

Summary of Asthma Care Model

Asthma Definition and Diagnosis

Definition: Chronic inflammatory disorder of airways, causing recurrent symptoms, manifested by variable airflow obstruction that either reverses spontaneously or with treatment, and often precipitated by triggers.

Airflow is limited by:

- Bronchoconstriction
- Airway inflammation and edema
- Airway hyperresponsiveness

Diagnosis suggested by:

-History of episodic symptoms [coughing (particularly night or early morning), wheezing, breathlessness, chest tightness] often provoked by triggers [viral infections, exercise, allergens, irritants, others].

-Airflow obstruction at least partially reversible on spirometry

-Alternative diagnoses excluded

Diagnosis challenging in young children (<4 YO). There are risks associated with over and under diagnosis. Consider 4 - 6 week trial with controller medication and compare response on and off medication.

Asthma Predictive Index - can help predict which children will develop asthma. (Table on reverse page)

Asthma Education

Iterative process. Education should increase knowledge about basic asthma facts, risks, benefits and proper use of medications (including inhalation technique and compliance), trigger avoidance strategies and should address specific patient concerns. Teach-back method is effective.

Patient should have an individualized Asthma Action Plan reflecting personal goals and clearly delineating controller and reliever medication dosage and how to escalate care. The plan should be shared with all caregivers including school.

Peak expiratory flow rate monitoring or symptom monitoring (symptoms of cough, wheezing, shortness of breath, nighttime awakening, SABA use, and limitation of activities) can be used by patient to self-monitor asthma control.

EIB: Exercise induced bronchospasm
ICS: Inhaled corticosteroids
LABA: Long acting beta agonist
LTRA: Leukotriene receptor antagonist
MDI: Metered dose inhaler
OCS: Oral corticosteroid
SABA: Short acting beta agonist
VHC: Valved holding chamber

Asthma Management

At each visit assess: asthma control, medication technique, asthma action plan, adherence to plan, any comorbidities, and concerns. Reinforce education and environmental control, including tobacco exposure.

Measure spirometry at diagnosis and every 1 - 2 years, more frequently if not well controlled (≥ 5 YO).

Determine need for step up, maintenance or step down therapy.

Follow up:

-within 2 - 7 days following a hospital visit or severe exacerbation

-every 2 - 6 weeks while gaining control

-every 1 - 6 months to monitor control

-every 3 months if step down in therapy

See table on reverse side for evaluation of asthma severity and step care.

See table on reverse side for recommendations for referral to asthma specialist.

Also consider referral to allergist if patient candidate for immunotherapy.

Asthma Special Considerations

Exercise -Induced Bronchospasm: SABA 5 – 20 minutes prior to exercise will be effective for 2 – 4 hours to prevent EIB. Regular daily use will decrease the effectiveness. EIB in a patient with chronic asthma suggests poor control of asthma and need for stepping up care. LABAs should not be used routinely as monotherapy for EIB nor asthma and should only be added onto a patient already receiving ICSs. LTRAs are effective in about half of patients and can be used daily or intermittently to attenuate EIB.

Dosage during an acute exacerbation (change)

-The recommended dosage of albuterol during an exacerbation is 2.5 - 5 mg nebulized or 4 - 8 puffs with MDI and VHC/spacer, q 20 min x 3, then q 1 - 4 hr. Both delivery methods are equally effective.

-The recommended dosage of oral or systemic steroid during an exacerbation is 1mg/kg/d (max 60 mg/d)

Immunization: Annual flu vaccine recommended all ages, and one-time pneumonia vaccine (PPSV23) given for adults 19 - 64 YO

Summary Table of Severity and Step Care						
Components		Intermittent	Mild Persistent	Moderate Persistent	Severe Persistent	
Impairment	Symptoms	≤ 2 d/wk	> 2 d/wk	Daily	Throughout day	
	Nighttime awakening	0 (≤ 4 YO) ≤ 2x/mo (≥ 5 YO)	1-2 x/mo (≤ 4 YO) 3-4x/mo (≥ 5 YO)	3-4x/mo (≤ 4 YO) >1x/wk (≥ 5 YO)	>1x/wk (≤ 4 YO) Often 7x/wk(≥ 5 YO)	
	Short acting beta agonist (SABA) use for symptoms	≤ 2 d/wk	> 2 d/wk	Daily	Several times per day	
	Limitation of activity	None	Minor	Some	Extreme	
	Lung function (normal between exacerbations)	FEV1 >80% FEV1/FVC >85% (5 – 11 YO) FEV1/FVC normal (≥ 12 YO)	FEV1 >80% FEV1/FVC >80% (5 – 11 YO) FEV1/FVC normal (≥ 12 YO)	FEV1 60 - 80% FEV1/FVC 75 - 80% (5 – 11 YO) FEV1/FVC reduced by 5% (≥ 12 YO)	FEV1 < 60% FEV1/FVC <75% (5 – 11 YO) FEV1/FVC reduced by >5% (≥ 12 YO)	
Risk	Exacerbations requiring Oral corticosteroid (OCS)	0-1/yr	≥ 2/6 mo (≤ 4 YO) ≥ 2/yr (≥ 5 YO)			
Recommended step of care SABA PRN for all steps of care		Step 1	Step 2	Step 3 or 4	Step 5 or 6	
Steps of Care (Preferred) Quick Relief: SABA as needed. Note: SABA use more than 2 x/wk (not EIB) indicates inadequate control Proper inhalation technique, compliance with written asthma plan and management of environmental triggers is the foundation of asthma management		Step 1: no control medication required Step 2: low dose inhaled corticosteroid (ICS) (≤ 4 YO – consider referral) Step 3 (≤ 4 YO): medium dose ICS + <u>referral</u> Step 3 (> 5 YO): low dose ICS + long acting beta-agonist (LABA) or leukotriene receptor antagonist (LRTA) <u>or</u> medium dose ICS (consider referral) Step 4 (≤ 4 YO): medium dose ICS + LABA or montelukast + <u>referral</u> Step 4 (> 5 YO): medium dose ICS + LABA or LRTA + <u>referral</u> Step 5 (≤ 4 YO): high dose ICS + LABA or montelukast + <u>referral</u> Step 5 (> 5 YO): high dose ICS + LABA or LRTA + <u>referral</u> Step 5 (≥12 YO): high dose ICS + LABA or LRTA + <u>referral</u> (consider omalizumab) [Step 6 specialist care, high dose ICS + LABA or LTRA + OCS (≥12 YO: consider omalizumab)]				

Asthma Predictive Index: Risk based on child who wheezes during first 3 years of life and

Either 1 of the following:

- Parental history of asthma
- Physician diagnosis of atopic dermatitis
- Evidence of sensitization to aeroallergens

Or 2 of the following:

- Evidence of sensitization to foods,
 - > 4% eosinophilia
 - Wheezing apart from viral respiratory infections
- 95% of children with a negative index do not develop asthma.

Castro-Rodríguez JA, Holberg CJ, Wright AL, Martinez FD. A clinical index to define risk of asthma in young children with recurrent wheezing. *Am J Respir Crit Care Med.* 2000; 162: 1403-1406.

Asthma Control			
	Well	Not well	Poorly
Symptoms	≤2d/wk	>2d/wk	Throughout day
Nighttime awakening	≤ 1/mo ≤ 2/mo	> 1x/mo ≥2x/mo 1-3x/wk	>1x/wk ≥2x/wk ≥4x/wk
Interference normal activity	No limitation	Some limitation	Extremely limited
SABA (not EIB)	≤2x/wk	>2x/wk	Several times/d
Requires OCS	0-1/yr	2-3/yr ≥2/yr	≥3/yr ≥2/yr
FVC	NA >80%	NA 60-80%	NA <60%
FEV1/FVC	NA >85% NL	NA 75-80% ↓5%	NA <75% ↓>5%

Gray highlighted common questions found in validated asthma control questionnaires.

(≤ 4 YO) (2 – 11 YO) (5 – 11 YO) (≥ 5 YO) (≥ 12 YO) (All ages)