Clinical Practice Guidelines
Asthma

CLINICAL PRACTICE GUIDELINE: ASTHMA

A critical aspect of the diagnosis and management of asthma is the precise and periodic measurement of lung function, both before and after bronchodilator therapy, to determine both the severity and the effectiveness of therapeutic interventions. When establishing the diagnosis of asthma, evaluate:

- Medical History including smoking, drug and alcohol use; physician examination; and supportive diagnostic lung function testing
- **Establish that episodic symptoms of airflow obstruction are present** and objectively demonstrate that obstruction is at least partially reversible with spirometry.
- Exclude the presence of any alternative diagnoses, particularly Chronic Obstructive Pulmonary Disease (COPD) or vocal chord obstruction in adults, and aspiration, cardiac failure, inhaled foreign body, structural abnormality or cystic fibrosis in children.
- **Medication requirements** – short-acting bronchodilators used more than twice per week should prompt daily inhaled corticosteroid administration for persistent asthma, even if mild severity.

ASSESSMENT

Measures of assessment and monitoring should include:

- **Spirometry** — to be conducted at least once a year before and after inhaled bronchodilator therapy. Significant reversibility is indicated by an increase of greater than 12 percent and 200 ml in FEV1.
- **Peak Flow** — Symptomatic patients with normal spirometry should:
    - Have a daily assessment of peak flow monitoring upon rising and before bedtime
    - Maintain an accurate log of daily measurements to help detect subtle changes in lung function that may otherwise go unnoticed by the patient or the provider.

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CONTRIBUTING FACTORS
Assess at the initial evaluation and additional visits based on seasonal variations: • Smoking and secondhand smoke. If the member smokes, address the value and available resources to aid in smoking cessation. • Identify possible environmental inhalant allergens, indoor irritants, pet dander, air pollution, etc. • Viral Respiratory Infection component to induction of Reactive Airways Disease • Identify all the modifiable risk factors: Sedentary lifestyle, obesity, stress, smoking, drug use, etc. • Identify other factors: Acute/chronic rhino-sinusitis, gastro-esophageal reflux, drugs (ASA/NSAIDS, sulfites, beta adrenergic blockers in sensitive patients)
TRIGGERS
• Smoking and second-hand smoke • Air pollution • Things that the member is allergic to (e.g., pet dander, dust mites, cockroaches or pollen) • For exercise-induced asthma: Advise members on the proper use of inhaler use before they exercise • Dry, cold air • Infection • Some medicines, such as aspirin
PHARMACOTHERAPY
Maintain optimal outcomes: • Control chronic and nocturnal symptoms • Maintain normal activity levels, including exercise

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All patients with Asthma should have a written Asthma Action Plan which incorporates all aspects of their Asthma care. This care plan should be re-evaluated at least annually and more often if necessary to help control the patient's changing condition. A team approach, which includes the patient, the Primary Care Provider, a certified asthma educator and a pulmonary specialist when appropriate, is the ideal delivery model for the effective and efficient treatment of Asthma. To this end, the patient must understand his/her Asthma Action Plan, which includes:

- Short-and long-term goals
- Written environmental control recommendations
- Lifestyle changes including sick-day interventions
- Self-monitoring of peak flows with use of a recording system (monthly calendar charting seasonal variations in asthma symptoms)
- Basic facts about asthma (provide written material for patient reference)
- List of environmental controls (stress the importance of implementation)
- Appropriate role of Asthma medications:
    - Explain use of controller vs. reliever medications
    - Provide Asthma Action Plan for medication use
    - Provide use instructions for Metered Dose Inhaler (observe use and critique technique) and the use of spacer devices

MONITORING AND REPORTING

- Establish therapeutic goals: Normal activity without restriction, rare symptoms
- Provide instructions for monitoring and reporting
    - Practice use of peak flow meter as a monitoring tool and instruct patient to record missed school/work days, altered activity and symptom changes

FOLLOW UP

- Routine office exams seasonally or every one to six months if stable, with increased frequency in acute cases or if patient's routine stable status changes
- Assess attainment of patient goals and concerns

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- Adjust treatment plans as often as necessary for optimal control. Add inhaled corticosteroids for all persistent (e.g., rescue meds more than twice per week) asthma, no matter how mild the severity
- Update the Asthma Action Plan and self-management plan at least annually and more often as indicated for changes in status
- Re-assess patient's peak flow and inhaler technique
- Smoking cessation program referral for smokers

REFERENCES

American Academy of Allergy Asthma and Immunology. http://www.aaaai.org/conditions-and-treatments/asthma.aspx.

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

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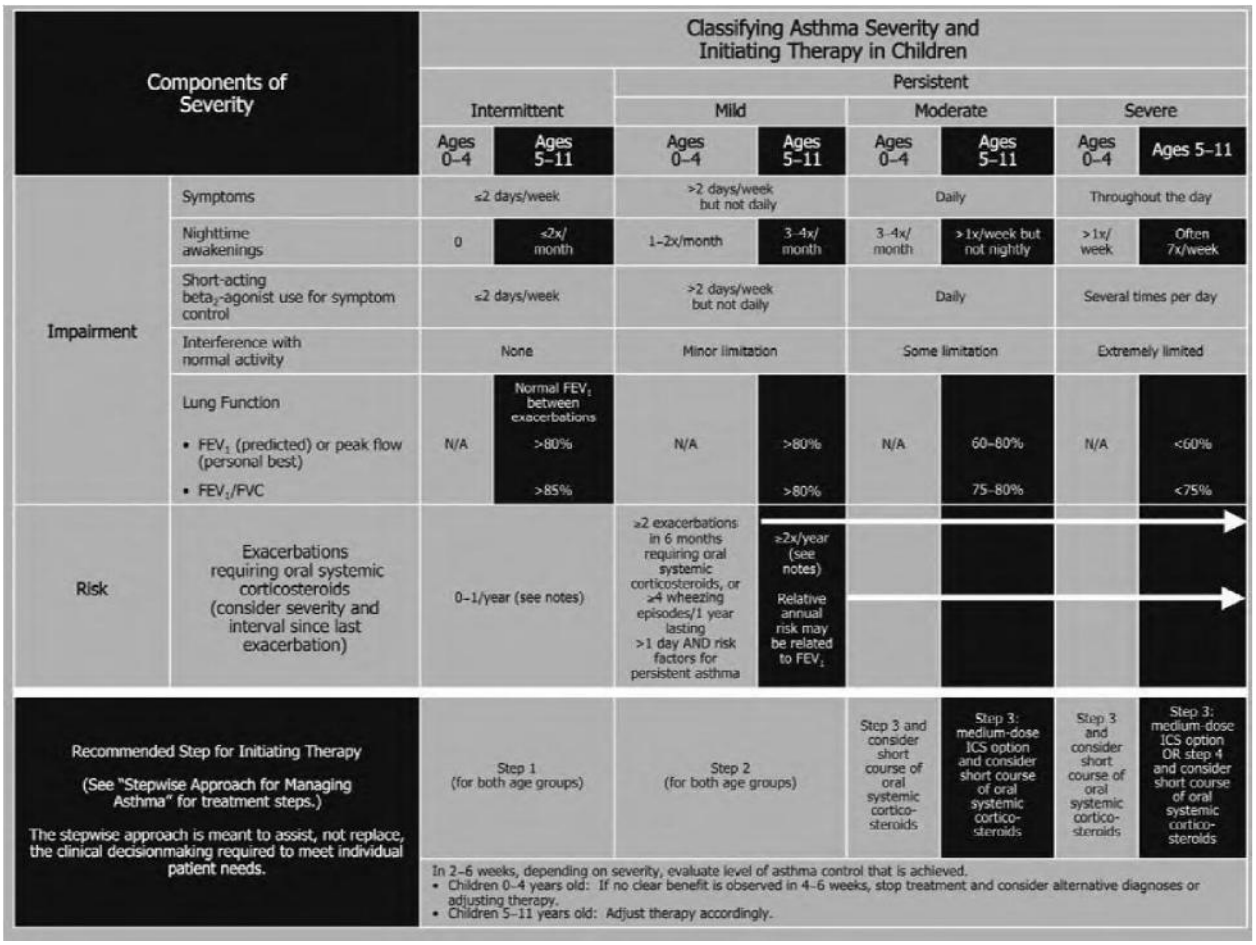
Clinical Practice Guidelines
Asthma

Components of Severity and Therapy Initiation in Children (0-11 years)



Components of Severity		Classifying Asthma Severity and Initiating Therapy in Children							
		Intermittent		Persistent: Mild		Persistent: Moderate		Persistent: Severe	
		Ages 0–4	Ages 5–11	Ages 0–4	Ages 5–11	Ages 0–4	Ages 5–11	Ages 0–4	Ages 5–11
Impairment	Symptoms	≤2 days/week		>2 days/week but not daily		Daily		Throughout the day	
	Nighttime awakenings	0	≤2x/ month	1–2x/month	3–4x/ month	3–4x/ month	>1x/week but not nightly	>1x/ week	Often 7x/week
	Short-acting beta$_2$-agonist use for symptom control	≤2 days/week		>2 days/week but not daily		Daily		Several times per day	
	Interference with normal activity	None		Minor limitation		Some limitation		Extremely limited	
	Lung Function • FEV_1 (predicted) or peak flow (personal best) • FEV_1/FVC	N/A	Normal FEV_1 between exacerbations >80% >85%	N/A	>80% >80%	N/A	60–80% 75–80%	N/A	<60% <75%
Risk	Exacerbations requiring oral systemic corticosteroids (consider severity and interval since last exacerbation)	0–1/year (see notes)		≥2 exacerbations in 6 months requiring oral systemic corticosteroids, or ≥4 wheezing episodes/1 year lasting >1 day AND risk factors for persistent asthma	≥2x/year (see notes) Relative annual risk may be related to FEV_1				
Recommended Step for Initiating Therapy (See "Stepwise Approach for Managing Asthma" for treatment steps.) The stepwise approach is meant to assist, not replace, the clinical decisionmaking required to meet individual patient needs.		Step 1 (for both age groups)		Step 2 (for both age groups)		Step 3 and consider short course of oral systemic cortico-steroids	Step 3: medium-dose ICS option and consider short course of oral systemic cortico-steroids	Step 3 and consider short course of oral systemic cortico-steroids	Step 3: medium-dose ICS option OR step 4 and consider short course of oral systemic cortico-steroids
		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.							

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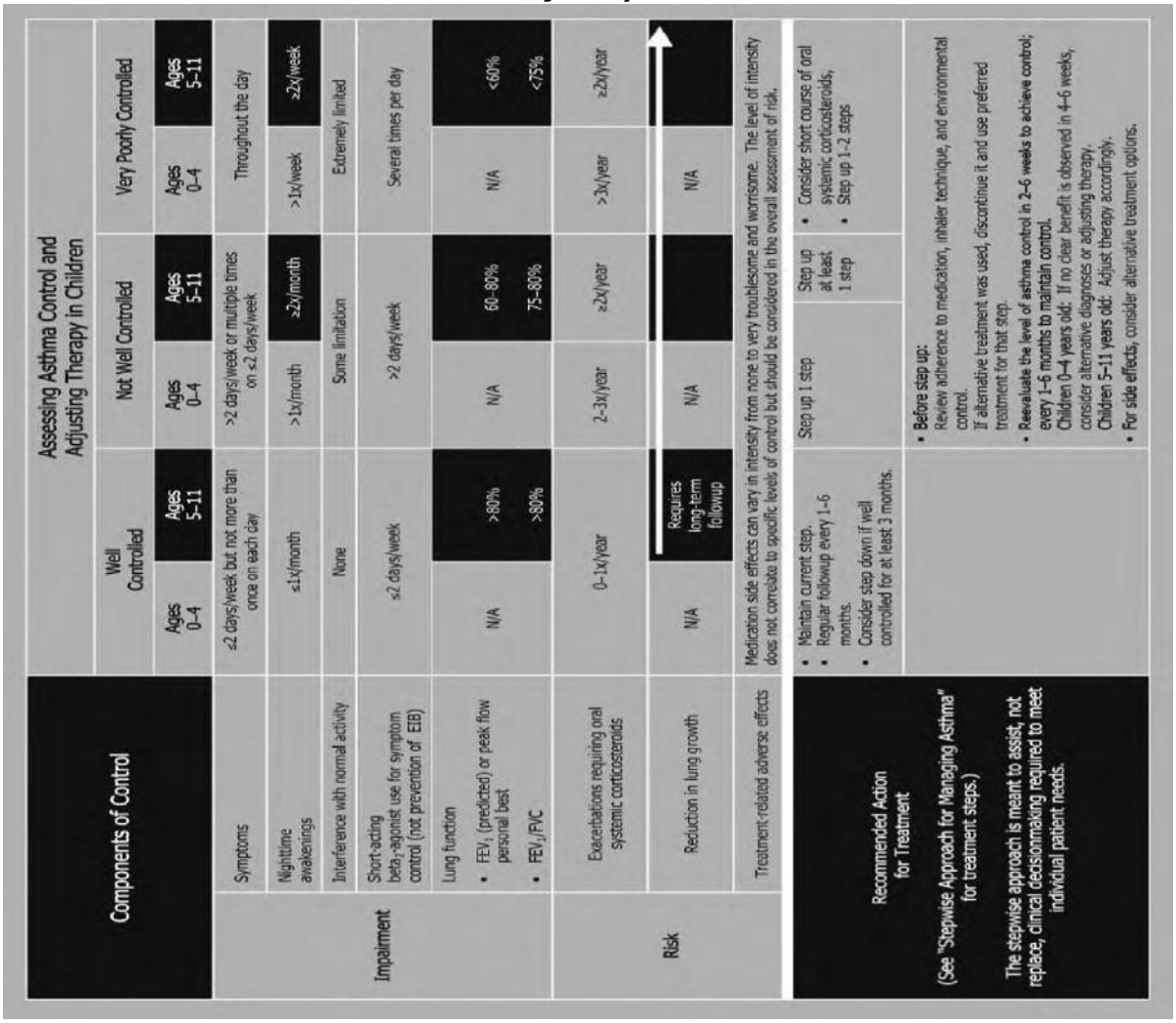
Clinical Practice Guidelines
Asthma

Assessing Asthma Control and Adjusting Therapy in Children (0-11 years)



Components of Control		Assessing Asthma Control and Adjusting Therapy in Children							
		Well Controlled		Not Well Controlled		Very Poorly Controlled	
		Ages 0–4	Ages 5–11	Ages 0–4	Ages 5–11	Ages 0–4	Ages 5–11
Impairment	Symptoms	≤2 days/week but not more than once on each day		>2 days/week or multiple times on ≤2 days/week		Throughout the day	
	Nighttime awakenings	≤1x/month		>1x/month	≥2x/month	>1x/week	≥2x/week
	Interference with normal activity	None		Some limitation		Extremely limited	
	Short-acting beta$_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week		>2 days/week		Several times per day	
	Lung function • FEV$_1$ (predicted) or peak flow personal best • FEV$_1$/FVC	N/A	>80% >80%	N/A	60–80% 75–80%	N/A	<60% <75%
Risk	Exacerbations requiring oral systemic corticosteroids	0–1x/year		2–3x/year	≥2x/year	>3x/year	≥2x/year
	Reduction in lung growth	N/A	Requires long-term followup	N/A		N/A	
	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" for treatment steps.) The stepwise approach is meant to assist, not replace, clinical decisionmaking 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 0–4 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.					

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Clinical Practice Guidelines
Asthma

Assessing Asthma Control and Adjusting Therapy in Youths ≥ 12 years of Age and Adults

Components of Control		Classification of Asthma Control (≥12 years of age)		
		Well Controlled	Not Well Controlled	Very Poorly Controlled
Impairment	Symptoms	≤2 days/week	>2 days/week	Throughout the day
	Nighttime awakenings	≤2x/month	1–3x/week	≥4x/week
	Interference with normal activity	None	Some limitation	Extremely limited
	Short-acting $beta_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week	Several times per day
	FEV_1 or peak flow	>80% predicted/ personal best	60–80% predicted/ personal best	<60% predicted/ personal best
	Validated questionnaires ATAQ ACQ ACT	 0 ≤0.75* ≥20	 1–2 ≥1.5 16–19	 3–4 N/A ≤15
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year	≥2/year (see note)	
		Consider severity and interval since last exacerbation		
	Progressive loss of lung function	Evaluation requires long-term followup 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" for treatment steps.)		• Maintain current step. • Regular followup at every 1–6 months to maintain control. • Consider step down if well controlled for at least 3 months.	• Step up 1 step. • Reevaluate in 2–6 weeks. • For side effects, consider alternative treatment options.	• Consider short course of oral systemic corticosteroids. • Step up 1–2 steps. • Reevaluate in 2 weeks. • For side effects, consider alternative treatment options.

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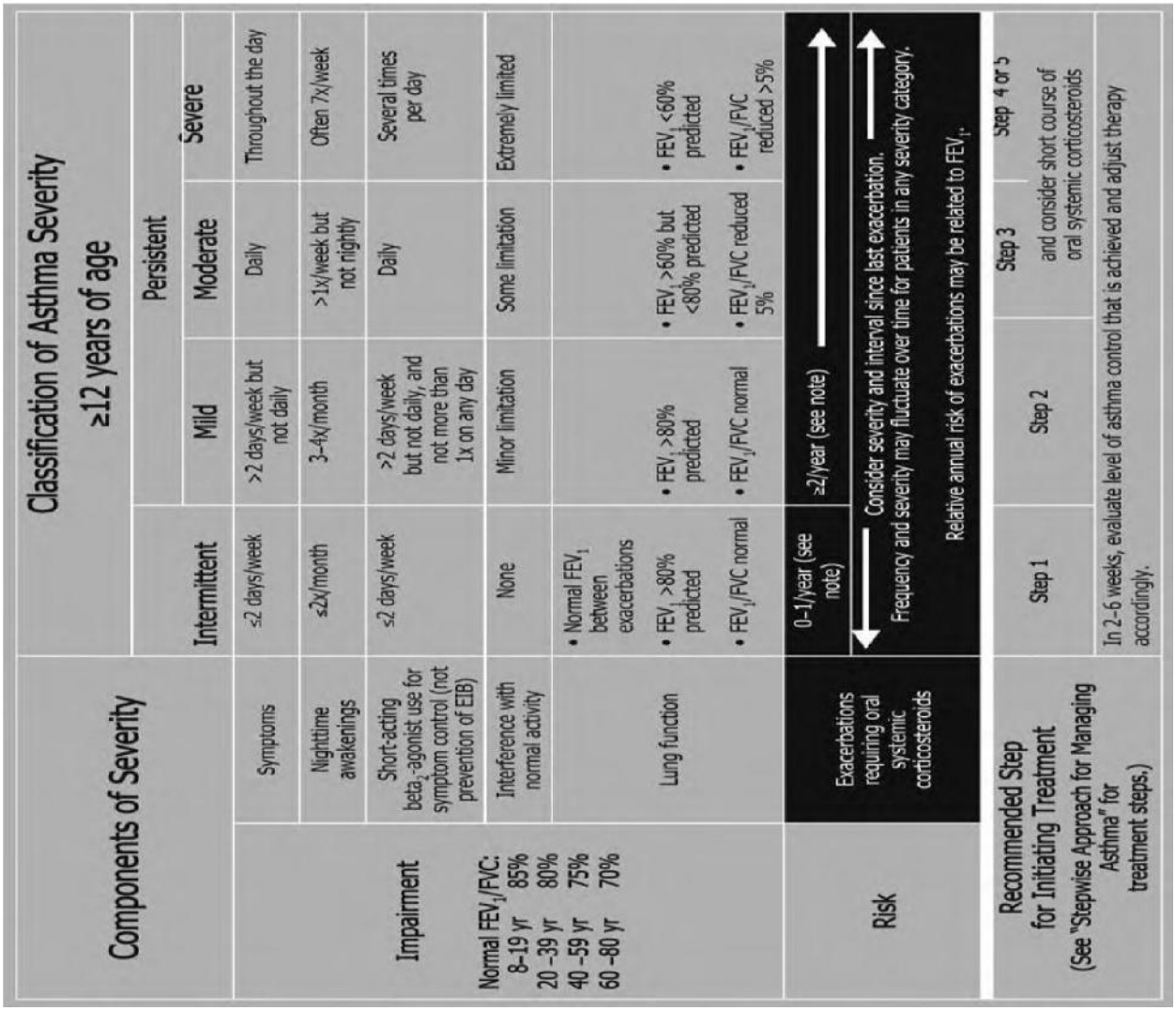
Clinical Practice Guidelines
Asthma

Classifying Asthma Severity and Initiating Treatment in Youths ≥ 12 Years of Age and Adults



Components of Severity		Classification of Asthma Severity ≥12 years of age			
		Intermittent	Persistent		
			Mild	Moderate	Severe
Impairment	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	≤2x/month	3–4x/month	>1x/week but not nightly	Often 7x/week
	Short-acting beta$_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week but not daily, and not more than 1x on any day	Daily	Several times per day
Normal FEV$_1$/FVC: 8–19 yr 85% 20 –39 yr 80% 40 –59 yr 75% 60 –80 yr 70%	Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
	Lung function	• Normal FEV$_1$ between exacerbations • FEV$_1$ >80% predicted • FEV$_1$/FVC normal	• FEV$_1$ >80% predicted • FEV$_1$/FVC normal	• FEV$_1$ >60% but <80% predicted • FEV$_1$/FVC reduced 5%	• FEV$_1$ <60% predicted • FEV$_1$/FVC reduced >5%
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year (see note)	≥2/year (see note)	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 FEV$_1$.	
Recommended Step for Initiating Treatment (See "Stepwise Approach for Managing Asthma" for treatment steps.)		Step 1	Step 2	Step 3	Step 4 or 5
		In 2–6 weeks, evaluate level of asthma control that is achieved and adjust therapy accordingly.		and consider short course of oral systemic corticosteroids	

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Figure 1. Summary of Recommended Key Clinical Activities for the Diagnosis and Management of Asthma

Clinical Issue	Key Clinical Activities	Action Steps
DIAGNOSIS		
	Establish asthma diagnosis	• Use medical history and physical examination to determine the symptoms of recurrent episodes of airflow obstruction are present • Use spirometry in all patients ages 5 years and older to determine that airway obstruction is at least partially reversible • Consider alternative causes of airway obstruction
Managing Asthma Long-Term	**Goal of asthma therapy is asthma control:** • Reduce impairment (i.e., prevent chronic symptoms, require infrequent use of Short-Acting Beta2-Agonist (SABA), maintain (near) normal lung function and normal activity levels) • Reduce risk (i.e., prevent exacerbations, minimize need for emergency care or hospitalization, prevent loss of lung function, or for children, prevent reduced lung growth, have minimal or no adverse effects of therapy)	
FOUR COMPONENTS OF CARE		
Assessment and Monitoring	Assess asthma severity to initiate therapy Assess asthma control to monitor and adjust therapy	• Use severity classification chart, assessing both domains of impairment and risk, to determine initial treatment • Use asthma control chart, assessing both domains of impairment and risk, to determine if therapy should be maintained or adjusted (step up if necessary, step down if possible • Use multiple measures of impairment and risk: Different measures assess different manifestations of asthma, they may not correlate with each other, and they may respond differently to therapy. Obtain lung function measures by spirometry at least every one to two years, more frequently for not well-controlled asthma

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	Schedule follow-up care	• Asthma is highly variable over time: Periodic monitoring is essential. Consider scheduling patients at two to six-week intervals while gaining control; at one to six-month intervals, depending on step of care required or duration of control to monitor if sufficient control is maintained; at three-month intervals if a step down in therapy is anticipated • Assess asthma control, medical technique, written asthma action plan, patient adherence and concerns at every visit

Education	Provide self-management education
	
	Tailor education to literacy level of patient. Appreciate the potential role of a patient's cultural beliefs and practices in asthma management.
	
	Develop a written asthma action plan in partnership with the patient.
	
	Integrate
		Teach and reinforce:
		• Self-monitoring to assess the level of asthma control and signs of worsening asthma (either symptom or peak flow monitoring shows similar benefits for most patients). Peak flow monitoring may be helpful for patients who have difficulty perceiving symptoms, a history of severe exacerbations, or moderate or severe asthma.
		• Using written Asthma Action Plan (review differences between long-term control and quick relief medication).
		• Taking medication correctly (inhaler technique and use of devices)
		• Agree on treatment goals and address patient concerns
		• Provide instructions for daily management:
		  ○ Long-term control medication, if applicable, and environmental control measures
		• Managing worsening asthma
		  ○ How to adjust medication and know when to seek medical care
		• Involve all members of the health care team in providing/reinforcing education, including physicians, nurses, pharmacists, respiratory therapists and asthma educators
		• Encourage education at all points of care: clinics, emergency departments, hospitals, pharmacies, schools and other community settings, and the patient's home

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	education into all points of care where health professionals interact with patients.	• Use a variety of educational strategies and methods
Control Environmental Factors and Comorbid Conditions	Recommend measures to control exposures to allergens and pollutants or irritants that make asthma worse. Treat comorbid conditions	• Determine exposures, history of symptoms in presence of exposures and sensitivities • Advise patient on ways to reduce exposure to those allergens and pollutants or irritants to which the patient is sensitive. Multifaceted approaches are beneficial; single steps alone are generally ineffective. Advise all patients and pregnant women to avoid exposure to tobacco smoke • Consider allergen immunotherapy by specifically trained personnel for patients who have persistent asthma and when there is clear evidence of a relationship between symptoms and exposure to an allergen to which the patient is sensitive • Consider especially: allergic bronchopulmonary aspergillosis; gastroesophageal reflux, obesity, obstructive sleep apnea, rhinitis and sinusitis, and stress or depression. Recognition and treatment of conditions may improve asthma control • Consider inactivated influenza vaccine for all patients over 6 months of age
Medications	Select medication and delivery devices to meet patient's needs and circumstances	• Use stepwise approach to identify appropriate treatment options • Inhaled Corticosteroids (ICSs) are the most effective long-term control therapy. When choosing among treatment options, consider domain of relevance to the patient (impairment, risk, or both), patient's history of response to the medication, and patient's willingness and ability to

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		use the medication
Clinical Issue	Key Clinical Activities	Action Steps
STEPWISE APPROACH		
General Principles for All Age Groups	Incorporate Four Components of Care	• Include medications, patient education, environmental control measures and management of comorbidities at each step. Monitor asthma control regularly
	Initiate therapy based on asthma severity	• For patients not taking long-term control therapy, select treatment step based on severity. Patients who have persistent asthma require daily long-term control medication
	Adjust therapy based on asthma control	• Once therapy is initiated, monitor the level of asthma control and adjust therapy accordingly, step up if necessary and step down if possible to identify the minimum amount of medication required to maintain asthma control • Refer to an asthma specialist for consultation or co-management if there are difficulties achieving or maintaining control; step 4 care or higher is required (step 3 care or higher for children **0** – 4 years of age); immunotherapy or omalizumab is considered or additional testing is indicated or if the patient required two bursts of oral systemic corticocosticosteriods in the past year or a hospitalization
For age-specific principles using the stepwise approach, refer to the National Heart, Lung and Blood Institute's Expert Panel Report 3 (2007) at http://www.nhlbi.nih.gov/guidelines/asthma/index.htm. Guidance is also available on treating		
patients with respect to pregnancy, surgery and management in home or emergency care settings.		

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