr>
<tr>
<td></td>
<td>FEV₁/FVC normal</td>
<td>FEV₁/FVC normal</td>
<td>FEV₁/FVC reduced 5%</td>
<td>FEV₁/FVC reduced &gt;5%</td>
</tr>
<tr>
<td><strong>Exacerbations requiring oral systemic corticosteroids</strong></td>
<td>0–1/year (see note)</td>
<td>2/year (see note)</td>
<td>Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category. Relative annual risk of exacerbations may be related to FEV₁.</td>
<td></td>
</tr>
</tbody>
</table>

**Recommended Step for Initiating Treatment**

(See "Stepwise Approach for Managing Asthma" for treatment steps.)

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4 or 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Step 2</td>
<td>Step 3</td>
<td>and consider short course of oral systemic corticosteroids</td>
</tr>
</tbody>
</table>

In 2–6 weeks, evaluate level of asthma control that is achieved and adjust therapy accordingly.

**Key:**
- EIB: exercise-induced bronchoconstriction
- FEV₁: forced expiratory volume in 1 second
- FVC: forced vital capacity
- ICU: intensive care unit

**Notes:**
- The stepwise approach is meant to assist, not replace, the clinical judgment required to meet individual patient needs.
- Level of severity is determined by assessment of both impairment and risk. Assess impairment domain by patient/caregiver’s recall of previous 2–4 weeks and symptom severity. Assign severity to the most severe category in which any feature occurs.
- At present, there are inadequate data to correspond frequencies of exacerbations with different levels of asthma severity. In general, more frequent and intense exacerbations (e.g., requiring urgent, unscheduled care, hospitalization, or ICU admission) indicate greater underlying disease severity. For treatment purposes, patients who had ≥2 exacerbations requiring oral systemic corticosteroids in the past year may be considered the same as patients who have persistent asthma, even in the absence of impairment levels consistent with persistent asthma.
**FIGURE 15. ASSESSING ASTHMA CONTROL AND ADJUSTING THERAPY IN YOUTHS ≥12 YEARS OF AGE AND ADULTS**

<table>
<thead>
<tr>
<th>Components of Control</th>
<th>Classification of Asthma Control (≥12 years of age)</th>
<th>Well Controlled</th>
<th>Not Well Controlled</th>
<th>Very Poorly Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impairment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms</td>
<td>≥2 days/week</td>
<td>&gt;2 days/week</td>
<td>Throughout the day</td>
<td></td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≥x2/month</td>
<td>1-3x/week</td>
<td>≥4x/week</td>
<td></td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
<td>Some limitation</td>
<td>Extremely limited</td>
<td></td>
</tr>
<tr>
<td>Short-acting beta-agonist use for symptom control (not prevention of EIB)</td>
<td>≥2 days/week</td>
<td>&gt;2 days/week</td>
<td>Several times per day</td>
<td></td>
</tr>
<tr>
<td>FEV1 or peak flow</td>
<td>&gt;80% predicted/personal best</td>
<td>60-80% predicted/personal best</td>
<td>&lt;60% predicted/personal best</td>
<td></td>
</tr>
<tr>
<td>Validated questionnaires</td>
<td>ATAAQ ACQ ACT</td>
<td>0 ≤0.75* ≤20</td>
<td>1-2 ≥1.5 16-19</td>
<td>3-4 N/A ≥15</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exacerbations requiring oral systemic corticosteroids</td>
<td>0-1/year</td>
<td>≥2/year (see note)</td>
<td>Consider severity and interval since last exacerbation</td>
<td></td>
</tr>
<tr>
<td>Progressive loss of lung function</td>
<td>Evaluation requires long-term followup care.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment-related adverse effects</td>
<td>Medication side effects can vary in intensity from none to very troublesome and uncomfortable. The level of intensity does not correlate to specific levels of control but should be considered in the overall assessment of risk.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Recommended Action for Treatment</strong></td>
<td>(See &quot;Stepwise Approach for Managing Asthma&quot; for treatment steps.)</td>
<td>Maintain current step.</td>
<td>Regular followup at every 1-6 months to maintain control.</td>
<td>Consider step down if well controlled for at least 3 months.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Step up 1 step.</td>
<td>Reevaluate in 2-6 weeks. For side effects, consider alternative treatment options.</td>
<td>Consider short course of oral systemic corticosteroids.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continue.</td>
<td>Review and reevaluate in 2 weeks. For side effects, consider alternative treatment options.</td>
<td></td>
</tr>
</tbody>
</table>

*ACQ values of 0.70-1.4 are indeterminate regarding well-controlled asthma.

Key: EIB, exercise-induced bronchoconstriction; ICU, intensive care unit.

**Notes:**

- The stepwise approach is meant to assist, not replace, the clinical decision making required to meet individual patient needs.
- The level of control is based on the most severe impairment or risk category. Assess impairment domain by patient's recall of previous 2-4 weeks and by spirometry or peak flow measures. Symptom assessment for longer periods should reflect a global assessment, such as inquiring whether the patient's asthma is better or worse since the last visit.
- At present, there are inadequate data to correspond frequencies of exacerbations with different levels of asthma control. In general, more frequent and intense exacerbations (e.g., requiring urgent, unscheduled care, hospitalization, or ICU admission) indicate poorer disease control. For treatment purposes, patients who have ≥2 exacerbations requiring oral systemic corticosteroids in the past year may be considered the same as patients who have not-well-controlled asthma, even in the absence of impairment levels consistent with not-well-controlled asthma.

ATAQ = Asthma Therapy Assessment Questionnaire™
ACQ = Asthma Control Questionnaire™
ACT = Asthma Control Test™

**Before step up in therapy:**

- Review adherence to medication, inhaler technique, environmental control, and comorbid conditions.
- If an alternative treatment option was used in a step, discontinue and use the preferred treatment for that step.
FIGURE 16. STEPWISE APPROACH FOR MANAGING ASTHMA IN YOUTHS ≥12 YEARS OF AGE AND ADULTS

Key:
- Alphabetical order is used when more than one treatment option is listed within either preferred or alternative therapy. ICS, inhaled corticosteroid; LABA, long-acting inhaled beta-agonist; LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting beta-agonist.

Notes:
- The stepwise approach is meant to assist, not replace, the clinical decision-making required to meet individual patient needs.
- If alternative treatment is used and response is inadequate, discontinue it and use the preferred treatment before stepping up.
- Zileuton is a less desirable alternative due to limited studies as an additive therapy and the need to monitor liver function. Theophylline requires monitoring of serum concentration levels.
- In step 6, before oral corticosteroids are introduced, a trial of high-dose ICS + LABA + either LTRA, theophylline, or zileuton may be considered, although this approach has not been studied in clinical trials.
- Step 1, 2, and 5 preferred therapies are based on Evidence A; step 3 alternative therapy is based on Evidence A for LTRA, Evidence B for theophylline, and Evidence D for zileuton. Step 4 preferred therapy is based on Evidence B, and alternative therapy is based on Evidence B for LTRA and theophylline and Evidence D zileuton. Step 5 preferred therapy is based on Evidence B. Step 6 preferred therapy is based on (ERR—2 1997) and Evidence B for omalizumab.
- Immunotherapy for steps 2–4 is based on Evidence B for house-dust mites, animal danders, and pollens; evidence is weak or lacking for molds and cockroaches. Evidence is strongest for immunotherapy with single allergens. The role of allergy in asthma is greater in children than in adults.
- Clinicians who administer immunotherapy or omalizumab should be prepared and equipped to identify and treat anaphylaxis that may occur.

Intermittent Asthma

Persistent Asthma: Daily Medication
Consult with asthma specialist if step 4 care or higher is required.
Consider consultation at step 3.

Step 1 Preferred:
SABA PRN

Step 2 Preferred:
Low-dose ICS + LABA
OR
Medium-dose ICS
Alternative:
Cromolyn, LTRA, Nedocromil, or Theophylline

Step 3 Preferred:
High-dose ICS + LABA
AND
Consider Omalizumab for patients who have allergies
Alternative:
Low-dose ICS + LTRA, Theophylline, or Zileuton

Step 4 Preferred:
High-dose ICS + LABA + oral corticosteroid
AND
Consider Omalizumab for patients who have allergies

Step 5 Preferred:
High-dose ICS + LABA + oral corticosteroid
AND
Consider Omalizumab for patients who have allergies

Step 6 Preferred:
High-dose ICS + LABA + oral corticosteroid
AND
Consider Omalizumab for patients who have allergies

Step up if needed (first, check adherence, environmental control, and comorbid conditions)

Assess control
Step down if possible (and asthma is well controlled at least 3 months)

Quick-Relief Medication for All Patients
- SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed. Short course of oral systemic corticosteroids may be needed.
- Use of SABA ≥2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and the need to step up treatment.