

Patient presents with respiratory signs & symptoms suggesting asthma – cough, wheezing, SOB, chest tightness

Diagnosis: History and Physical – avoid under diagnosis to reduce morbidity

- Diagnosis may be made from history, response to medications, and/or spirometry/lung challenge tests
- Consider symptom pattern, precipitating factors, patient/family hx of atopy, “colds” lasting > 10 days (a)
- Perform spirometry if child able to follow directions and give a good effort – if normal (FEV₁ > 80% & normal FEV₁/FVC) consider bronchial challenge test f; if spirometry abnormal, do pre/post bronchodilator (nebulized albuterol or 4 puffs albuterol MDI). If FEV₁ improves ≥12% or 200 ml, treat for asthma. If asthma diagnosis is indicated, proceed .

Assess SEVERITY if newly diagnosed or LEVEL of CONTROL in established asthmatics and Educate

- Administer Pediatric Asthma Control Test (for patients on established medication for asthma) (b)
- Categorize level/severity (for patients not on controller medication for asthma) (Table 1 or c)

Assign to one of six treatment steps based on severity or level of control (f); also treat co-morbidities (i.e. allergic rhinitis, GERD, etc.)

Step 1 (Intermittent Asthma)

Preferred:
SABA PRN
(inhaled short-acting beta₂-agonist)

Step 2 (Persistent Asthma)

Preferred:
SABA PRN + Low-dose ICS
Alternative: see Table g

Step 3 (Persistent Asthma)

Preferred:
SABA PRN + Low-dose ICS (inhaled corticosteroid) + **LABA*** (inhaled long-acting beta₂-agonist), **LTRA** (Leukotriene receptor antagonist) **Or Medium-dose ICS**
Alternative: see Table g

For Step 4, 5 and 6: Consider referral to RN Health Coach (or local equivalent) to evaluate adherence/barriers

Step 4 (Persistent Asthma)

Preferred:
SABA PRN + Medium-dose ICS + LABA*
Alternative: see Table g

Step 5 (Persistent Asthma)

Preferred:
SABA PRN + High-dose ICS + LABA*
Alternative: see Table g

Step 6 (Persistent Asthma)

Preferred:
SABA PRN + High-dose ICS + LABA* + oral corticosteroid
Alternative: see Table g

Use treatment step necessary to gain and maintain control. Reassess at each asthma visit. Exacerbations may require stepping up and a short course of oral corticosteroids. If using reliever for symptoms > 2 days for weeks, step up therapy. ***Do not use LABA alone without daily anti-inflammatory medicine.**

Education – caregiver and patient. Involve child as much as possible. If 10 or older, directly involve in education.

- Educate: Medication use: Controller vs. Reliever, Indications, Adverse Reactions
- Educate: Inhaler technique and use of holding device (use in all MDI inhaled steroids and others with poor technique) or holding chamber with a mask; home nebulizer use if indicated (if too young to use mouthpiece use mask not blow-by method); peak flow (PF) meter use (consider in moderate to severe persistent asthma or difficult to manage)
- Educate: Identification & avoidance of triggers (d) , family smoking cessation (e) as needed, and annual influenza vaccination. Promote active participation in physical activities.
- Outline Asthma Action Plan (d):** monitor symptom and reliever medicine use, guidelines for seeking medical help
- Consider subcutaneous allergy immunotherapy for patients who have persistent, allergic asthma

Reassess

Follow up well controlled every 1-6 months, every 2-6 weeks for partly controlled, and at 2 weeks for uncontrolled patients. Consider stepping down therapy after 3 months of control. Monitor linear growth closely. For medicine side effects consider alternative medications. Do ACT (Asthma Control Test) at every visit. Review Action Plan every visit.

Follow up at 6 month intervals:

- ACT and action plan
- Monitor linear growth
- Environmental control
- Flu shot yearly
- Medication review
- spirometry at least every 1-2 years

Goals of therapy met (h); ACT ≥ 20 with optimal spirometry and asymptomatic

Yes

No

Consider These Before Stepping Up

- Reassess medication adherence (especially daily use of controller)
- Evaluate inhaler technique
- Adherence to environmental control
- Investigate other possible precipitating factors (i.e. allergens, GERD, Sinus infection, Beta-blocker use, vocal cord dysfunction, etc) or asthma mimickers (Cystic Fibrosis, Alpha-1 antitrypsin deficiency)
- Consider consultation with asthma specialist (pediatric pulmonologist or allergist) if needing step 3 therapy; consult if needing step 4 or higher

Table a: Asthma Signs, Symptoms and Triggers

- Wheezing
- History of any of the following
 - Cough, worse particularly at night
 - Recurrent wheeze
 - Recurrent difficult breathing
 - Recurrent chest tightness
- Symptoms occur or worsen at night, awakening patient
- Symptoms occur or worsen in a seasonal pattern
- Patient has eczema, hay fever or family history of asthma or atopic diseases
- Symptoms occur or worsen in presence of animals with fur, aerosol chemicals, change in temperature, domestic dust mites, drugs (aspirin, beta blockers), pollen, respiratory viral infections, smoke, strong emotional expression
- Symptoms exacerbated by aerobic activity
- Symptoms respond to anti-asthma therapy
- Patient's colds "go to chest" & last > 10 days

Differential Diagnosis Possibilities:

Upper airway diseases – allergic rhinitis and sinusitis

Obstructions involving large airways – foreign body in trachea or bronchus, vocal cord dysfunction, vascular rings or laryngeal webs, laryngotracheomalacia, tracheal stenosis, or bronchostenosis, enlarged lymph nodes or tumor

Obstructions involving small airways – viral bronchiolitis or obliterative bronchiolitis, cystic fibrosis, bronchopulmonary dysplasia, heart disease

Other causes – recurrent cough not due to asthma, aspiration from swallowing mechanism dysfunction or gastroesophageal reflux

Table b: Asthma Control Test for Children 5 to 11 years (ACT)

Have child answer question 1-4. Caregiver answers questions 5-7. Add up scores.

1. How is your asthma today? Very bad = 0, bad = 1, good = 2, very good = 3.
2. How much of a problem is your asthma when you run, exercise or play sports? It's a big problem. I can't do what I want to do = 0, It's a problem and I don't like it. = 1, It's a little problem but it's okay. = 2, It's not a problem. = 3.
3. Do you cough because of your asthma? Yes, all of the time. = 0, Yes, most of the time. = 1, Yes, some of the time. = 2, No, none of the time. = 3.
4. Do you wake up during the night because of your asthma? Yes, all of the time = 0, Yes, most of the time = 1, Yes, some of the time = 2, No, none of the time = 3.
5. During the last 4 weeks, how many days did your child have any daytime asthma symptoms? Not at all = 5, 1-3 days = 4, 4-10 days = 3, 11-18 days = 2, 19-24 days = 1, Everyday = 0.
6. During the last 4 weeks, how many days did your child wheeze during the day because of asthma? Not at all = 5, 1-3 days = 4, 4-10 days = 3, 11-18 days = 2, 19-24 days = 1, Everyday = 0.
7. During the last 4 weeks, how many days did your child wake up during night because of asthma? Not at all = 5, 1-3 days = 4, 4-10 days = 3, 11-18 days = 2, 19-24 days = 1, Everyday = 0.

Add all scores together and if score is 19 or less, it may indicate child's asthma is not as controlled as it should be.

Table h: Asthma Therapy Goals

- Prevent chronic and troublesome symptoms
- Require infrequent symptoms-related SABA use ($\leq 2x/week$)
- Maintain near normal pulmonary function/ prevent loss of lung function
- Maintain normal activity levels
- Meet patient/family care expectations
- Prevent recurrent exacerbations and urgent care needs
- No to minimal medication adverse effects

Table c: Classification of Asthma Severity

Use for initial classification if patient not on controller medicine for asthma

1. Intermittent – Symptoms ≤ 2 days/week; nighttime awakenings $\leq 2x/month$; reliever use for symptoms ≤ 2 days/week; activity interference none; lung function normal between flare-ups. (Initial therapy started on Step 1)
2. Mild Persistent - Symptoms > 2 days/week not daily; nighttime awakenings 3-4x/month; reliever use for symptoms ≥ 2 days/week but not daily; activity interference minor limitation; lung function FEV1 > 80%, FEV1/FVC normal. (Initial therapy started on Step 2).
3. Moderate Persistent - Symptoms daily; nighttime awakenings > 1x/week but not nightly; reliever use for symptoms daily; activity interference some limitation; lung function normal FEV1 > 60% but < 80%, FEV1/FVC 75-80% (Initial therapy started on Step 3 and consider short course of oral corticosteroids.).
4. Severe Persistent - Symptoms throughout the day; nighttime awakenings often 7x/week; reliever use for symptoms several time/day; activity interference extremely limited; lung function normal FEV1 < 60%, FEV1/FVC < 75% (Initial therapy started on Step 3 or consider Step 4 and short course of systemic corticosteroids.)

Table d: See Attached action plan and trigger sheet

Action Plan (self-management plan): written instructions include what to do daily when well, when symptoms start, when urgent care is needed, medication doses and purposes.

Source Control – Individualized; avoidance or decreasing exposure leads to greater control and often need for less medications. (See Table a for triggers.)

Table e: Guideline for Treating Tobacco Dependence

1. **Ask** – document tobacco use at every visit
2. **Advise** – strongly urge all tobacco users to quit
3. **Assess** – determine willingness to make a quit attempt
4. **Assist** – aid the patient in quitting: set quit date
5. **Arrange** – refer to resources such as quit lines, give prescription for medications as needed.
6. www.smokefree.gov

Table f: Medication Abbreviations**Relievers:**

SABA – inhaled short-acting beta₂-agonist

Controllers

ICS – inhaled corticosteroid

LABA – inhaled long-acting beta₂-agonist

LTRA – Leukotriene receptor antagonist

Table g: Alternative Medicine for step 2, 3 and 4

Step 2: LTRA or theophylline*

Step 3: theophylline*

Step 4: Medium-dose ICS + LTRA or theophylline*

Step 5: High-dose ICS + LTRA or theophylline*

Step 6: High-dose ICS + LTRA or theophylline* + oral corticosteroids

*theophylline not advised unless ordered by specialist

Table 1: Assessing Asthma Control & Adjusting Therapy

	Components of Control	Well Controlled (all of the following)	Not Well Controlled (Any measure present in any week)	Very Poorly Controlled
Impairment	Daytime symptoms	≤ 2 days/week but not more than once on each day	> 2 days/week or multiple time on ≤2 days/week	Throughout day
	Nighttime awakenings	≤ 1x/month	≥ 2x/month	≥ 2x/week
	Interference with normal activity	None	Some limitation	Extremely limited
	Need for reliever/rescue treatment (not EIB* prevention)	≤ 2 days/week	> 2 days/week	Several times/day
	Lung function •FEV1 or peak flow personal best 5 •FEV1/FVC	>80% personal best > 80% (actual number not % of predicted)	60-80% predicted/personal best 75-80% (actual number not % of predicted)	< 60% predicted/personal best < 75% (actual number not % of predicted)
	ACT	> 20	16-19	<15
Risk	Exacerbations requiring oral steroids	0-1 year	≥2/year	≥2/year
	Progressive loss of lung function	Evaluation requires long-term follow up care		
	Treatment-related adverse effects	Monitor & adjust		
Recommended	Action (see steps)	Maintain current step. Follow-up 1-6 months. Consider step down if well controlled for at least 3 months.	Step up 1 step. Reevaluate in 2-6 weeks. For side effects, consider alternate options.	Consider short course oral steroid. Step up 1-2 steps. Reevaluate in 2 weeks. For side effects, consider alternative treatment options

* EIB = Exercise induced bronchospasm. Preferred treatment is 2 puffs MDI or nebulized 1 unit dose short-acting beta₂-agonist 15-30 minutes prior to activity. If not controlled, treat as persistent asthma at lowest possible step to achieve control.

References:

Pocket Guide for Asthma Management and Prevention: A pocket guide for physicians and Nurses
Updated 2008 form the Global Initiative for Asthma

National Asthma Education And Prevention Program. Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma 2007. (NIH Publication No. 07-4051). 2007. National Heart, Lung, and Blood Institute.

ACT: American Lung Association

Treating Tobacco Use and Dependence, U.S. Department of Health and Human Services, 2000