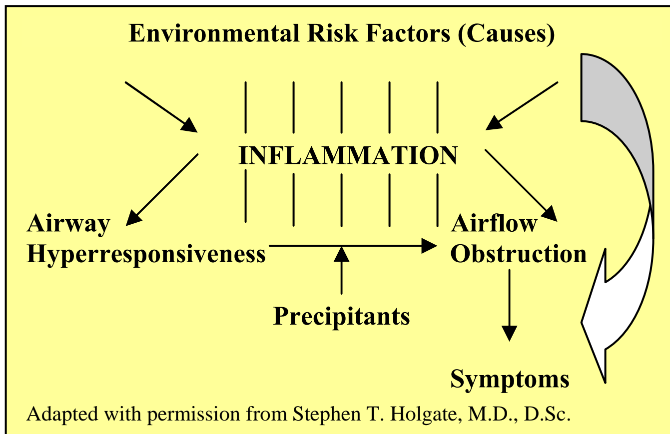
ADULT ASTHMA DISEASE MANAGEMENT
2010 Version 4.0



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Asthma and Its Management

The management of asthma needs to be responsive to the characteristics that define asthma. The relationships between these characteristics are illustrated in Figure 1.

- Asthma is a chronic inflammatory disorder of the airways.
- Environmental and other factors “cause” or provoke the airway inflammation in people with asthma.
- Airway inflammation causes recurrent episodes. *This inflammation is always present to some degree, regardless of the level of asthma severity.*
- These episodes of asthma symptoms are usually widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment.
- Inflammation causes an associated increase in the existing airway hyperresponsiveness. *These stimuli or precipitants result in airflow obstruction and asthma symptoms in asthma patients.*

Asthma Changes Over Time, Requiring Active Management – Asthma Severity Migration

The condition of a patient’s asthma will change depending on the environment, patient activities, management practices, and other factors. Thus, even when patients have their asthma under control, monitoring and treatment are needed to maintain control.

Four Components of Asthma Management

The four components of asthma therapy respond to the basic nature of asthma described previously. The four components are:

* Assessment and Monitoring
* Pharmacologic Therapy
* Patient Education for a Partnership
* Control of Environmental Factors and Comorbid conditions that affect asthma

General Goals of Asthma Therapy and Control

* Prevent chronic and troublesome symptoms (e.g., coughing or breathlessness in the night, in the early morning, or after exertion).
* Maintain near “normal” pulmonary function
* Maintain normal activity levels (including exercise and other physical activity).
* Reduce impairment and risk by preventing recurrent with exacerbations and minimize the need for emergency department visits or hospitalizations.
* Provide optimal pharmacotherapy with minimal or no adverse effects.
* Meet patients’ and families’ expectations of and satisfaction with asthma care
* Assessment of asthma control

Components of Severity		Classification of Asthma Severity ≥12 years of age			
			Persistent		
		Intermittent	Mild	Moderate	Severe
Impairment Normal FEV_1/FVC: 8–19 yr 85% 20 –39 yr 80% 40 –59 yr 75% 60 –80 yr 70%	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
	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 figure 4–5 for treatment steps.)		Step 1	Step 2	Step 3 and consider short course of oral systemic corticosteroids	Step 4 or 5
		In 2–6 weeks, evaluate level of asthma control that is achieved and adjust therapy accordingly.			

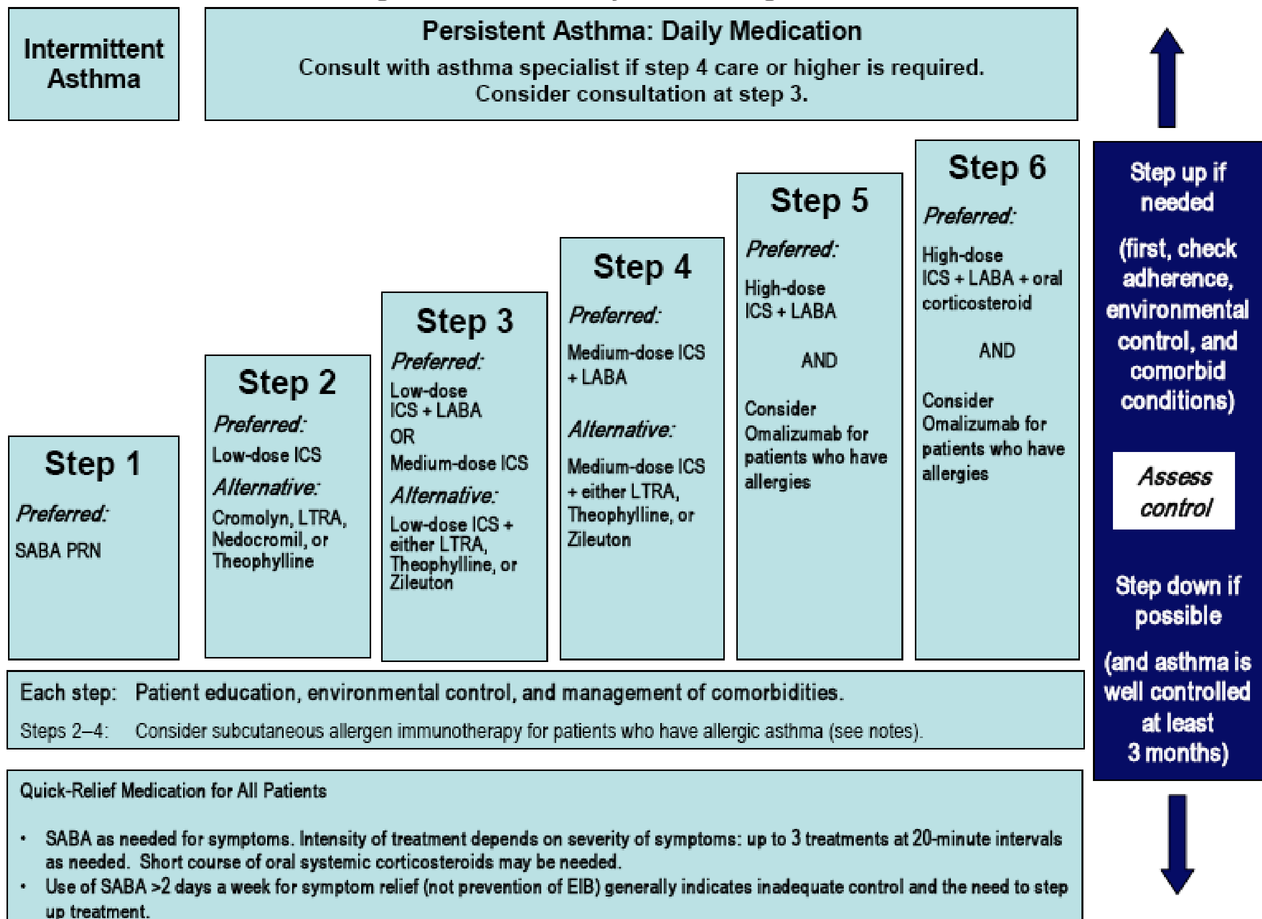
Key: FEV_1, forced expiratory volume in 1 second; FVC, forced vital capacity; ICU, intensive care unit

Guidelines taken from NHLBI 2007 Asthma Guidelines Expert Panel Report 3

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 figure 4–5 for treatment steps)		• Maintain current step. • Regular followups every 1–6 months to maintain control. • Consider step down if well controlled for at least 3 months.	• Step up 1 step and • Reevaluate in 2–6 weeks. • For side effects, consider alternative treatment options.	• Consider short course of oral systemic corticosteroids, • Step up 1–2 steps, and • Reevaluate in 2 weeks. • For side effects, consider alternative treatment options.

*ACQ values of 0.76–1.4 are indeterminate regarding well-controlled asthma.
Key: EIB, exercise-induced bronchospasm; ICU, intensive care unit

Asthma Guideline Management for >12 years of age



Key: SABA, short-acting beta$_2$-agonist,; ICS, inhaled corticosteroid; LTRA, Leukotriene Receptor Antagonist; LABA, Long-acting beta$_2$ agonist

ESTIMATED COMPARATIVE DAILY DOSAGES FOR INHALED STEROIDS FOR ADULTS			
INHALED STEROIDS	**LOW DOSE (Step2)**	**MEDIUM DOSE (Step 3) ***	**HIGH DOSE ***
Beclomethasone HFA (Q-Var): 40 or 80 mcg/puff **Available on Patient Assistance (PAP) and COST PLUS**	80-240 mcg	>240-480 mcg	> 480 mcg
Budesonide HFA (Pulmicort Flexhaler) 90 and 180 mcg/puff **Available on PAP and COST PLUS**	180-360 mcg	360- 720 mcg	>720 mcg
Fluticasone: (Flovent) HFA or DPI **MDI**: 44, 110, 220 mcg/puff **DPI**: 50, 100, 250 mcg/puff **Medicare/Medicaid covers** **Available thru Bridges to Access**	**MDI**: 88 – 264 mcg 2 – 6 puffs – 44 mcg or 2 puffs – 110 mcg **DPI**: 100-300 mcg 2 – 6 Inhalations – 50 mcg	**MDI**: >264 – 440mcg 2 – 6 puffs – 110 mcg **DPI**: >300-500 3 – 6 Inhalations – 100 mcg	**MDI:** >440 mcg > 6 puffs – 110 mcg or > 3 puffs – 220 mcg **DPI**: >500 mcg > 6 Inhalations – 100 mcg or > 2 Inhalations – 250 mcg

USUAL ADULT DOSAGES FOR ICS and LABA COMBINATIONS MEDICATIONS			
MEDICATION	**STEP 3 ***	**STEP 4-6 ***	**COMMENTS**
Budesonide/formoterol HFA (Symbicort) 80/4.5 and 160/4.5 mcg/puff **Medicare/Medicaid covers** **Available on PAP**	80/4.5 mcg/puff 2 puffs twice a day	160/4.5 mcg/puff 2 puffs twice a day	➢ Used for Step 3-6 ➢ Provides bronchodilation for 12 hours and an anti-inflammatory controller agent
Fluticasons/Salmeterol (Advair) **DPI:** 100/50, 250/50, 500/50 mcg/blister **HFA**: 45/21, 115/21, 230/21 mcg/spray **Medicare/Medicaid covers** **Available thru Bridges to Access**	**DPI:** 100/50 mcg/blister 1 puff twice a day **HFA**: 45/21 mcg/spray 2 puffs twice a day	**DPI:** 250/50 (Step 4) or 500 / 50 (Step 5-6) mcg/blister 1 puff twice a day **HFA**: 115/21 mcg/spray (Step 4) or 230/21 mcg/spray (Step 5-6) 2 puffs twice a day	➢ Used for Step 3-6 ➢ Provides bronchodilation for 12 hours and an anti-inflammatory controller agent

USUAL ADULT DOSAGES FOR OTHER CONTROLLER MEDICATIONS			
MEDICATION	**DOSAGE FORM**	**ADULT DOSE**	**COMMENTS**
ORAL STEROIDS **Methylprednisolone** **Prednisone –** 10 mg ($6.00 / 100)	2, 4, 8, 16, 32 mg Tablets 5, 10, 20 mg Tablets	➢ 7. 5 – 60 mg daily in a single dose or as needed for control ➢ Short-course “Burst”: 40 – 60 mg per day as single dose or two divided doses for 3 – 10 days	➢ For long-term treatment of severe persistent asthma, give single dose in a.m. either daily or on alternate days (which may lessen adrenal suppression). ➢ Short courses or “Bursts” are effective for establishing control when initiating therapy or during a period of gradual deterioration.
LEUKOTRIENE MODIFIERS: **Montelulcast (Singulair)** **Available on PAP**	10 mg Tablet	10 mg every day at night	➢ May be considered at Step 2 for patients > 12 years of age, although their position in therapy is not fully established.
IMMUNOMODULATOR: **Omalizumab (Xolair)** Subcutaneous injection **Medicaid covers; Medicare 20% copay. Indigent programs available for those who qualify.**	Subcutaneous (SC) injection 150 mg /1.2 ml following careful reconstitution with 1.4 ml sterile water	150-375 mg SC every 2-4 weeks depending on body weight and pretreatment IgE level	➢ Monitor for anaphylaxis for 2 hours following at least the first 3 injections

LONG-TERM CONTROL LER MEDICATIONS

- Long-term-controller asthma medications are taken daily to achieve and maintain control of persistent asthma.
- Inhaled steroids are the most effective long-term-control medication for asthma because it reduces the chronic airway inflammation present in asthma.
- Daily use of inhaled steroids results in the following:
  1) Symptoms will diminish and improvement will continue greatly
  2) Occurrence of severe exacerbations is greatly reduced
  3) Use of quick-relief medication decreases
  4) Lung function improves significantly.

QUICK RELIEVER MEDICATIONS

- Quick reliever medications are used to provide prompt treatment of acute airflow obstruction and its accompanying symptoms.
- These medications include short-acting inhaled Beta$_2$-Agonists and oral steroids.
- Anticholinergics are included in special circumstances.
- All patients need to have a short-acting inhaled beta$_2$-agonist to take as needed for symptoms.
- Patients with mild, moderate, or severe persistent asthma require daily long-term-control medication to control their asthma.

Key: HFA, hydrofluoroalkane; MDI, metered-dose inhaler; LABA, Long-acting beta$_2$-agonist; IgE, Immunoglobulin E

Guidelines taken from NHLBI 2007 Asthma Guidelines Expert Panel Report 3

MANAGEMENT OF ASTHMA EXACERBATIONS: EMERGENCY DEPARTMENT AND HOSPITAL-BASED CARE

Initial Assessment: History, physical examination (auscultation, use of accessory muscles, heart rate), PEF or FEV_1, oxygen saturation, & other test as indicated

FEV_1 OR PEF > 40% (Mild to Moderate)
*Oxygen to achieve O_2 saturation ≥ 90%
*Inhaled $Beta_2$-Agonist by metered dose inhaler of nebulizer, up to three Tx in 1st hr.
*Oral steroids if no immediate response or

FEV_1 OR PEF < 40% (Severe Exacerbation):
* Oxygen to achieve O_2 saturation ≥ 90%
* Inhaled high-dose $Beta_2$-Agonist & Anticholinergic by nebulization q 20 min. or continuously for 1 hour
* Oral steroid

Impending or Actual Respiratory Arrest:
* Intubation and mechanical ventilation with 100% O_2.
* Nebulized $Beta_2$-Agonist and Anticholinergic
* Intravenous steroid

Admit to Hospital Intensive Care (See Below)

Repeat Assessment: Symptoms, physical examination, PEF, O_2 saturation, other tests as needed

Moderate Exacerbation:
FEV_1 OR PEF < 40-69% predicted/personal best
Physical exam: Moderate symptoms
*Inhaled SABA every 60 min.
*Systemic steroid
*Continue treatment 1 – 3 hours, provided there is improvement

Severe Exacerbation:
FEV_1 OR PEF <40% predicted/personal best
Physical Exam: Severe symptoms at rest, accessory muscle use, chest retraction
History: High risk patient
No improvement after initial treatment
*Oxygen
*Inhaled short-acting $Beta_2$-Agonist hourly or continuously + inhaled anticholinergic
*Systemic steroid

Good Response:
*FEV_1 or PEF ≥ 70%
*Response sustained 60 min. after last treatment
*No distress
*Physical Exam: Normal

Incomplete Response:
*FEV_1 or PEF 40-69%
Mild-to-moderate symptoms

Poor Response:
*FEV_1 or PEF <40%
*PCO_2 ≥ 42 mm Hg
*Physical Exam: Symptoms severe, drowsiness, confusion

Discharge Home:
* Continue treatment with inhaled SABA
* Continue course of oral steroid, consider initiation of an ICS
* Patient Education
-Review medicine use
-Review/initiate action plan

Individualized Decision Regarding Hospitalization

Admit to Hospital Ward:
*Inhaled SABA
*Systemic corticosteroid (oral or intravenous)
*Oxygen
*Monitor VS FEV_1 or PEF, SaO_2

Admit to Hospital Intensive Care Unit:
*Inhaled SABA hourly or continuously
*Intravenous corticosteroid
*Oxygen
*Possible intubation & mechanical ventilation, consider adjunct therapies

IMPROVE

IMPROVE

Discharge Home: *Continue treatment with inhaled SABA; * Continue course of oral steroid; *Continue on ICS. For those not on long-term control therapy, consider initiation of an ICS; * Patient Education (Meds, Action Plan, Environmental control measure, whenever possible; recommend close medical followup) *Follow-up with PCP and/or asthma specialist in 1-4 weeks.

↓ STEP DOWN THERAPY	↑ STEP UP THERAPY
* Review treatment every 3 to 6 months: a gradual stepwise reduction in treatment may be possible.	* If control is not maintained, consider "Step Up." First, review pt. **I**nhaler techniques, **C**ompliance, and **E**nvironmental control (**ICE**) (avoidance of allergens or other factors that contribute to asthma severity.)

NOTE: Pt. evaluation is necessary for step up or step down in severity classification.

- The stepwise approach presents general guidelines to assist clinical decision-making. It is not intended to be a specific prescription. Asthma is highly variable. Clinicians should tailor specific mediation plans to the needs and circumstances of individual patients**.**
- Gain control as quickly as possible; then decrease treatment to the least medication necessary to maintain control. Gaining control may be accomplished by either starting treatment at the step most appropriate to the initial severity of the condition or starting at a higher level of therapy.

Key: FEV1, forced espiratory volume in 1 second; ICS, inhaled corticosteroid; MDI, metered dose inhaler; PCO_2, partial pressure carbon dioxide; PEF, peak expiratory flow; SABA, short-acting $beta_2$ agonist; SaO_2, oxygen saturation; PCP, primary care provider.

Guidelines taken from NHLBI 2007 Asthma Guidelines Expert Panel Report 3 and LSUHSC HCSD Adult Asthma Disease Management 2006 version 3.0

LSU Health Sciences Center
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ADULT ASTHMA DISEASE MANAGEMENT
2010 Version 4.0

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LSUHSC-HCSD Adult Asthma Disease Management Guidelines designed

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