

Case for the week of 5/20/2013 - 5/26/2013

Time	Patient Name	Age	Type	Notes
2:40 PM	Smith, Sarah	69 F	FOLLOW-UP	Routine follow-up

*NOTE: This is not a real patient!

A 69-year-old African American woman with T2DM on insulin, HTN, and asthma presents to clinic for a routine health maintenance visit. She reports that she has been feeling well and has been taking her medicines as prescribed, though she occasionally forgets to take her "cholesterol pill" at night. Her blood glucose logbook indicates that her sugars typically run in the range of 76 - 160 mg/dL.

Regarding her asthma, she reports using her fluticasone inhaler twice daily as prescribed, though she still requires her rescue albuterol inhaler several times a day for adequate symptom relief. She is requesting a nebulizer machine because she does not feel that the inhaler works well enough. She denies recent illness, sick contacts, or allergy symptoms.

PMH:

Asthma since childhood
 - 1 intubation @ 20yo
 - triggers: pollen, cigarette smoke, perfume
 HTN
 T2DM, on insulin
 Hypercholesterolemia

Meds:

Chlorthalidone 25 mg daily
 Lisinopril 20 mg daily
 Metformin 500 mg BID
 Lantus 20 units SQ QHS
 Lispro 7 units SQ QAC
 Rosuvastatin 10 mg QHS
 Aspirin 81 mg daily
 Albuterol 90 mcg MDI inh PRN
 Fluticasone 250 mcg inh BID

Soc Hx:

No tobacco
 No EtOH
 No illicit drugs

ROS:

(-) weight loss, (-) fevers or chills
 (+) nocturnal asthma symptoms requiring rescue inhaler 2-3 times per week
 (-) PND, orthopnea, LE edema, palpitations or chest pain

Exam:

VS: T 37.4 HR 76 BP 128/80 RR 16 SpO₂ 99% (RA) BMI 31.8
 Gen: NAD
 Eyes: No conjunctival pallor, no scleral injection
 ENT: (+) edematous nasal mucosa, (+) cobblestoning of posterior pharynx
 CV: Normal S1S2, RRR, no M/R/G
 Resp: No increased WOB, lungs CTAB, no wheezing or rhonchi
 GI: Abdomen soft, NT/ND
 Feet: Microfilament sensation normal, no skin lesions

Data:



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Given her ongoing symptoms, which of the following would be the MOST APPROPRIATE addition to her asthma regimen?

- A. Albuterol nebulizer
- B. Ipratroprium MDI with spacer
- C. Ipratroprium nebulizer
- D. Salmeterol dry powder inhaler
- E. Montelukast PO
- F. Prednisone PO

You counsel her on the plan and schedule her return visit, but she is lost to follow-up. She returns 2 years later. Now, her symptoms suggest severe persistent asthma. Despite maximal medical therapy (see below) from an outside pulmonologist, she has had repeated exacerbations and hospitalizations over the past 6 months. She tells you that she typically improves after discharge, but after a week or two her asthma begins to worsen and she requires hospitalization again.

Regimen:

Albuterol MDI with spacer
Fluticasone MDI with spacer
Salmeterol dry powder inhaler
Omalizumab SQ daily
Montelukast PO daily
Cetirizine PO daily
Fluticasone NASAL spray BID

What would be the MOST APPROPRIATE addition to her maintenance asthma regimen at this time?

- A. Prednisone 5 mg daily
- B. Tacrolimus 1 mg daily
- C. Clarithromycin 500 mg BID
- D. Theophylline 300 mg daily
- E. A and B
- F. A and C

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Answers:

Given her ongoing symptoms, which of the following would be the MOST APPROPRIATE addition to her asthma regimen?

- A. Albuterol nebulizer
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Discussion Points:

To answer the first question, you must first classify the severity of the patient's asthma, then determine whether her asthma is controlled. Figure 1 lists the National Heart, Lung, and Blood Institute's National Asthma Education and Prevention Program (NAEPP) Expert Panel Report 3 (EPR3): Guidelines for the Diagnosis and Management of Asthma (2007) classification system for asthma severity. Figure 2 lists EPR3's classification of asthma control.

Figure 1. EPR3 Classification of Asthma Severity for Adults and Youths Age ≥ 12 Years.

Components of Severity		Classification of Asthma Severity ≥ 12 years of age			
		Intermittent	Persistent		
			Mild	Moderate	Severe
Impairment Normal FEV₁/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	$\leq 2x$ /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	<ul style="list-style-type: none"> • Normal FEV₁ between exacerbations • FEV₁ $> 80\%$ predicted • FEV₁/FVC normal 	<ul style="list-style-type: none"> • FEV₁ $> 80\%$ predicted • FEV₁/FVC normal 	<ul style="list-style-type: none"> • FEV₁ $> 60\%$ but $< 80\%$ predicted • FEV₁/FVC reduced 5% 	<ul style="list-style-type: none"> • FEV₁ $< 60\%$ predicted • FEV₁/FVC reduced $> 5\%$

Adapted from National Heart, Blood, and Lung Institute Expert Panel Report 3 (EPR 3): Guidelines for the Diagnosis and Management of Asthma. NIH Publication no. 07-4051, 2007.

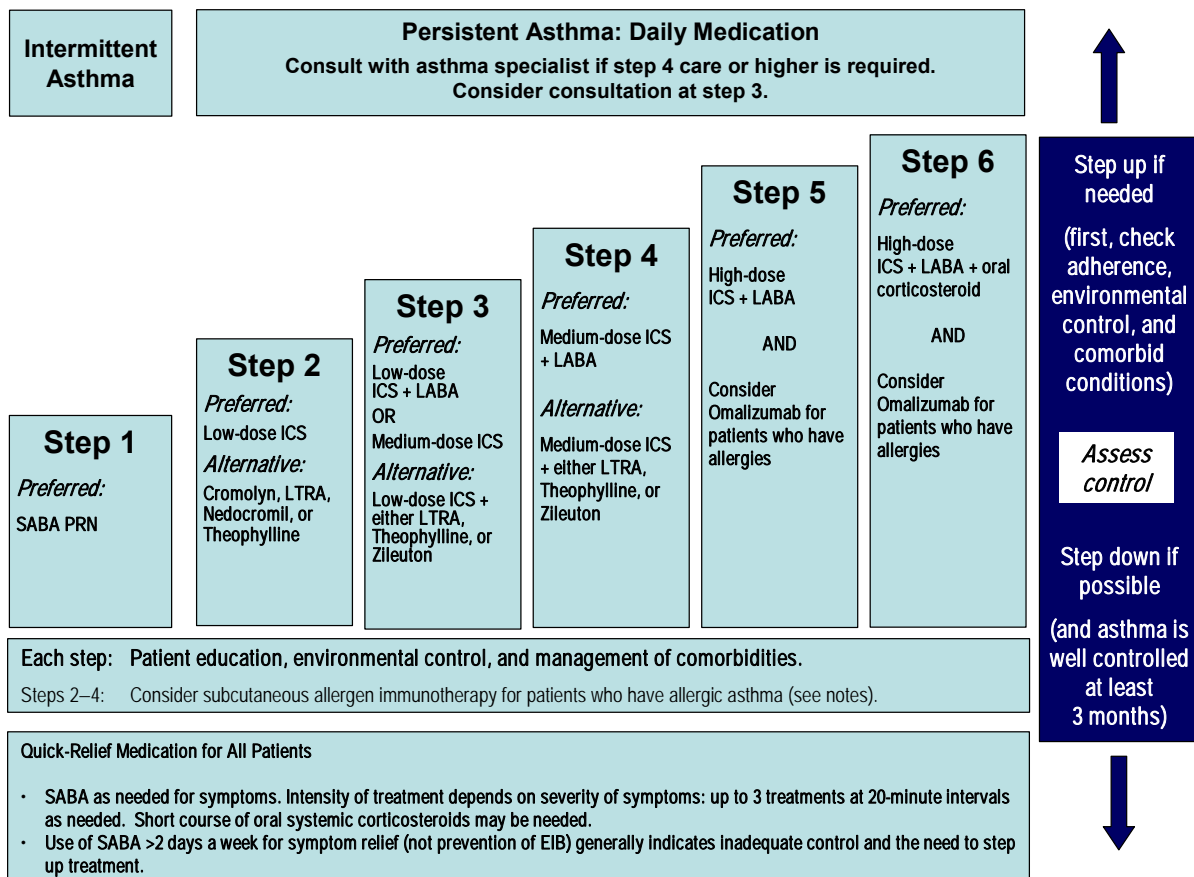
Figure 2. EPR3 Classification of Asthma Control for Adults and Youths Age ≥ 12 Years.

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	$\leq 2x$ /month	1–3x/week	$\geq 4x$ /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 $\leq 0.75^*$ ≥ 20	1–2 ≥ 1.5 16–19	3–4 N/A ≤ 15

Adapted from National Heart, Blood, and Lung Institute Expert Panel Report 3 (EPR 3): Guidelines for the Diagnosis and Management of Asthma. NIH Publication no. 07-4051, 2007.

Thus, she has moderate persistent asthma that is uncontrolled. As she is on albuterol and inhaled steroids already, in addition to suggesting trigger avoidance and considering treatment for her probable allergic rhinitis, we should intensify therapy in stepwise fashion. Figure 3 lists EPR3's stepwise algorithm for asthma treatment.

Figure 3. EPR3 Stepwise Approach for Managing Asthma in Adults and Youths Age ≥ 12 Years.



— Key: **Alphabetical order is used when more than one treatment option is listed within either preferred or alternative therapy.** EIB, exercise-induced bronchospasm; ICS, inhaled corticosteroid; LABA, long-acting inhaled beta₂-agonist; LTRA, leukotriene receptor antagonist; SABA, inhaled short-acting beta₂-agonist

Notes:

- The stepwise approach is meant to assist, not replace, the clinical decisionmaking required to meet individual patient needs.
- If alternative treatment is used and response is inadequate, discontinue it and use the preferred treatment before stepping up.
- Zileuton is a less desirable alternative due to limited studies as adjunctive therapy and the need to monitor liver function. Theophylline requires monitoring of serum concentration levels.
- In step 6, before oral systemic corticosteroids are introduced, a trial of high-dose ICS + LABA + either LTRA, theophylline, or zileuton may be considered, although this approach has not been studied in clinical trials.
- Step 1, 2, and 3 preferred therapies are based on Evidence A; step 3 alternative therapy is based on Evidence A for LTRA, Evidence B for theophylline, and Evidence D for zileuton. Step 4 preferred therapy is based on Evidence B, and alternative therapy is based on Evidence B for LTRA and theophylline and Evidence D for zileuton. Step 5 preferred therapy is based on Evidence B. Step 6 preferred therapy is based on (EPR—2 1997) and Evidence B for omalizumab.
- Immunotherapy for steps 2–4 is based on Evidence B for house-dust mites, animal danders, and pollens; evidence is weak or lacking for molds and cockroaches. Evidence is strongest for immunotherapy with single allergens. The role of allergy in asthma is greater in children than in adults.
- Clinicians who administer immunotherapy or omalizumab should be prepared and equipped to identify and treat anaphylaxis that may occur.

Reproduced from National Heart, Blood, and Lung Institute Expert Panel Report 3 (EPR 3): Guidelines for the Diagnosis and Management of Asthma. NIH Publication no. 07-4051, 2007.

All patients with moderate persistent asthma are treated with maintenance inhaled corticosteroids to reduce airway inflammation and PRN bronchodilators to treat acute symptoms. As this patient's symptoms are still not controlled, it would be most appropriate to add a long-acting beta agonist such as salmeterol or formoterol as our next step (Step 3).

Salmeterol is administered via a dry powder inhalation diskus (i.e., Serevent Diskus). Agents such as albuterol and ipratropium can be administered through HFA metered dose inhalers or as nebulized solutions. Studies have shown that meter-dosed inhalers with spacers are as effective or superior to nebulizers in cooperative, adult patients and are cost-effective and portable.

Also remember to set up an asthma action plan with your patients and counsel them on trigger avoidance. See sample patient handouts from the NAEPP report in the appendix.

In the second question, the patient now has severe persistent asthma and is likely steroid dependent. Early evidence suggests that macrolide antibiotics such as clarithromycin may improve asthma control in some patients with severe, refractory asthma on the basis of anti-inflammatory and antimicrobial effects, and some experts recommend a trial of therapy in refractory patients who describe asthma onset following a respiratory infection. There is currently insufficient evidence, however, to recommend macrolide therapy to most patients with severe asthma over proven therapies such as systemic corticosteroids. Among the other choices, tacrolimus has no role in asthma treatment, while theophylline is a consideration in moderate persistent asthma but not specifically recommended in severe persistent asthma.

References:

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

<http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf>

Newman KB, Milne S, Hamilton C, Hall K. A comparison of albuterol administered by metered-dose inhaler and spacer with albuterol by nebulizer in adults presenting to an urban emergency department with acute asthma. *Chest*. 2002 Apr;121(4):1036-41.

Appendix pages:

Asthma Action Plan. National Heart, Blood, and Lung Institute. NIH Publication no. 07-5251, 2007.

http://www.nhlbi.nih.gov/health/public/lung/asthma/asthma_actplan.pdf

Asthma Action Plan

For: _____ Doctor: _____ Date: _____
 Doctor's Phone Number _____ Hospital/Emergency Department Phone Number _____

GREEN ZONE

Doing Well

- No cough, wheeze, chest tightness, or shortness of breath during the day or night
- Can do usual activities

And, if a peak flow meter is used,

Peak flow: more than _____
 (80 percent or more of my best peak flow)

My best peak flow is: _____

Take these long-term control medicines each day (include an anti-inflammatory).

Medicine	How much to take	When to take it
_____	_____	_____
_____	_____	_____
_____	_____	_____

Before exercise _____ 2 or 4 puffs _____ 5 minutes before exercise

YELLOW ZONE

Asthma Is Getting Worse

- Cough, wheeze, chest tightness, or shortness of breath, or
- Waking at night due to asthma, or
- Can do some, but not all, usual activities

-Or-

Peak flow: _____ to _____
 (50 to 79 percent of my best peak flow)

First Add: quick-relief medicine—and keep taking your GREEN ZONE medicine.



_____ 2 or 4 puffs, every 20 minutes for up to 1 hour
 (short-acting beta₂-agonist) Nebulizer, once



Second If your symptoms (and peak flow, if used) return to GREEN ZONE after 1 hour of above treatment:

- Continue monitoring to be sure you stay in the green zone.

-Or-

If your symptoms (and peak flow, if used) do not return to GREEN ZONE after 1 hour of above treatment:

- Take: _____ 2 or 4 puffs or Nebulizer
 (short-acting beta₂-agonist)
- Add: _____ mg per day For _____ (3–10) days
 (oral steroid)
- Call the doctor before/ within _____ hours after taking the oral steroid.

RED ZONE

Medical Alert!

- Very short of breath, or
- Quick-relief medicines have not helped, or
- Cannot do usual activities, or
- Symptoms are same or get worse after 24 hours in Yellow Zone

-Or-

Peak flow: less than _____
 (50 percent of my best peak flow)

Take this medicine:

- _____ 4 or 6 puffs or Nebulizer
 (short-acting beta₂-agonist)
- _____ mg
 (oral steroid)

Then call your doctor NOW. Go to the hospital or call an ambulance if:

- You are still in the red zone after 15 minutes AND
- You have not reached your doctor.

DANGER SIGNS ■ Trouble walking and talking due to shortness of breath ■ Take 4 or 6 puffs of your quick-relief medicine AND
 ■ Lips or fingernails are blue ■ Go to the hospital or call for an ambulance _____ NOW!
 (phone)

See the reverse side for things you can do to avoid your asthma triggers.

How To Control Things That Make Your Asthma Worse

This guide suggests things you can do to avoid your asthma triggers. Put a check next to the triggers that you know make your asthma worse and ask your doctor to help you find out if you have other triggers as well. Then decide with your doctor what steps you will take.

Allergens

Animal Dander

Some people are allergic to the flakes of skin or dried saliva from animals with fur or feathers.

The best thing to do:

- Keep furred or feathered pets out of your home.

If you can't keep the pet outdoors, then:

- Keep the pet out of your bedroom and other sleeping areas at all times, and keep the door closed.
- Remove carpets and furniture covered with cloth from your home. If that is not possible, keep the pet away from fabric-covered furniture and carpets.

Dust Mites

Many people with asthma are allergic to dust mites. Dust mites are tiny bugs that are found in every home—in mattresses, pillows, carpets, upholstered furniture, bedcovers, clothes, stuffed toys, and fabric or other fabric-covered items.

Things that can help:

- Encase your mattress in a special dust-proof cover.
- Encase your pillow in a special dust-proof cover or wash the pillow each week in hot water. Water must be hotter than 130° F to kill the mites. Cold or warm water used with detergent and bleach can also be effective.
- Wash the sheets and blankets on your bed each week in hot water.
- Reduce indoor humidity to below 60 percent (ideally between 30—50 percent). Dehumidifiers or central air conditioners can do this.
- Try not to sleep or lie on cloth-covered cushions.
- Remove carpets from your bedroom and those laid on concrete, if you can.
- Keep stuffed toys out of the bed or wash the toys weekly in hot water or cooler water with detergent and bleach.

Cockroaches

Many people with asthma are allergic to the dried droppings and remains of cockroaches.

The best thing to do:

- Keep food and garbage in closed containers. Never leave food out.
- Use poison baits, powders, gels, or paste (for example, boric acid). You can also use traps.
- If a spray is used to kill roaches, stay out of the room until the odor goes away.

Indoor Mold

- Fix leaky faucets, pipes, or other sources of water that have mold around them.
- Clean moldy surfaces with a cleaner that has bleach in it.

Pollen and Outdoor Mold

What to do during your allergy season (when pollen or mold spore counts are high):

- Try to keep your windows closed.
- Stay indoors with windows closed from late morning to afternoon, if you can. Pollen and some mold spore counts are highest at that time.
- Ask your doctor whether you need to take or increase anti-inflammatory medicine before your allergy season starts.

Irritants

Tobacco Smoke

- If you smoke, ask your doctor for ways to help you quit. Ask family members to quit smoking, too.
- Do not allow smoking in your home or car.

Smoke, Strong Odors, and Sprays

- If possible, do not use a wood-burning stove, kerosene heater, or fireplace.
- Try to stay away from strong odors and sprays, such as perfume, talcum powder, hair spray, and paints.

Other things that bring on asthma symptoms in some people include:

Vacuum Cleaning

- Try to get someone else to vacuum for you once or twice a week, if you can. Stay out of rooms while they are being vacuumed and for a short while afterward.
- If you vacuum, use a dust mask (from a hardware store), a double-layered or microfilter vacuum cleaner bag, or a vacuum cleaner with a HEPA filter.

Other Things That Can Make Asthma Worse

- Sulfites in foods and beverages: Do not drink beer or wine or eat dried fruit, processed potatoes, or shrimp if they cause asthma symptoms.
- Cold air: Cover your nose and mouth with a scarf on cold or windy days.
- Other medicines: Tell your doctor about all the medicines you take. Include cold medicines, aspirin, vitamins and other supplements, and nonselective beta-blockers (including those in eye drops).

