

Asthma Care Quick Reference

DIAGNOSING AND MANAGING ASTHMA

Guidelines from the National Asthma Education and Prevention Program

The goal of this asthma care quick reference guide is to help clinicians provide quality care to people who have asthma.

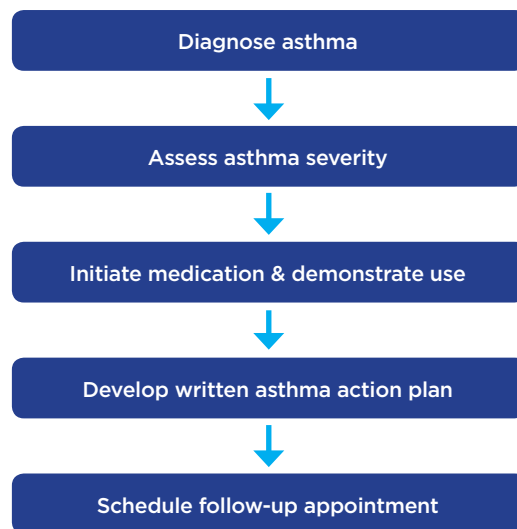
Quality asthma care involves not only initial diagnosis and treatment to achieve asthma control, but also long-term, regular follow-up care to maintain control.

Asthma control focuses on two domains: (1) **reducing impairment**—the frequency and intensity of symptoms and functional limitations currently or recently experienced by a patient; and (2) **reducing risk**—the likelihood of future asthma attacks, progressive decline in lung function (or, for children, reduced lung growth), or medication side effects.

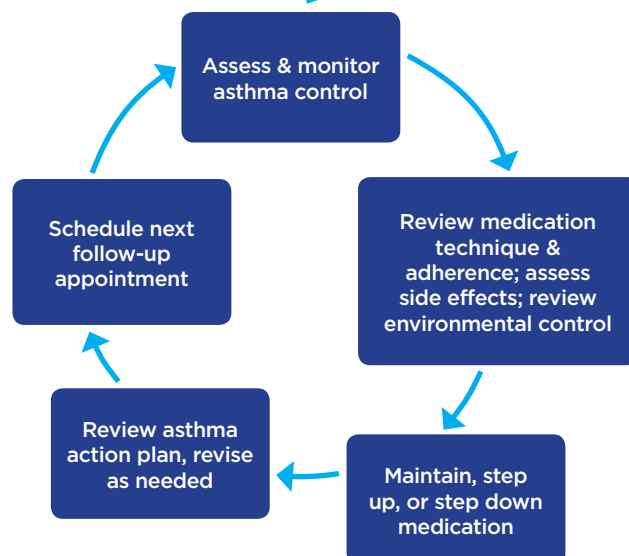
Achieving and maintaining asthma control requires providing appropriate medication, addressing environmental factors that cause worsening symptoms, helping patients learn self-management skills, and monitoring over the long term to assess control and adjust therapy accordingly.

The diagram (right) illustrates the steps involved in providing quality asthma care.

INITIAL VISIT



FOLLOW-UP VISITS



U.S. Department of Health and Human Services
National Institutes of Health
National Heart, Lung, and Blood Institute

KEY CLINICAL ACTIVITIES FOR QUALITY ASTHMA CARE

(See complete table in *Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma* [EPR-3])

Clinical Issue	Key Clinical Activities and Action Steps
→ ASTHMA DIAGNOSIS	
	<p>Establish asthma diagnosis.</p> <ul style="list-style-type: none"> Determine that symptoms of recurrent airway obstruction are present, based on history and exam. <ul style="list-style-type: none"> History of cough, recurrent wheezing, recurrent difficulty breathing, recurrent chest tightness Symptoms occur or worsen at night or with exercise, viral infection, exposure to allergens and irritants, changes in weather, hard laughing or crying, stress, or other factors In all patients ≥ 5 years of age, use spirometry to determine that airway obstruction is at least partially reversible. Consider other causes of obstruction.
→ LONG-TERM ASTHMA MANAGEMENT	
GOAL: Asthma Control	<p>Reduce Impairment</p> <ul style="list-style-type: none"> Prevent chronic symptoms. Require infrequent use of short-acting beta₂-agonist (SABA). Maintain (near) normal lung function and normal activity levels. <p>Reduce Risk</p> <ul style="list-style-type: none"> Prevent exacerbations. Minimize need for emergency care, hospitalization. Prevent loss of lung function (or, for children, prevent reduced lung growth). Minimize adverse effects of therapy.
Assessment and Monitoring	<p>INITIAL VISIT: Assess asthma severity to initiate treatment (see page 5).</p> <p>FOLLOW-UP VISITS: Assess asthma control to determine if therapy should be adjusted (see page 6).</p> <ul style="list-style-type: none"> Assess at each visit: asthma control, proper medication technique, written asthma action plan, patient adherence, patient concerns. Obtain lung function measures by spirometry at least every 1–2 years; more frequently for asthma that is not well controlled. Determine if therapy should be adjusted: Maintain treatment; step up, if needed; step down, if possible. <p>Schedule follow-up care.</p> <ul style="list-style-type: none"> Asthma is highly variable over time. See patients: <ul style="list-style-type: none"> Every 2–6 weeks while gaining control Every 1–6 months to monitor control Every 3 months if step down in therapy is anticipated
Use of Medications	<p>Select medication and delivery devices that meet patient's needs and circumstances.</p> <ul style="list-style-type: none"> Use stepwise approach to identify appropriate treatment options (see page 7). Inhaled corticosteroids (ICSs) are the most effective long-term control therapy. When choosing treatment, consider domain of relevance to the patient (risk, impairment, or both), patient's history of response to the medication, and willingness and ability to use the medication. <p>Review medications, technique, and adherence at each follow-up visit.</p>

KEY CLINICAL ACTIVITIES FOR QUALITY ASTHMA CARE (continued)

Clinical Issue	Key Clinical Activities and Action Steps
Patient Education for Self-Management	<p>Teach patients how to manage their asthma.</p> <ul style="list-style-type: none"> Teach and reinforce at each visit: <ul style="list-style-type: none"> Self-monitoring to assess level of asthma control and recognize signs of worsening asthma (either symptom or peak flow monitoring) Taking medication correctly (inhaler technique, use of devices, understanding difference between long-term control and quick-relief medications) <ul style="list-style-type: none"> Long-term control medications (such as inhaled corticosteroids, which reduce inflammation) prevent symptoms. Should be taken daily; will not give quick relief. Quick-relief medications (short-acting beta₂-agonists or SABAs) relax airway muscles to provide fast relief of symptoms. Will not provide long-term asthma control. If used >2 days/week (except as needed for exercise-induced asthma), the patient may need to start or increase long-term control medications. Avoiding environmental factors that worsen asthma <p>Develop a written asthma action plan in partnership with patient/family (sample plan available at www.nhlbi.nih.gov/health/public/lung/asthma/asthma_actplan.pdf).</p> <ul style="list-style-type: none"> Agree on treatment goals. Teach patients how to use the asthma action plan to: <ul style="list-style-type: none"> Take daily actions to control asthma Adjust medications in response to worsening asthma Seek medical care as appropriate Encourage adherence to the asthma action plan. <ul style="list-style-type: none"> Choose treatment that achieves outcomes and addresses preferences important to the patient/family. Review at each visit any success in achieving control, any concerns about treatment, any difficulties following the plan, and any possible actions to improve adherence. Provide encouragement and praise, which builds patient confidence. Encourage family involvement to provide support. <p>Integrate education into all points of care involving interactions with patients.</p> <ul style="list-style-type: none"> Include members of all health care disciplines (e.g., physicians, pharmacists, nurses, respiratory therapists, and asthma educators) in providing and reinforcing education at all points of care.
Control of Environmental Factors and Comorbid Conditions	<p>Recommend ways to control exposures to allergens, irritants, and pollutants that make asthma worse.</p> <ul style="list-style-type: none"> Determine exposures, history of symptoms after exposures, and sensitivities. (In patients with persistent asthma, use skin or in vitro testing to assess sensitivity to perennial indoor allergens to which the patient is exposed.) <ul style="list-style-type: none"> Recommend multifaceted approaches to control exposures to which the patient is sensitive; single steps alone are generally ineffective. Advise all asthma patients and all pregnant women to avoid exposure to tobacco smoke. Consider allergen immunotherapy by trained personnel for patients with persistent asthma when there is a clear connection between symptoms and exposure to an allergen to which the patient is sensitive. <p>Treat comorbid conditions.</p> <ul style="list-style-type: none"> Consider allergic bronchopulmonary aspergillosis, gastroesophageal reflux, obesity, obstructive sleep apnea, rhinitis and sinusitis, and stress or depression. Treatment of these conditions may improve asthma control. Consider inactivated flu vaccine for all patients >6 months of age.

ASTHMA CARE FOR SPECIAL CIRCUMSTANCES

Clinical Issue	Key Clinical Activities and Action Steps
Exercise-Induced Bronchospasm	<p>Prevent EIB.*</p> <ul style="list-style-type: none"> Physical activity should be encouraged. For most patients, EIB should not limit participation in any activity they choose. Teach patients to take treatment before exercise. SABAs* will prevent EIB in most patients; LTRAs,* cromolyn, or LABAs* also are protective. Frequent or chronic use of LABA to prevent EIB is discouraged, as it may disguise poorly controlled persistent asthma. Consider long-term control medication. EIB often is a marker of inadequate asthma control and responds well to regular anti-inflammatory therapy. Encourage a warm-up period or mask or scarf over the mouth for cold-induced EIB.
Pregnancy	<p>Maintain asthma control through pregnancy.</p> <ul style="list-style-type: none"> Check asthma control at all prenatal visits. Asthma can worsen or improve during pregnancy; adjust medications as needed. Treating asthma with medications is safer for the mother and fetus than having poorly controlled asthma. Maintaining lung function is important to ensure oxygen supply to the fetus. ICSs* are the preferred long-term control medication. Remind patients to avoid exposure to tobacco smoke.

MANAGING EXACERBATIONS

Clinical Issue	Key Clinical Activities and Action Steps
Home Care	<p>Develop a written asthma action plan (see Patient Education for Self-Management, page 3).</p> <p>Teach patients how to:</p> <ul style="list-style-type: none"> Recognize early signs, symptoms, and PEF* measures that indicate worsening asthma. Adjust medications (increase SABA* and, in some cases, add oral systemic corticosteroids) and remove or withdraw from environmental factors contributing to the exacerbation. Monitor response. Seek medical care if there is serious deterioration or lack of response to treatment. Give specific instructions on who and when to call.
Urgent or Emergency Care	<p>Assess severity by lung function measures (for ages ≥ 5 years), physical examination, and signs and symptoms.</p> <p>Treat to relieve hypoxemia and airflow obstruction; reduce airway inflammation.</p> <ul style="list-style-type: none"> Use supplemental oxygen as appropriate to correct hypoxemia. Treat with repetitive or continuous SABA,* with the addition of inhaled ipratropium bromide in severe exacerbations. Give oral systemic corticosteroids in moderate or severe exacerbations or for patients who fail to respond promptly and completely to SABA. Consider adjunctive treatments, such as intravenous magnesium sulfate or heliox, in severe exacerbations unresponsive to treatment. <p>Monitor response with repeat assessment of lung function measures, physical examination, and signs and symptoms, and, in emergency department, pulse oximetry.</p> <p>Discharge with medication and patient education:</p> <ul style="list-style-type: none"> Medications: SABA, oral systemic corticosteroids; consider starting ICS* Referral to follow-up care Asthma discharge plan Review of inhaler technique and, whenever possible, environmental control measures

*Abbreviations: EIB, exercise-induced bronchospasm; ICS, inhaled corticosteroid; LABA, long-acting beta₂-agonist; LTRA, leukotriene receptor antagonist; PEF, peak expiratory flow; SABA, short-acting beta₂-agonist.

INITIAL VISIT: CLASSIFYING ASTHMA SEVERITY AND INITIATING THERAPY (in patients who are not currently taking long-term control medications)

Level of severity (Columns 2–5) is determined by events listed in Column 1 for both impairment (frequency and intensity of symptoms and functional limitations) and risk (of exacerbations). Assess impairment by patient's or caregiver's recall of events during the previous 2–4 weeks; assess risk over the last year. Recommendations for initiating therapy based on level of severity are presented in the last row.

Components of Severity		Intermittent			Mild			Persistent			
		Ages 0-4 years	Ages 5-11 years	Ages ≥12 years	Ages 0-4 years	Ages 5-11 years	Ages ≥12 years	Ages 0-4 years	Ages 5-11 years	Ages ≥12 years	
Impairment	Symptoms	≤2 days/week			>2 days/week but not daily			Daily			
	Nighttime awakenings	0	≤2x/month			1-2x/month			3-4x/month		
	SABA* use for symptom control (not to prevent EIB*)	≤2 days/week			>2 days/week but not daily			3-4x/month			
	Interference with normal activity	None			Minor limitation			Some limitation			
	Lung function	Normal FEV ₁ between exacerbations			Normal FEV ₁ between exacerbations			Extremely limited			
Risk	→ FEV ₁ * (% predicted)	Not applicable	>80%	>80%	Not applicable	>80%	>80%	Not applicable	60-80%	Not applicable	
	→ FEV ₁ /FVC*		>85%	Normal†		>80%	Normal†		75-80%	Reduced 5%‡	
	Asthma exacerbations requiring oral systemic corticosteroids†	0-1/year			≥2 exacerb. in 6 months, or wheezing ≥4x per year lasting >1 day AND risk factors for persistent asthma			Generally, more frequent and intense events indicate greater severity.			
		0-1/year			≥2/year			Generally, more frequent and intense events indicate greater severity.			
Consider severity and interval since last asthma exacerbation. Frequency and severity may fluctuate over time for patients in any severity category. Relative annual risk of exacerbations may be related to FEV ₁ *.											
Recommended Step for Initiating Therapy <small>(See "Stepwise Approach for Managing Asthma Long Term," page 7)</small> <small>The stepwise approach is meant to help, not replace, the clinical decisionmaking needed to meet individual patient needs.</small>	Step 1			Step 2			Step 3 medium-dose ICS* option			Step 3 medium-dose ICS* option or Step 4	
	Consider short course of oral systemic corticosteroids.										
In 2-6 weeks, depending on severity, assess level of asthma control achieved and adjust therapy as needed. For children 0-4 years old, if no clear benefit is observed in 4-6 weeks, consider adjusting therapy or alternate diagnoses.											

* **Abbreviations:** EIB, exercise-induced bronchospasm; FEV₁, forced expiratory volume in 1 second; FVC, forced vital capacity; ICS, inhaled corticosteroid; SABA, short-acting beta₂-agonist.

+ Normal FEV₁/FVC by age: 8–19 years, 85%; 20–39 years, 80%; 40–59 years, 75%; 60–80 years, 70%.

‡ Data are insufficient to link frequencies of exacerbations with different levels of asthma severity. Generally, more frequent and intense exacerbations (e.g., requiring urgent care, hospital or intensive care admission, and/or oral corticosteroids) indicate greater underlying disease severity. For treatment purposes, patients with ≥2 exacerbations may be considered to have persistent asthma, even in the absence of impairment levels consistent with persistent asthma.

FOLLOW-UP VISITS: ASSESSING ASTHMA CONTROL AND ADJUSTING THERAPY

Level of control (Columns 2-4) is based on the most severe component of impairment (symptoms and functional limitations) or risk (exacerbations). Assess impairment by patient's or caregiver's recall of events listed in Column 1 during the previous 2-4 weeks and by spirometry and/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. Assess risk by recall of exacerbations during the previous year and since the last visit. Recommendations for adjusting therapy based on level of control are presented in the last row.

Components of Control		Well Controlled			Not Well Controlled			Very Poorly Controlled		
		Ages 0-4 years	Ages 5-11 years	Ages ≥12 years	Ages 0-4 years	Ages 5-11 years	Ages ≥12 years	Ages 0-4 years	Ages 5-11 years	Ages ≥12 years
Impairment	Symptoms	≤2 days/week	≤2 days/week but not more than once on each day	≤2 days/week	>2 days/week	>2 days/week or multiple times on ≤2 days/week	>2 days/week	Throughout the day		
	Nighttime awakenings	≤1x/month		≤2x/month	>1x/month	≥2x/month	1-3x/week	>1x/week	≥2x/week	≥4x/week
	Interference with normal activity	None			Some limitation			Extremely limited		
	SABA* use for symptom control (not to prevent EIB*)	≤2 days/week			>2 days/week			Several times per day		
	Lung function									
	➔ FEV ₁ * (% predicted) or peak flow (% personal/best)	Not applicable	>80%	>80%	Not applicable	60-80%	60-80%	Not applicable	<60%	<60%
	➔ FEV ₁ /FVC*		>80%	Not applicable		75-80%	Not applicable		<75%	Not applicable
	Validated questionnaires†									
	➔ ATAQ*	Not applicable	Not applicable	0	Not applicable	Not applicable	1-2	Not applicable	Not applicable	3-4
➔ ACQ*			≤0.75‡			≥1.5			Not applicable	
➔ ACT*			≥20			16-19			≤15	
Risk	Asthma exacerbations requiring oral systemic corticosteroids§	0-1/year			2-3/year			≥2/year		
					Consider severity and interval since last asthma exacerbation.					
	Reduction in lung growth/Progressive loss of lung function	Not applicable	Evaluation requires long-term follow-up care.		Not applicable	Evaluation requires long-term follow-up care.		Not applicable	Evaluation requires long-term follow-up care.	
Treatment-related adverse effects		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.								
Recommended Action for Treatment	(See "Stepwise Approach for Managing Asthma Long Term," page 7) The stepwise approach is meant to help, not replace, the clinical decisionmaking needed to meet individual patient needs.	Maintain current step. Regular follow-up 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	Step up 1 step	Consider short course of oral systemic corticosteroids. Step up 1-2 steps. Reevaluate in 2 weeks to achieve control.		
					Reevaluate in 2-6 weeks to achieve control. For children 0-4 years, if no clear benefit observed in 4-6 weeks, consider adjusting therapy or alternative diagnoses.					
					Review adherence to medication, inhaler technique, and environmental control. If alternative treatment was used, discontinue and use preferred treatment for that step. For side effects, consider alternative treatment options.					

* **Abbreviations:** ACQ, Asthma Control Questionnaire[®]; ACT, Asthma Control Test[™]; ATAQ, Asthma Therapy Assessment Questionnaire[®]; EIB, exercise-induced bronchospasm; FVC, forced vital capacity; FEV₁, forced expiratory volume in 1 second; SABA, short-acting beta₂-agonist.
† Minimal important difference: 1.0 for the ATAQ; 0.5 for the ACQ; not determined for the ACT.
‡ ACQ values of 0.76-1.4 are indeterminate regarding well-controlled asthma.
§ Data are insufficient to link frequencies of exacerbations with different levels of asthma control. Generally, more frequent and intense exacerbations (e.g., requiring urgent care, hospital or intensive care admission, and/or oral corticosteroids) indicate poorer asthma control.



2020 FOCUSED UPDATES TO THE Asthma Management Guidelines



AT-A-GLANCE GUIDE

This At-A-Glance Guide describes a treatment management approach based on recommendations from the *2020 Focused Updates to the Asthma Management Guidelines: A Report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group*.¹ Step diagrams from the 2007 Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma (EPR-3) were updated with the new recommendations. The diagrams are intended to help clinicians integrate the new recommendations into clinical care, and are meant to assist, and not replace, clinical judgment or decision-making for individual patient management, with input from individuals with asthma about their preferences.

AGES 0-4 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 0–4 Years				
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6
Preferred	PRN SABA and At the start of RTI: Add short course daily ICS▲	Daily low-dose ICS and PRN SABA	Daily medium-dose ICS and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA
Alternative		Daily montelukast* or Cromolyn,* and PRN SABA		Daily medium-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast* and PRN SABA	Daily high-dose ICS + montelukast*+ oral systemic corticosteroid and PRN SABA
			For children age 4 years only, see Step 3 and Step 4 on Management of Persistent Asthma in Individuals Ages 5–11 Years diagram.			
Assess Control						
<ul style="list-style-type: none">First check adherence, inhaler technique, environmental factors,▲ and comorbid conditions.Step up if needed; reassess in 4–6 weeksStep down if possible (if asthma is well controlled for at least 3 consecutive months) <p>Consult with asthma specialist if Step 3 or higher is required. Consider consultation at Step 2.</p> <p>Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual’s clinical situation.</p>						

Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting beta₂-agonist; SABA, inhaled short-acting beta₂-agonist; RTI, respiratory tract infection; PRN, as needed

[▲] Updated based on the 2020 guidelines.

* Cromolyn and montelukast were not considered for this update and/or have limited availability for use in the United States. The FDA issued a Boxed Warning for montelukast in March 2020.

¹The full-length report, *2020 Focused Updates to the Asthma Management Guidelines: A Report from the National Asthma Education and Prevention Program Coordinating Committee Expert Panel Working Group*, can be accessed at nhlbi.nih.gov/asthmaguidelines.



U.S. Department of Health and Human Services
National Institutes of Health
National Heart, Lung, and Blood Institute

NIH Publication No. 20-HL-8142
December 2020

NOTES FOR INDIVIDUALS AGES 0–4 YEARS DIAGRAM

Quick-relief medications	<ul style="list-style-type: none"> Use SABA as needed for symptoms. The intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed. Caution: Increasing use of SABA or use >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and may require a step up in treatment. Consider short course of oral systemic corticosteroid if exacerbation is severe or individual has history of previous severe exacerbations.
Each step: Assess environmental factors, provide patient education, and manage comorbidities▲	<ul style="list-style-type: none"> In individuals with sensitization (or symptoms) related to exposure to pests‡: conditionally recommend integrated pest management as a single or multicomponent allergen-specific mitigation intervention.▲ In individuals with sensitization (or symptoms) related to exposure to identified indoor allergens, conditionally recommend a multi-component allergen-specific mitigation strategy.▲ In individuals with sensitization (or symptoms) related to exposure to dust mites, conditionally recommend impermeable pillow/mattress covers only as part of a multicomponent allergen-specific mitigation intervention, but not as a single component intervention.▲
Notes	<ul style="list-style-type: none"> If clear benefit is not observed within 4–6 weeks and the medication technique and adherence are satisfactory, the clinician should consider adjusting therapy or alternative diagnoses.
Abbreviations	<p>EIB, exercise-induced bronchoconstriction; SABA, inhaled short-acting beta₂-agonist.</p> <p>▲Updated based on the 2020 guidelines.</p> <p>‡ Refers to mice and cockroaches, which were specifically examined in the Agency for Healthcare Research and Quality systematic review.</p>

WHAT'S NEW (AGES 0–4 YEARS)

- Step 1:** In children ages 0–4 years with recurrent wheezing, a short (7–10 day) course of daily ICS with as-needed SABA for quick-relief therapy is recommended starting at the onset of a respiratory tract infection.
 - ✓ Recurrent wheezing is defined as at least three episodes of wheezing triggered by apparent infection in their lifetime, or two episodes in the past year, and no symptoms between infections.
 - ✓ One regimen, used in two reviewed studies, is budesonide inhalation suspension, 1 mg twice daily for 7 days at the first sign of respiratory tract infection-associated symptoms.
 - ✓ The main benefit during respiratory tract infections is a reduction in exacerbations requiring systemic corticosteroids.
 - ✓ Caregivers can initiate intermittent ICS treatment at home without a visit to a health care provider when they have clear instructions.
 - ✓ This treatment could affect growth. Carefully monitor growth in children who use this treatment.
- Steps 3 and 4:** For children age 4 years only with persistent asthma, see Steps 3 and 4 on Management of Persistent Asthma in Individuals Ages 5–11 Years.
- Each step:**
 - ✓ Consider the severity of an individual's asthma, the small potential benefit, and the extent of previous symptoms and exacerbations when recommending allergen mitigation interventions.

AGES 5-11 YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 5-11 Years				
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA	Daily and PRN combination low-dose ICS-formoterol [▲]	Daily and PRN combination medium-dose ICS-formoterol [▲]	Daily high-dose ICS-LABA and PRN SABA	Daily high-dose ICS-LABA + oral systemic corticosteroid and PRN SABA
Alternative		Daily LTRA,* or Cromolyn,* or Nedocromil,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LTRA,* or daily low-dose ICS + Theophylline,* and PRN SABA	Daily medium-dose ICS-LABA and PRN SABA or Daily medium-dose ICS + LTRA* or daily medium-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* or daily high-dose ICS + Theophylline,* and PRN SABA	Daily high-dose ICS + LTRA* + oral systemic corticosteroid or daily high-dose ICS + Theophylline* + oral systemic corticosteroid, and PRN SABA
		Steps 2-4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy [▲]			Consider Omalizumab** [▲]	

Assess Control

- First check adherence, inhaler technique, environmental factors,[▲] and comorbid conditions.
- **Step up** if needed; reassess in 2-6 weeks
- **Step down** if possible (if asthma is well controlled for at least 3 consecutive months)

Consult with asthma specialist if Step 4 or higher is required. Consider consultation at Step 3.

Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual's clinical situation.

Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting beta₂-agonist; LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting beta₂-agonist

[▲] Updated based on the 2020 guidelines.

* Cromolyn, Nedocromil, LTRAs including montelukast, and Theophylline were not considered in this update and/or have limited availability for use in the United States, and/or have an increased risk of adverse consequences and need for monitoring that make their use less desirable. The FDA issued a Boxed Warning for montelukast in March 2020.

** Omalizumab is the only asthma biologic currently FDA-approved for this age range.

NOTES FOR INDIVIDUALS AGES 5-11 YEARS DIAGRAM

Quick-relief medications	<ul style="list-style-type: none"> Use SABA as needed for symptoms. The intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed. In Steps 3 and 4, the preferred option includes the use of ICS-formoterol 1 to 2 puffs as needed up to a maximum total daily maintenance and rescue dose of 8 puffs (36 mcg).▲ Caution: Increasing use of SABA or use >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and may require a step up in treatment.
Each step: Assess environmental factors, provide patient education, and manage comorbidities▲	<ul style="list-style-type: none"> In individuals with sensitization (or symptoms) related to exposure to pests†: conditionally recommend integrated pest management as a single or multicomponent allergen-specific mitigation intervention.▲ In individuals with sensitization (or symptoms) related to exposure to identified indoor allergens, conditionally recommend a multi-component allergen-specific mitigation strategy.▲ In individuals with sensitization (or symptoms) related to exposure to dust mites, conditionally recommend impermeable pillow/mattress covers only as part of a multicomponent allergen-specific mitigation intervention, but not as a single component intervention.▲
Notes	<ul style="list-style-type: none"> The terms ICS-LABA and ICS-formoterol indicate combination therapy with both an ICS and a LABA, usually and preferably in a single inhaler. Where formoterol is specified in the steps, it is because the evidence is based on studies specific to formoterol. In individuals ages 5-11 years with persistent allergic asthma in which there is uncertainty in choosing, monitoring, or adjusting anti-inflammatory therapies based on history, clinical findings, and spirometry, FeNO measurement is conditionally recommended as part of an ongoing asthma monitoring and management strategy that includes frequent assessment.
Abbreviations	<p>EIB (exercise-induced bronchoconstriction); FeNO (fractional exhaled nitric oxide); ICS (inhaled corticosteroid); LABA (long-acting beta₂-agonist); SABA (inhaled short-acting beta₂-agonist).</p> <p>▲Updated based on the 2020 guidelines.</p> <p>† Refers to mice and cockroaches, which were specifically examined in the Agency for Healthcare Research and Quality systematic review.</p>

WHAT'S NEW (AGES 5-11 YEARS)

- For individuals with mild to moderate persistent asthma who are taking daily ICS treatment (likely adherent with prescribed daily ICS) as a controller, increasing the regular daily ICS dose for short periods is not recommended when symptoms increase or peak flow decreases.
- Steps 2-4:** Subcutaneous immunotherapy (SCIT) is recommended as an adjunct treatment for individuals who have demonstrated allergic sensitization and evidence of worsening asthma symptoms after exposure to the relevant antigen or antigens.
 - ✓ Do not initiate, increase, or administer maintenance SCIT doses while individuals have asthma symptoms.
 - ✓ Do not administer SCIT in individuals with severe asthma.
- Steps 3 and 4:** For individuals with moderate to severe persistent asthma already taking low- or medium-dose ICS, the preferred treatment is a single inhaler with ICS-formoterol (referred to as single maintenance and reliever therapy, or “SMART”) used both daily and as needed.
 - ✓ Individuals with a severe exacerbation in the prior year are particularly good candidates for SMART to reduce exacerbations.
 - ✓ Do not use ICS-formoterol as reliever therapy in individuals taking ICS-salmeterol as maintenance therapy.
 - ✓ Individuals whose asthma is uncontrolled on maintenance ICS-LABA with SABA as quick-relief therapy should receive the preferred SMART if possible before moving to a higher step of therapy.
 - ✓ In children ages 4-11 years, there may be a lower risk of growth suppression among those taking SMART versus daily higher-dose ICS treatment.
- Steps 5 and 6:** Consider Omalizumab, the only FDA-approved asthma biologic for this age group.
- Each step:**
 - ✓ Consider the severity of an individual's asthma, the small potential benefit, and the extent of previous symptoms and exacerbations when recommending allergen mitigation interventions.

AGES 12+ YEARS: STEPWISE APPROACH FOR MANAGEMENT OF ASTHMA

	Intermittent Asthma	Management of Persistent Asthma in Individuals Ages 12+ Years				
Treatment	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6 [■]
Preferred	PRN SABA	Daily low-dose ICS and PRN SABA or PRN concomitant ICS and SABA [▲]	Daily and PRN combination low-dose ICS-formoterol [▲]	Daily and PRN combination medium-dose ICS-formoterol [▲]	Daily medium-high dose ICS-LABA + LAMA and PRN SABA [▲]	Daily high-dose ICS-LABA + oral systemic corticosteroids + PRN SABA
Alternative		Daily LTRA* and PRN SABA or Cromolyn,* or Nedocromil,* or Zileuton,* or Theophylline,* and PRN SABA	Daily medium-dose ICS and PRN SABA or Daily low-dose ICS-LABA, or daily low-dose ICS + LAMA, [▲] or daily low-dose ICS + LTRA,* and PRN SABA or Daily low-dose ICS + Theophylline* or Zileuton,* and PRN SABA	Daily medium-dose ICS-LABA or daily medium-dose ICS + LAMA, and PRN SABA [▲] or Daily medium-dose ICS + LTRA,* or daily medium-dose ICS + Theophylline,* or daily medium-dose ICS + Zileuton,* and PRN SABA	Daily medium-high dose ICS-LABA or daily high-dose ICS + LTRA,* and PRN SABA	
		Steps 2–4: Conditionally recommend the use of subcutaneous immunotherapy as an adjunct treatment to standard pharmacotherapy in individuals ≥ 5 years of age whose asthma is controlled at the initiation, build up, and maintenance phases of immunotherapy [▲]			Consider adding Asthma Biologics (e.g., anti-IgE, anti-IL5, anti-IL5R, anti-IL4/IL13)**	

Assess Control

- First check adherence, inhaler technique, environmental factors,[▲] and comorbid conditions.
- **Step up** if needed; reassess in 2–6 weeks
- **Step down** if possible (if asthma is well controlled for at least 3 consecutive months)

Consult with asthma specialist if Step 4 or higher is required. Consider consultation at Step 3.

Control assessment is a key element of asthma care. This involves both impairment and risk. Use of objective measures, self-reported control, and health care utilization are complementary and should be employed on an ongoing basis, depending on the individual's clinical situation.

Abbreviations: ICS, inhaled corticosteroid; LABA, long-acting beta₂-agonist; LAMA, long-acting muscarinic antagonist; LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting beta₂-agonist

[▲] Updated based on the 2020 guidelines.

* Cromolyn, Nedocromil, LTRAs including Zileuton and montelukast, and Theophylline were not considered for this update, and/or have limited availability for use in the United States, and/or have an increased risk of adverse consequences and need for monitoring that make their use less desirable. The FDA issued a Boxed Warning for montelukast in March 2020.

** The AHRQ systematic reviews that informed this report did not include studies that examined the role of asthma biologics (e.g. anti-IgE, anti-IL5, anti-IL5R, anti-IL4/IL13). Thus, this report does not contain specific recommendations for the use of biologics in asthma in Steps 5 and 6.

■ Data on the use of LAMA therapy in individuals with severe persistent asthma (Step 6) were not included in the AHRQ systematic review and thus no recommendation is made.

NOTES FOR INDIVIDUALS AGES 12+ YEARS DIAGRAM

Quick-relief medications	<ul style="list-style-type: none"> Use SABA as needed for symptoms. The intensity of treatment depends on the severity of symptoms: up to 3 treatments at 20-minute intervals as needed. In steps 3 and 4, the preferred option includes the use of ICS-formoterol 1 to 2 puffs as needed up to a maximum total daily maintenance and rescue dose of 12 puffs (54 mcg).▲ Caution: Increasing use of SABA or use >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and may require a step up in treatment.
Each step: Assess environmental factors, provide patient education, and manage comorbidities▲	<ul style="list-style-type: none"> In individuals with sensitization (or symptoms) related to exposure to pests†: conditionally recommend integrated pest management as a single or multicomponent allergen-specific mitigation intervention.▲ In individuals with sensitization (or symptoms) related to exposure to identified indoor allergens, conditionally recommend a multi-component allergen-specific mitigation strategy.▲ In individuals with sensitization (or symptoms) related to exposure to dust mites, conditionally recommend impermeable pillow/mattress covers only as part of a multicomponent allergen-specific mitigation intervention, but not as a single component intervention.▲
Notes	<ul style="list-style-type: none"> The terms ICS-LABA and ICS-formoterol indicate combination therapy with both an ICS and a LABA, usually and preferably in a single inhaler. Where formoterol is specified in the steps, it is because the evidence is based on studies specific to formoterol. In individuals ages 12 years and older with persistent allergic asthma in which there is uncertainty in choosing, monitoring, or adjusting anti-inflammatory therapies based on history, clinical findings, and spirometry, FeNO measurement is conditionally recommended as part of an ongoing asthma monitoring and management strategy that includes frequent assessment. Bronchial thermoplasty was evaluated in Step 6. The outcome was a conditional recommendation against the therapy.
Abbreviations	<p>EIB, exercise-induced bronchoconstriction; FeNO, fractional exhaled nitric oxide; ICS, inhaled corticosteroid; LABA, long-acting beta₂-agonist; SABA, inhaled short-acting beta₂-agonist.</p> <p>▲Updated based on the 2020 guidelines.</p> <p>†Refers to mice and cockroaches, which were specifically examined in the Agency for Healthcare Research and Quality systematic review.</p>

WHAT'S NEW (AGES 12+ YEARS)

- For individuals with mild to moderate persistent asthma who are taking daily ICS treatment (likely adherent with prescribed daily ICS) as a controller, increasing the regular daily ICS dose for short periods is not recommended when symptoms increase or peak flow decreases.
- Step 2:** For individuals with mild persistent asthma, either of the following two treatments are recommended as part of Step 2 therapy: 1) a daily low-dose ICS and as-needed SABA for quick-relief therapy, or 2) intermittent as-needed SABA and ICS used one after the other for worsening asthma.
 - ✓ One approach to intermittent therapy is two to four puffs of albuterol followed by 80–250 mcg of beclomethasone equivalent every 4 hours as needed for asthma symptoms.
 - ✓ Intermittent therapy can be initiated at home with regular provider follow-up to ensure that the intermittent regimen is still appropriate.
 - ✓ Individuals with either low or high perception of symptoms may not be good candidates for as-needed ICS therapy. Daily low-dose ICS with as-needed SABA may be preferred.
- Steps 2–4:** Subcutaneous immunotherapy (SCIT) is recommended as an adjunct treatment for individuals who have demonstrated allergic sensitization and evidence of worsening asthma symptoms after exposure to the relevant antigen or antigens.
 - ✓ Do not initiate, increase, or administer maintenance SCIT doses while individuals have asthma symptoms.
 - ✓ Do not administer SCIT in individuals with severe asthma.
- Steps 3 and 4:** For individuals with moderate to severe persistent asthma already taking low- or medium-dose ICS, the preferred treatment is a single inhaler with ICS-formoterol (referred to as single maintenance and reliever therapy, or “SMART”) used both daily and as needed.
 - ✓ Individuals with a severe exacerbation in the prior year are particularly good candidates for SMART to reduce exacerbations.
 - ✓ Do not use ICS-formoterol as reliever therapy in individuals taking ICS-salmeterol as maintenance therapy.
 - ✓ Individuals whose asthma is uncontrolled on maintenance ICS-LABA with SABA as quick-relief therapy should receive the preferred SMART if possible before moving to a higher step of therapy.
- Each step:**
 - ✓ Consider the severity of an individual's asthma, the small benefit, and the extent of previous symptoms and exacerbations when recommending allergen mitigation interventions.

EDUCATIONAL RESOURCES

National Heart, Lung, and Blood Institute

- Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma (EPR-3)
www.nhlbi.nih.gov/guidelines/asthma
- Physician Asthma Care Education (PACE): www.nhlbi.nih.gov/health/prof/lung/asthma/pace/
- National Asthma Control Initiative (NACI): <http://naci.nhlbi.nih.gov>

Allergy & Asthma Network Mothers of Asthmatics
800-878-4403
www.aanma.org

**American Academy of Allergy, Asthma,
and Immunology**
414-272-6071
www.aaaai.org

American Academy of Pediatrics
847-434-4000
www.aap.org

American Association of Respiratory Care
972-243-2272
www.aarc.org

American College of Chest Physicians
847-498-1400
www.chestnet.org

American College of Allergy, Asthma & Immunology
847-427-1200
www.acaai.org

American Lung Association
800-LUNG-USA (800-586-4872)
www.lungusa.org

American School Health Association
800-445-2742
www.ashaweb.org

Asthma and Allergy Foundation of America
800-7-ASTHMA (800-727-8462)
<http://aafa.org>

Centers for Disease Control and Prevention
800-CDC-INFO (800-232-4636)
www.cdc.gov/asthma

**Environmental Protection Agency/
Asthma Community Network**
www.asthmacommunitynetwork.org
800-490-9198 (to order EPA publications)
www.epa.gov/asthma/publications.html

National Association of School Nurses
240-821-1130
www.nasn.org

For more information contact:

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U.S. Department of Health and Human Services
National Institutes of Health

NIH Publication No. 12-5075
Originally Printed June 2002
Revised September 2012



**National Heart
Lung and Blood Institute**
People Science Health

