

# Diagnosis and Management of Asthma in American Indian Youth

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# Objectives

- Describe the pathophysiology of asthma
- Explain the diagnosis criteria for asthma in Native youth
- Apply diagnostic criteria for obstructive lung disease based on PFT results
- Create a personalized asthma action plan based on peak flow readings
- Recommend the most appropriate medication regimen by utilizing the guideline tables for assessing control and severity of asthma

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- Advanced Practice Pharmacist II
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- Completed PGY-1 Residency at NNMCM (Class of 2008)
- New Mexico Pharmacist Clinician
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# Pathophysiology and Diagnosis

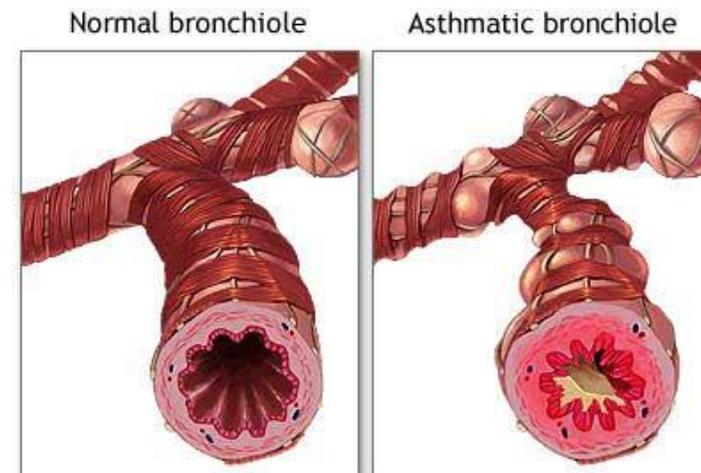
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# What defines asthma?

- Global Initiative for Asthma 2014 (GINA)
  - “Asthma is a heterogeneous disease, usually characterized by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness, and cough that vary over time and in intensity, together with variable expiratory flow limitations”
- Expert Panel Report 3, 2007 Guidelines
  - “Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role.... In susceptible individuals this inflammation causes recurrent episodes of coughing, wheezing, breathlessness and chest tightness. These episodes are usually associated with widespread but variable airflow obstruction...”

# Inflammation Leads to the Following:

- Bronchoconstriction
  - Bronchial smooth muscle constriction that quickly narrows airways in response to various stimuli
- Airway Hyper responsiveness
  - An exaggerated bronchoconstriction to a stimuli
- Airway Edema
  - Edema, mucus hypersecretion, and mucus plug formation
- Remodeling
  - Occurs over time and will reduce reversibility of disease



# Diagnosis Criteria

- Nothing specific for Native American youth
- There is no one diagnostic test for asthma in any age group
- Diagnosis is based on a thorough patient history and should include an assessment of risk factors
- Physical examination and pulmonary function tests (PFT) may be normal

# Diagnosis of Asthma – Patient History

- History of coughing, shortness of breath, wheezing
  - Recurrent and vary in intensity
  - Often occur at night or early morning
- Symptoms triggered by allergens or irritants
  - Smoke
  - Viral infections
  - Allergies
  - Cold air or weather changes
  - Emotions
  - Exercise
- Risk factors

# Asthma Risk Factors

- Parent or sibling with asthma
- Having another allergic conditions (atopic dermatitis or allergic rhinitis)
- Overweight/obese
- Smoker
- Exposure to secondhand smoke
- Having a mother that smoked during pregnancy
- Exposure to exhaust fumes or other pollution
- Exposure to occupational triggers such as chemicals used in farming, hairdressing, and manufacturing
- Boys>girls; women>men
- Respiratory infections in childhood may also contribute

# Spirometry

LCDR Kevin McDermott

# When to Perform

- At initial diagnosis
- After symptoms stabilized
- During periods of prolonged or progressive loss of asthma control
- At least every 1-2 years; more frequently if needed

# Who Should Not Be Tested

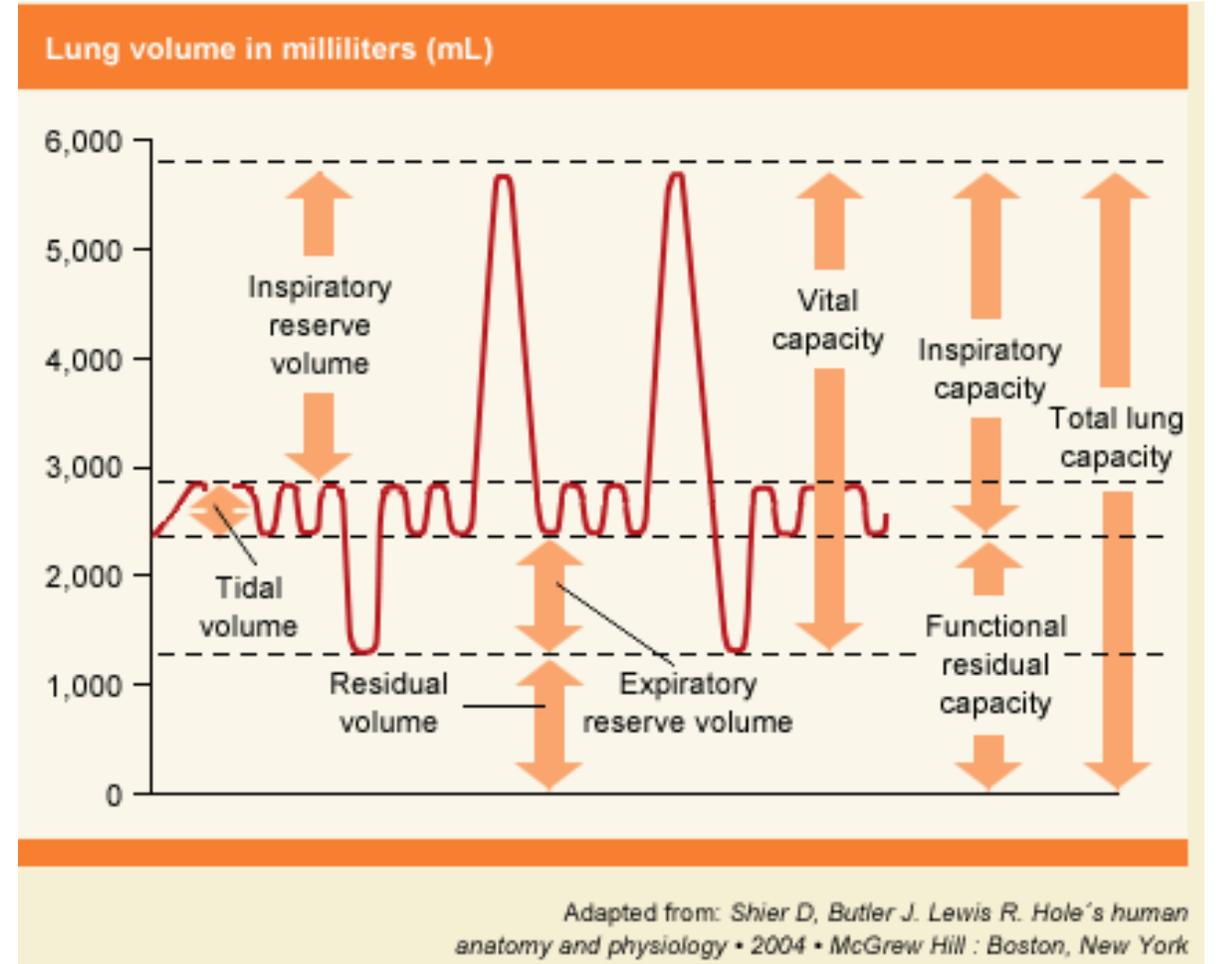
- One month since myocardial infarctions (contraindication)
- Chest or abdominal pain of any cause
- Oral/facial pain exacerbated by mouthpiece
- Stress incontinence
- Dementia or confused state

# Do's and Don'ts Before Procedure

- Do not use albuterol or anticholinergic w/in four hours of test
- Do not use long acting beta-agonists within 12 hours of test
- Do not take aminophylline within 12 hours of test
- Do not smoke within 1 hour of test
- Avoid caffeine products day of test
- May take inhaled or systemic steroids

# Terminology

- FEV1: Forced expiratory volume in 1 second after maximal inspiration
- FVC: Forced vital capacity – maximum air that can be forcibly exhaled after maximal inspiration

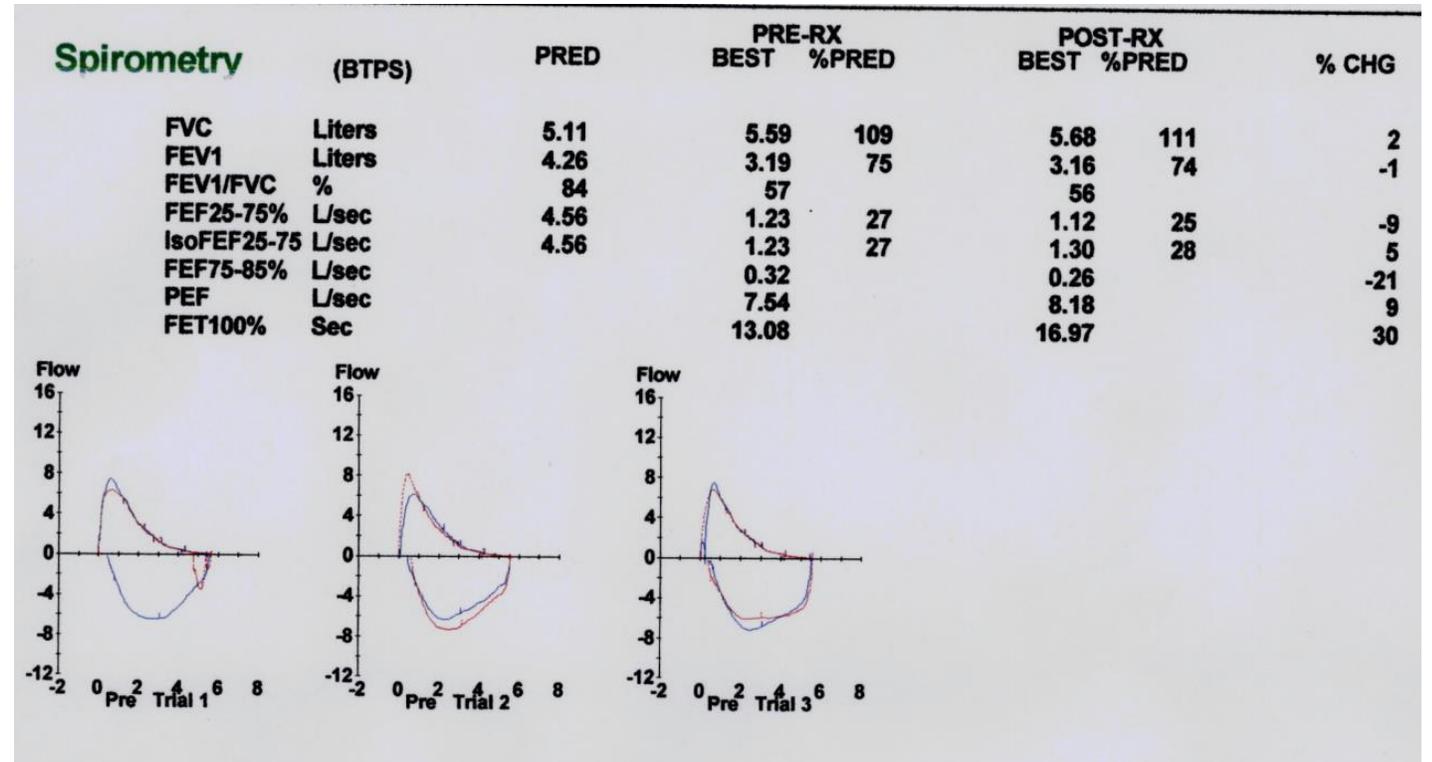


# Change in Spirometry Values

Measurement	Obstruction	Restriction
FVC	Normal or decreased	Decreased
FEV1	Decreased	Decreased or normal
FEV1/FVC	Decreased	Normal

# Reversibility Criteria

- FEV1 change after bronchodilator
  - Increase by 12%
  - AND
  - Increase by 200ml



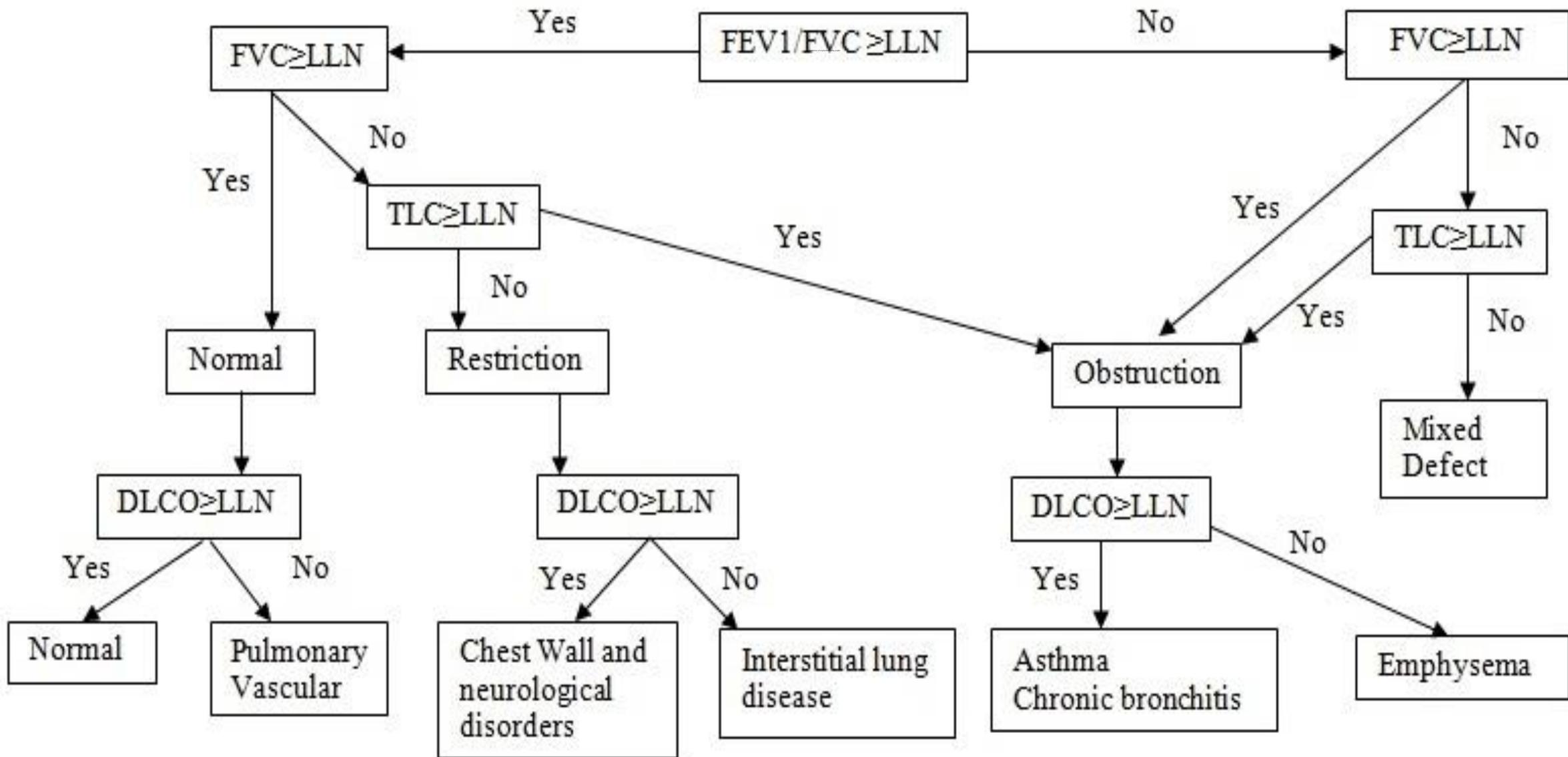
Miller, et al. Standardisation of spirometry. ATS/ERS 2005  
EPR 3 2007

# Normal Values

- There are no “normal” values
- Different data sets and guidelines
  - At least 84 data sets from 68 different authors (NHANES, Crapo, Hsu, etc)
  - Multiple guidelines for interpretation (GOLD, ATS/ERS, etc)
- Values depend on age, height, weight, and sex
- “Normal” values will decrease with age
- Predicted normal values will vary with study data/equations used

# Interpretation Guidelines

- ATS/ERS 2005
  - Uses 5<sup>th</sup> percentile as lower limit of normal (LLN) for all spirometry values
  - 5<sup>th</sup> percentile is becoming the Gold Standard
- Gold Guidelines
  - Uses fixed ratio of 0.7 for FEV1/FVC and 0.8 for rest of testing values
  - Pros – easy to use and doesn't require complicated calculation
  - Cons – can lead to inappropriate diagnosis in old/young patients
- Pearl – most spirometry machines comes with pre-programmed software to calculate results of test

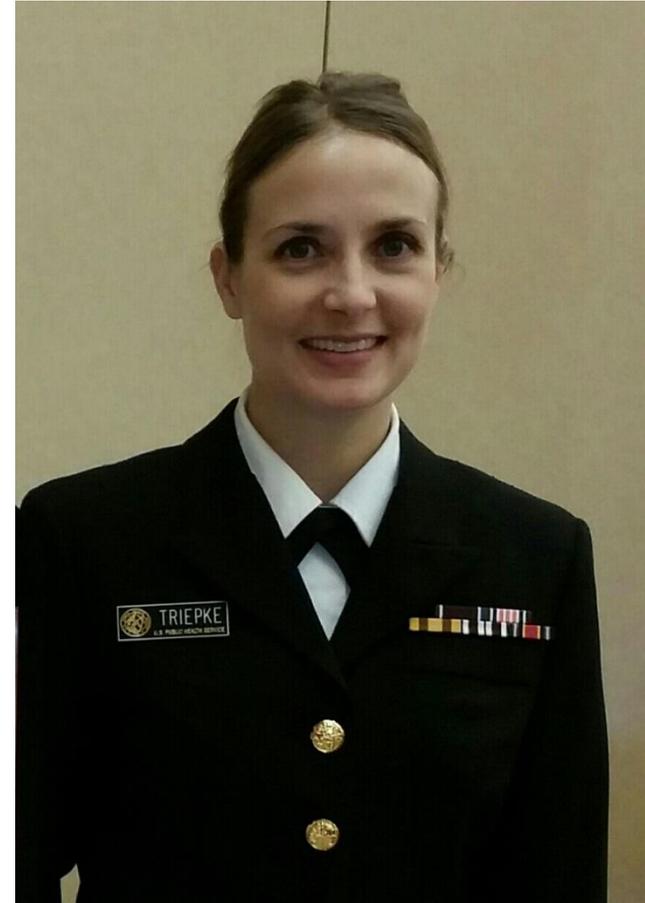


# Creating a Personalized Asthma Action Plan

LCDR Tana Triepke

**Tana Triepke, Pharm.D., cTTS, AE-C, NCPS  
LCDR, USPHS**

- Advanced Practice Pharmacist II
- Spirit Lake Health Center, Fort Totten, North Dakota
- Certified Tobacco Treatment Specialist; implemented Tobacco Cessation Clinic at Spirit Lake in 2008.
- NIOSH certification in spirometry and implementation of spirometry services at Spirit Lake in 2012.
- Certified Asthma Educator; implemented Adult Asthma Clinic at Spirit Lake in 2012.
- Anticoagulation and immunization provider.



# Asthma Action Plan

- A tool for asthma self management that includes instructions for:
  - Daily management
    - What medicine to take daily, including the specific names of the medications
    - What actions to take to control environmental factors that worsen the patient's asthma
  - How to recognize and handle worsening asthma
    - What signs, symptoms, and PEF measurements (if peak flow monitoring is used) indicate worsening asthma
    - What medications to take in response to these signs
    - What symptoms and PEF measurements indicate the need for urgent medical attention
    - Emergency telephone numbers for the physician, ED, and person or service to transport the patient rapidly for medical care

FIGURE 3-10b. SAMPLE ASTHMA ACTION PLAN

## Child Asthma Action Plan

0-5 years of age

Patient Name: \_\_\_\_\_

Medical Record #: \_\_\_\_\_

Health Care Provider's Name: \_\_\_\_\_ DOB: \_\_\_\_\_

Health Care Provider's Phone #: \_\_\_\_\_ Completed by: \_\_\_\_\_ Date: \_\_\_\_\_

Long-Term-Control Medicines (Use Every Day To Stay Healthy)	How Much To Take	How Often	Other Instructions (such as spacers/masks, nebulizers)
		_____ times per day EVERY DAY!	
		_____ times per day EVERY DAY!	
		_____ times per day EVERY DAY!	
		_____ times per day EVERY DAY!	
Quick-Relief Medicines	How Much To Take	How Often	Other Instructions
		Give ONLY as needed	NOTE: If this medicine is needed often (_____ times per week), call physician.

**Child is well** and has no asthma symptoms, even during active play.



**PREVENT** asthma symptoms every day:

- Give the above long-term-control medicines every day.
- Avoid things that make the child's asthma worse.
- ✓ Avoid tobacco smoke; ask people to smoke outside.

\_\_\_\_\_

\_\_\_\_\_

**Child is not well** and has asthma symptoms that may include:

- Coughing
- Wheezing
- Runny nose or other cold symptoms
- Breathing harder or faster
- Awakening due to coughing or difficulty breathing
- Playing less than usual

**CAUTION.** Take action by continuing to give regular asthma medicines every day AND:

Give \_\_\_\_\_  
(include dose and frequency)

If the child is not in the **Green Zone** and still has symptoms after 1 hour, then:

Give more \_\_\_\_\_  
(include dose and frequency)

\_\_\_\_\_  
(include dose and frequency)

Call \_\_\_\_\_  
(include dose and frequency)

**Child feels awful!** Warning signs may include:

- Child's wheeze, cough, or difficulty breathing continues or worsens, even after giving yellow zone medicines.
- Child's breathing is so hard that he/she is having trouble walking/talking/eating/playing.
- Child is drowsy or less alert than normal.

**MEDICAL ALERT! Get help!**

Take the child to the hospital or call 9-1-1 immediately!

Give more \_\_\_\_\_ until you get help. (include dose and frequency)

Give \_\_\_\_\_ (include dose and frequency)

- Call 9-1-1 if:
- The child's skin is sucked in around neck and ribs, or
  - Lips and/or fingernails are grey or blue, or
  - Child doesn't respond to you.

**Danger! Get help immediately!**

FIGURE 3-10a. SAMPLE ASTHMA ACTION PLAN

## My Asthma Action Plan

Patient Name: \_\_\_\_\_

Medical Record #: \_\_\_\_\_

Physician's Name: \_\_\_\_\_ DOB: \_\_\_\_\_

Physician's Phone #: \_\_\_\_\_ Completed by: \_\_\_\_\_ Date: \_\_\_\_\_

Long-Term-Control Medicines	How Much To Take	How Often	Other Instructions
		_____ times per day EVERY DAY!	
		_____ times per day EVERY DAY!	
		_____ times per day EVERY DAY!	
		_____ times per day EVERY DAY!	
Quick-Relief Medicines	How Much To Take	How Often	Other Instructions
		Take ONLY as needed	NOTE: If this medicine is needed frequently, call physician to consider increasing long-term-control medications.

Special instructions when I feel **good**, **not good**, and **awful**.

I feel **good**.  
(My peak flow is in the **GREEN** zone.)

GREEN ZONE

**PREVENT** asthma symptoms everyday:

- Take my long-term-control medicines (above) every day.
- Before exercise, take \_\_\_\_\_ puffs of \_\_\_\_\_
- Avoid things that make my asthma worse like: \_\_\_\_\_

I do **not** feel good.  
(My peak flow is in the **YELLOW** zone.)

YELLOW ZONE

My symptoms may include one or more of the following:

- Wheeze
- Tight chest
- Cough
- Shortness of breath
- Waking up at night with asthma symptoms
- Decreased ability to do usual activities

**CAUTION.** I should continue taking my long-term-control asthma medicines every day AND:

- Take \_\_\_\_\_
- If I still do not feel good, or my peak flow is not back in the **Green Zone** within 1 hour, then I should:

- Increase \_\_\_\_\_
- Add \_\_\_\_\_
- Call \_\_\_\_\_

I feel **awful**.  
(My peak flow is in the **RED** zone.)

RED ZONE

Warning signs may include one or more of the following:

- It's getting harder and harder to breathe
- Unable to sleep or do usual activities because of trouble breathing

**MEDICAL ALERT! Get help!**

- Take \_\_\_\_\_ until I get help immediately.
- Take \_\_\_\_\_
- Call \_\_\_\_\_

**Danger! Get help immediately!**

Call 9-1-1 if you have trouble walking or talking due to shortness of breath or lips or fingernails are grey or blue.

# Why utilize asthma action plans?

- The Expert Panel found that optimal self-management, including self-monitoring of symptoms and/or peak flow and a written asthma action plan, significantly reduced hospitalizations and ED visits for asthma.
- The Expert Panel recommends that asthma self-management education be incorporated into routine care for children who have asthma (Evidence A).
- Goal
  - Reduce impairment
  - Reduce risk

# Who should be utilizing asthma action plans?

- Provide to all patients a written asthma action plan that includes daily treatment and recognizing and handling worsening asthma, including self-adjustment of medications in response to acute symptoms or changes in PEF measures.
- Written action plans are particularly recommended for patients who have moderate or severe persistent asthma, a history of severe exacerbations, or poorly controlled asthma (Evidence B).

# To Peak Flow or to Not Peak Flow

- Whether peak flow monitoring, symptom monitoring, or a combination of approaches is used, self-monitoring is important to the effective self-management of asthma (Evidence A).
- Either peak flow monitoring or symptom monitoring, if taught and followed correctly, may be equally effective (Evidence B).

# Guidance on When to Use Peak Flow Monitoring

- At the discretion of the patient and provider
  - To evaluate responses to treatment
  - To evaluate environmental/occupational exposures
  - Provide guidance for patients who have poor perception of airflow obstruction
- Peak flow monitoring for self-management of asthma may be less effective for children but can be used in ages  $\geq 5$  years old.

## How to Use a Peak Flow Meter

1. Move the indicator to the bottom of the numbered scale.
2. Stand up.
3. Take a deep breath, filling your lungs completely.
4. Place the mouthpiece in your mouth and close your lips around it. Do not put your tongue inside the hole.
5. Blow out as hard and fast as you can in a single blow.



# Find Your Personal Best Peak Flow Number

- Personal best peak flow is the highest peak flow number you can achieve over a 2-week period when your asthma is under good control.
  - At least twice a day for 2 to 3 weeks.
  - When you wake up and in late afternoon or early evening.
  - 15–20 minutes after you take your inhaled short-acting beta2-agonist for quick relief.

# Setting Up Peak Flow Zones

- **Green Zone** (more than \_\_\_L/min [80 percent of your personal best number]) signals good control.
- **Yellow Zone** (between \_\_\_L/min and \_\_\_L/min [50 to less than 80 percent of your personal best number]) signals caution.
- **Red Zone** (below \_\_\_L/min [less than 50 percent of your personal best number]) signals a medical alert.



# Actions With Peak Flows

- If peak flow is in yellow zone: take inhaled short-acting beta2-agonist (quick-relief medicine) as prescribed
- If peak flow increases by 20% or more before and after taking inhaled short-acting beta2-agonist (quick-relief medicine) speak with provider about starting additional controller medication.

# Case Study

- Demo Child is a 9yo boy presenting to the clinic with his peak flow results. It was determined that 300 was his personal best peak flow. His current asthma medications are: flovent 110mcg/puff 1 puff bid; singulair 5mg qpm; albuterol 2 puffs q46h prn.
- Determine his peak flow zones and create a personalized asthma action plan for him
- <http://www.rampasthma.org/>

# Case Study

1. Green zone: >250L/min; Yellow zone 150-250L/min; Red zone <150
2. Green zone: >300L/min; Yellow zone 150-250L/min; Red zone <150
3. Green zone: >240L/min; Yellow zone 150-240L/min; Red Zone <150
4. Green zone: >240L/min; Yellow zone 120-240L/min; Red Zone <120

# My Asthma Plan

ENGLISH

Patient Name: Demo, Child

Medical Record #: 33333

Provider's Name: Dr. Asthmacontrol

DOB: 01-01-2006

Provider's Phone #: 666-666-6666

Completed by: TNT

Date: 01-30-2015

Controller Medicines	How Much to Take	How Often	Other Instructions
Flovent HFA 110	1 puff	2 times per day EVERY DAY!	<input checked="" type="checkbox"/> Gargle or rinse mouth after use
Singulair 5mg	1 tab	1 times per day EVERY DAY!	Take in the evening
		times per day EVERY DAY!	
		times per day EVERY DAY!	
Quick-Relief Medicines	How Much to Take	How Often	Other Instructions
Albuterol – Proventil	<input checked="" type="checkbox"/> 2 puffs <input type="checkbox"/> 4 puffs <input type="checkbox"/> 1 nebulizer treatment	Take ONLY as needed (see below — starting in Yellow Zone or before exercise)	NOTE: If you need this medicine more than two days a week, call physician to consider increasing controller medica- tions and discuss your treatment plan.

Special instructions when I am  *doing well*,  *getting worse*,  *having a medical alert.*

## Doing *well*.

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

**Peak Flow** (for ages 5 and up):  
is 240 or more. (80% or more of personal best)

**Personal Best Peak Flow** (for ages 5 and up): 300



**PREVENT** asthma symptoms every day:

- Take my controller medicines (above) every day.
- Before exercise, take 2 puff(s) of albuterol
- Avoid things that make my asthma worse.  
(See back of form.)

## Getting *worse*.

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

**Peak Flow** (for ages 5 and up):  
150 to 239 (50 to 79% of personal best)



**CAUTION.** Continue taking every day controller medicines, AND:

- Take 2 puffs or  one nebulizer treatment of quick relief medicine. If I am not back in the *Green Zone* within 20-30 minutes take 2 more puffs or nebulizer treatments. If I am not back in the *Green Zone* within one hour, then I should:
- Increase \_\_\_\_\_
- Add Prednisone 5mg twice daily for 5 days
- Call 666-666-6666
- Continue using quick relief medicine every 4 hours as needed. Call provider if not improving in 2 days.

GREEN ZONE

YELLOW ZONE

# Special instructions for different zones example for green and yellow

## 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.

**Peak Flow** (for ages 5 and up):

less than 150 (50% of personal best)



## MEDICAL ALERT! Get help!

Take quick relief medicine: 2 puffs every 20 minutes and get help immediately.

Take prednisone 5mg now and

Call 911

RED ZONE

**Danger! Get help immediately! Call 911 if trouble walking or talking due to shortness of breath or if lips or fingernails are gray or blue. For child, call 911 if skin is sucked in around neck and ribs during breaths or child doesn't respond normally.**

**Health Care Provider:** My signature provides authorization for the above written orders. I understand that all procedures will be implemented in accordance with state laws and regulations. Student may self carry asthma medications:  Yes  No self administer asthma medications:  Yes  No  
(This authorization is for a maximum of one year from signature date.)

Healthcare Provider Signature

Date

# Stepwise Approach to Asthma Treatment

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LCDR, USPHS**

- Advanced Practice Pharmacist I
- Northern Navajo Medical Center
- Completed PGY-1 Residency at NNMC (Class of 2010)
- Coordinator for NNMC Epilepsy Clinic.
- Pharmacist Provider in NNMC Asthma Clinic
- NCPS (Epilepsy)



# Guidelines in General

- Three Different Age Categories
  - 0-4 years old
  - 5-11 years old
  - 12 years old and older
- Symptom and Lung Function guided
- Classification
  - Initial step for treatment
- Control
  - Step up or down

# Symptoms

- Daytime symptoms
- Nighttime awakenings
- Use of short acting B-agonist
- Interference with normal activity

# Classification Example Case

- 13 yo M pt was seen last week in the ER with trouble breathing. He was diagnosed with asthma exacerbation. He has no prior diagnosis of asthma. He was prescribed an albuterol inhaler and a prednisone burst. Upon follow up at your clinic he admits to the following symptoms
  - <2 days out of the week of day time symptoms
  - Wakes up nightly with trouble breathing
  - Uses albuterol once each night
  - Minor limitations
  - Lung function tests not currently available
  - One prednisone burst

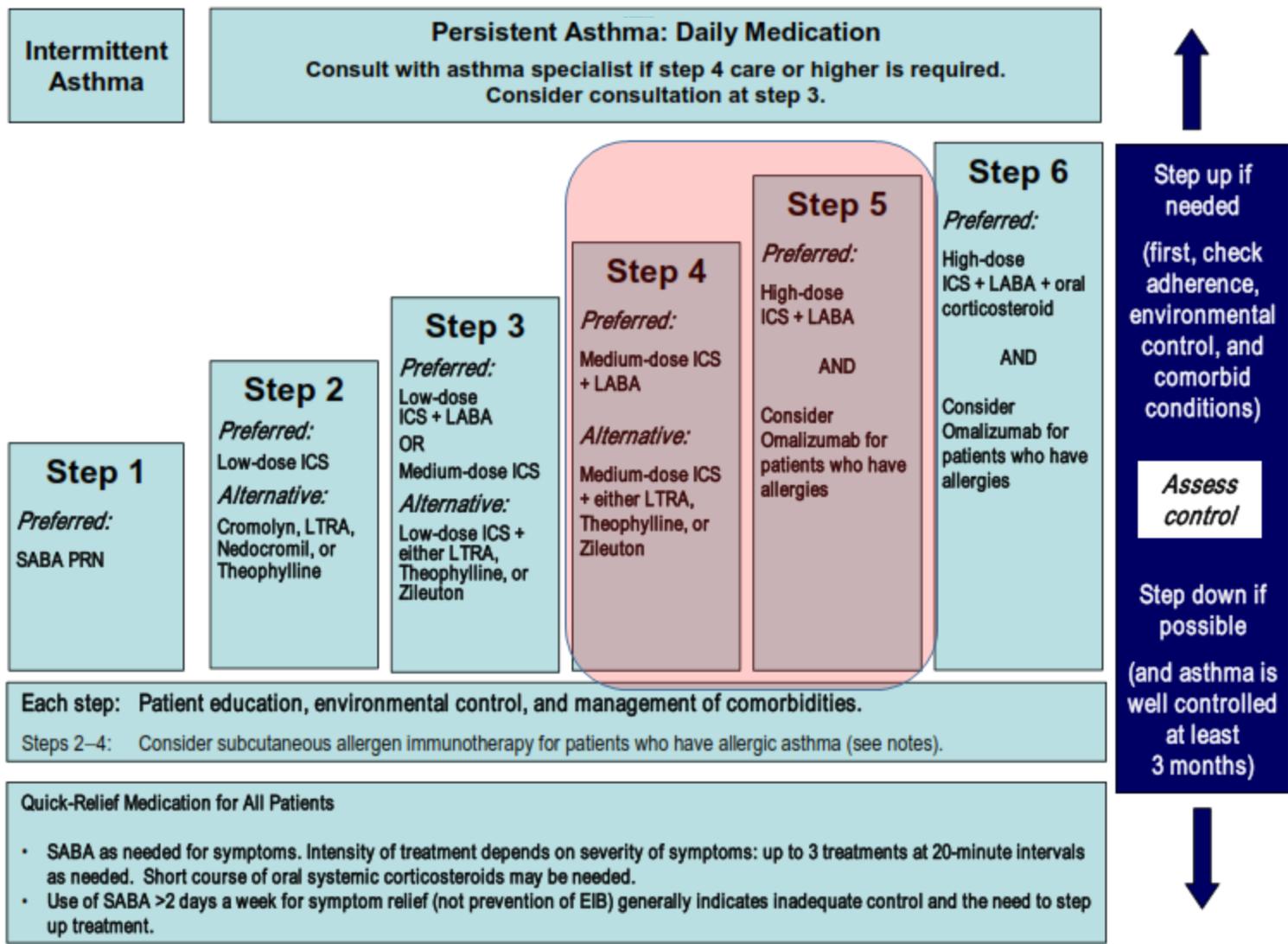
# How would his asthma severity be classified?

Components of Severity		Classification of Asthma Severity ≥12 years of age			
		Intermittent	Persistent		
			Mild	Moderate	Severe
<b>Impairment</b>  Normal FEV <sub>1</sub> /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 <sub>2</sub> -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"> <li>• Normal FEV<sub>1</sub> between exacerbations</li> <li>• FEV<sub>1</sub> &gt;80% predicted</li> <li>• FEV<sub>1</sub>/FVC normal</li> </ul>	<ul style="list-style-type: none"> <li>• FEV<sub>1</sub> &gt;80% predicted</li> <li>• FEV<sub>1</sub>/FVC normal</li> </ul>	<ul style="list-style-type: none"> <li>• FEV<sub>1</sub> &gt;60% but &lt;80% predicted</li> <li>• FEV<sub>1</sub>/FVC reduced 5%</li> </ul>	<ul style="list-style-type: none"> <li>• FEV<sub>1</sub> &lt;60% predicted</li> <li>• FEV<sub>1</sub>/FVC reduced &gt;5%</li> </ul>
<b>Risk</b>	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 <sub>1</sub> .					

# Which step should this pt be started on?

Components of Severity	Classification of Asthma Severity ≥12 years of age			
	Intermittent	Persistent		
		Mild	Moderate	Severe
Recommended Step for Initiating Treatment	Step 1	Step 2	Step 3 and consider short course of oral systemic corticosteroids	<b>Step 4 or 5</b>
(See figure 4–5 for treatment steps.)	In 2–6 weeks, evaluate level of asthma control that is achieved and adjust therapy accordingly.			

Components of Severity		Classification of Asthma Severity ≥12 years of age			
		Intermittent	Persistent		
			Mild	Moderate	Severe
<b>Impairment</b>  Normal FEV <sub>1</sub> /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
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	Short-acting beta <sub>2</sub> -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"> <li>• Normal FEV<sub>1</sub> between exacerbations</li> <li>• FEV<sub>1</sub> &gt;80% predicted</li> <li>• FEV<sub>1</sub>/FVC normal</li> </ul>	<ul style="list-style-type: none"> <li>• FEV<sub>1</sub> &gt;80% predicted</li> <li>• FEV<sub>1</sub>/FVC normal</li> </ul>	<ul style="list-style-type: none"> <li>• FEV<sub>1</sub> &gt;60% but &lt;80% predicted</li> <li>• FEV<sub>1</sub>/FVC reduced 5%</li> </ul>	<ul style="list-style-type: none"> <li>• FEV<sub>1</sub> &lt;60% predicted</li> <li>• FEV<sub>1</sub>/FVC reduced &gt;5%</li> </ul>
<b>Risk</b>	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 <sub>1</sub> .			
<b>Recommended Step for Initiating Treatment</b>		<b>Step 1</b>	<b>Step 2</b>	<b>Step 3</b> and consider short course of oral systemic corticosteroids	<b>Step 4 or 5</b>
<b>(See figure 4–5 for treatment steps.)</b>		In 2–6 weeks, evaluate level of asthma control that is achieved and adjust therapy accordingly.			



# Assessing Control Example Case

- Same pt came back to your clinic for his two week follow up appointment. At last visit he was started on Dulera 100/5 ii puffs BID.
- His symptoms are as follows
  - <2 days of the week with day time symptoms.
  - 2 night time awakenings.
  - No interference with his normal activities.
  - Uses his albuterol once per week.
  - FEV1 85% of personal best.

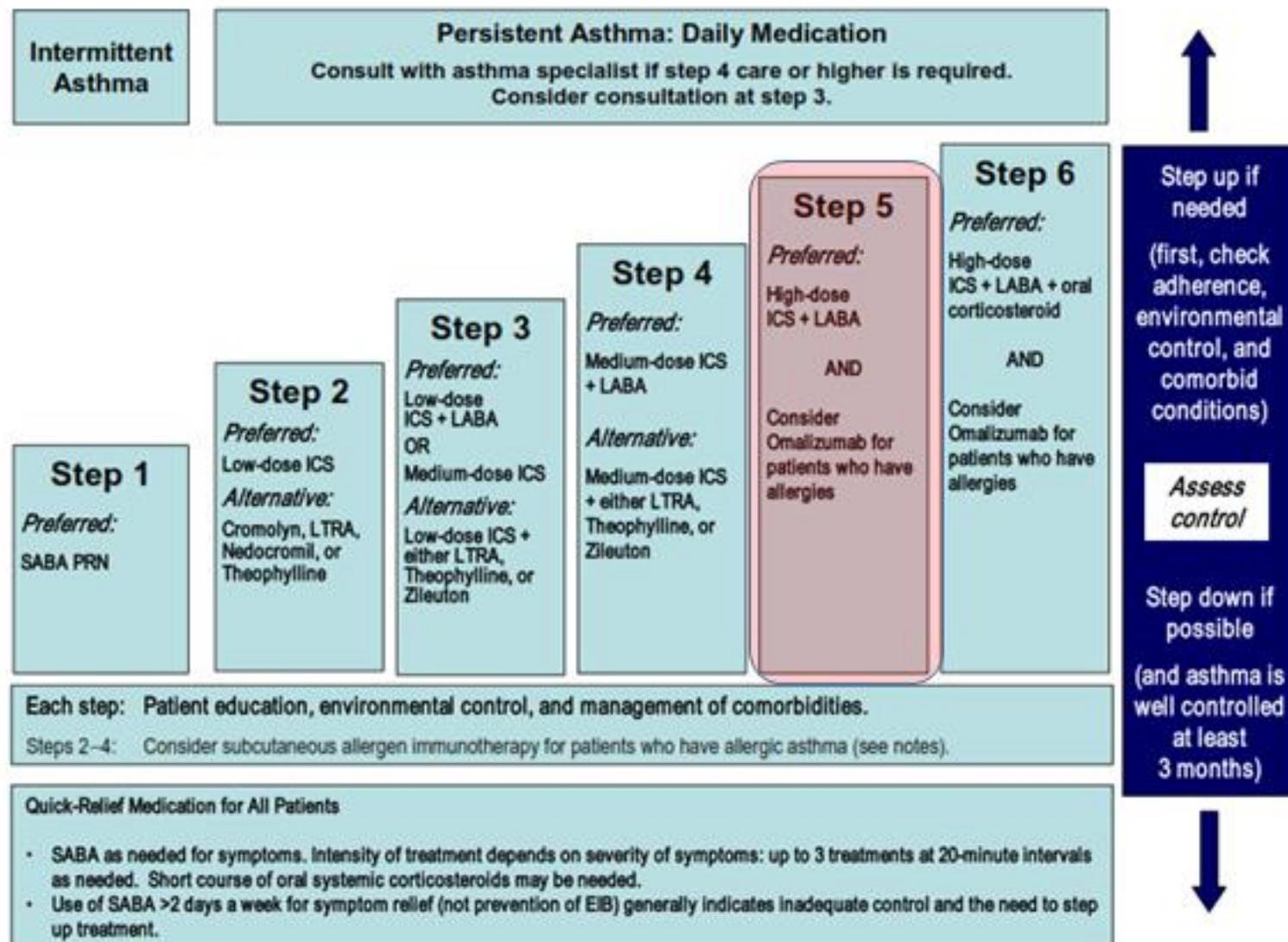
# How would his control be classified?

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 <sub>2</sub> -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week	Several times per day
	FEV <sub>1</sub> or peak flow	>80% predicted/ personal best	60–80% predicted/ personal best	<60% predicted/ personal best

## How should you change his treatment?

Recommended Action for Treatment (see figure 4–5 for treatment steps)	Well Controlled	Not Well Controlled	Very Poorly Controlled
	<ul style="list-style-type: none"> <li>• Maintain current step.</li> <li>• Regular followups every 1–6 months to maintain control.</li> <li>• Consider step down if well controlled for at least 3 months.</li> </ul>	<ul style="list-style-type: none"> <li>• Step up 1 step and reevaluate in 2–6 weeks.</li> <li>• For side effects, consider alternative treatment options.</li> </ul>	<ul style="list-style-type: none"> <li>• Consider short course of oral systemic corticosteroids.</li> <li>• Step up 1–2 steps, and reevaluate in 2 weeks.</li> <li>• For side effects, consider alternative treatment options.</li> </ul>

**FIGURE 4-5. STEPWISE APPROACH FOR MANAGING ASTHMA IN YOUTHS  $\geq 12$  YEARS OF AGE AND ADULTS**



# Differences in Age Groups

- No lung function assessment in 0-4 age group.
  - Classification and control.
- Less treatment options in 0-4 age group.
- Medium Dose ICS preferred step 3 in initial therapy for 0-4 and 5-11 age groups.
- Starting step for severe persistent asthma is Step 3 medium dose ICS or Step 4.

# Common Pitfalls

- Problem lists may be misleading.
  - Medications also guide
- Step 1 treatment is prn albuterol not low dose ICS.
- Don't assume technique and/or refill history is perfect.
- High dose ICS is not on the stepwise guidelines.
- Make sure you are using the correct guidelines for the patients age.

Figures from Guidelines for Reference.

## FIGURE 4–2a. CLASSIFYING ASTHMA SEVERITY AND INITIATING TREATMENT IN CHILDREN 0–4 YEARS OF AGE

Assessing severity and initiating therapy in children who are not currently taking long-term control medication

Components of Severity		Classification of Asthma Severity (0–4 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	0	1–2x/month	3–4x/month	>1x/week
	Short-acting beta <sub>2</sub> -agonist use for symptom control (not prevention of EIB)	≤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
Risk	Exacerbations requiring oral systemic corticosteroids	0–1/year	≥2 exacerbations in 6 months requiring oral systemic corticosteroids, or ≥4 wheezing episodes/1 year lasting >1 day AND risk factors for persistent asthma		
		<p style="text-align: center;">← Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time. →</p> <p style="text-align: center;">Exacerbations of any severity may occur in patients in any severity category.</p>			
Recommended Step for Initiating Therapy		Step 1	Step 2	Step 3 and consider short course of oral systemic corticosteroids	
(See figure 4–1a for treatment steps.)		In 2–6 weeks, depending on severity, evaluate level of asthma control that is achieved. If no clear benefit is observed in 4–6 weeks, consider adjusting therapy or alternative diagnoses.			

**FIGURE 4–2b. CLASSIFYING ASTHMA SEVERITY AND INITIATING TREATMENT IN CHILDREN 5–11 YEARS OF AGE**

Assessing severity and initiating therapy in children who are not currently taking long-term control medication

Components of Severity		Classification of Asthma Severity (5–11 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 <sub>2</sub> -agonist use for symptom control (not prevention of EIB)	≤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	<ul style="list-style-type: none"> <li>• Normal FEV<sub>1</sub> between exacerbations</li> <li>• FEV<sub>1</sub> &gt;80% predicted</li> <li>• FEV<sub>1</sub>/FVC &gt;85%</li> </ul>	<ul style="list-style-type: none"> <li>• FEV<sub>1</sub> = &gt;80% predicted</li> <li>• FEV<sub>1</sub>/FVC &gt;80%</li> </ul>	<ul style="list-style-type: none"> <li>• FEV<sub>1</sub> = 60–80% predicted</li> <li>• FEV<sub>1</sub>/FVC = 75–80%</li> </ul>	<ul style="list-style-type: none"> <li>• FEV<sub>1</sub> &lt;60% predicted</li> <li>• FEV<sub>1</sub>/FVC &lt;75%</li> </ul>
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 <sub>1</sub> .			
Recommended Step for Initiating Therapy (See figure 4–1b for treatment steps.)		Step 1	Step 2	Step 3, medium-dose ICS option and consider short course of oral systemic corticosteroids	Step 3, medium-dose ICS option, or step 4
		In 2–6 weeks, evaluate level of asthma control that is achieved, and adjust therapy accordingly.			

**FIGURE 4-6. CLASSIFYING ASTHMA SEVERITY AND INITIATING TREATMENT IN YOUTHS ≥12 YEARS OF AGE AND ADULTS**

— Assessing severity and initiating treatment for patients who are not currently taking long-term control medications

Components of Severity		Classification of Asthma Severity ≥12 years of age			
		Intermittent	Persistent		
			Mild	Moderate	Severe
<b>Impairment</b>  Normal FEV <sub>1</sub> /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 <sub>2</sub> -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"> <li>• Normal FEV<sub>1</sub> between exacerbations</li> <li>• FEV<sub>1</sub> &gt;80% predicted</li> <li>• FEV<sub>1</sub>/FVC normal</li> </ul>	<ul style="list-style-type: none"> <li>• FEV<sub>1</sub> &gt;80% predicted</li> <li>• FEV<sub>1</sub>/FVC normal</li> </ul>	<ul style="list-style-type: none"> <li>• FEV<sub>1</sub> &gt;80% but &lt;80% predicted</li> <li>• FEV<sub>1</sub>/FVC reduced 3%</li> </ul>	<ul style="list-style-type: none"> <li>• FEV<sub>1</sub> &lt;80% predicted</li> <li>• FEV<sub>1</sub>/FVC reduced &gt;3%</li> </ul>
<b>Risk</b>	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 <sub>1</sub> .			
<b>Recommended Step for Initiating Treatment</b>		Step 1	Step 2	Step 3	Step 4 or 5
(See figure 4-5 for treatment steps.)		and consider short course of oral systemic corticosteroids			
In 2-6 weeks, evaluate level of asthma control that is achieved and adjust therapy accordingly.					

**FIGURE 4–3a. ASSESSING ASTHMA CONTROL AND ADJUSTING THERAPY IN CHILDREN 0–4 YEARS OF AGE**

Components of Control		Classification of Asthma Control (0–4 years of age)		
		Well Controlled	Not Well Controlled	Very Poorly Controlled
<b>Impairment</b>	Symptoms	≤2 days/week	>2 days/week	Throughout the day
	Nighttime awakenings	≤1x/month	>1x/month	>1x/week
	Interference with normal activity	None	Some limitation	Extremely limited
	Short-acting beta <sub>2</sub> -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week	Several times per day
<b>Risk</b>	<b>Exacerbations requiring oral systemic corticosteroids</b>	<b>0–1/year</b>	<b>2–3/year</b>	<b>&gt;3/year</b>
	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.		
<b>Recommended Action for Treatment</b>  (See figure 4–1a for treatment steps.)		<ul style="list-style-type: none"> <li>• Maintain current treatment.</li> <li>• Regular followup every 1–6 months.</li> <li>• Consider step down if well controlled for at least 3 months.</li> </ul>	<ul style="list-style-type: none"> <li>• Step up (1 step) and reevaluate in 2–6 weeks.</li> <li>• If no clear benefit in 4–6 weeks, consider alternative diagnoses or adjusting therapy.</li> <li>• For side effects, consider alternative treatment options.</li> </ul>	<ul style="list-style-type: none"> <li>• Consider short course of oral systemic corticosteroids,</li> <li>• Step up (1–2 steps), and reevaluate in 2 weeks.</li> <li>• If no clear benefit in 4–6 weeks, consider alternative diagnoses or adjusting therapy.</li> <li>• For side effects, consider alternative treatment options.</li> </ul>

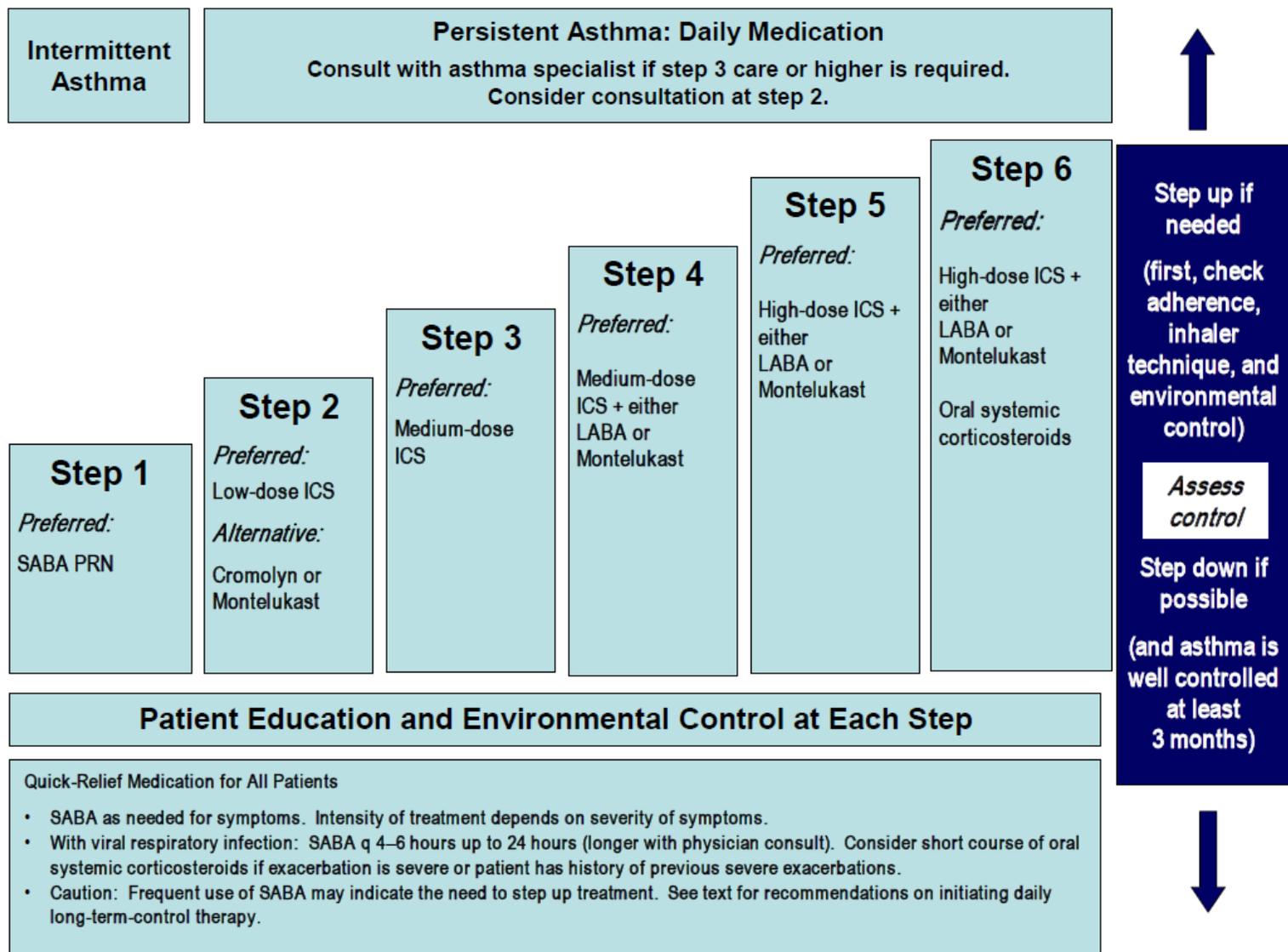
**FIGURE 4–3b. ASSESSING ASTHMA CONTROL AND ADJUSTING THERAPY IN CHILDREN 5–11 YEARS OF AGE**

Components of Control		Classification of Asthma Control (5–11 years of age)		
		Well Controlled	Not Well Controlled	Very Poorly Controlled
<b>Impairment</b>	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	≥2x/month	≥2x/week
	Interference with normal activity	None	Some limitation	Extremely limited
	Short-acting beta <sub>2</sub> -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week	Several times per day
	Lung function • FEV <sub>1</sub> or peak flow • FEV <sub>1</sub> /FVC	>80% predicted/ personal best >80%	60–80% predicted/ personal best 75–80%	<60% predicted/ personal best <75%
<b>Risk</b>	Exacerbations requiring oral systemic corticosteroids	0–1/year	≥2/year (see note)	
	Reduction in lung growth	Evaluation requires long-term followup.		
	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.		
<b>Recommended Action for Treatment</b>  (See figure 4–1b for treatment steps.)		<ul style="list-style-type: none"> <li>• Maintain current step.</li> <li>• Regular followup every 1–6 months.</li> <li>• Consider step down if well controlled for at least 3 months.</li> </ul>	<ul style="list-style-type: none"> <li>• Step up at least 1 step and Reevaluate in 2–6 weeks.</li> <li>• For side effects: consider alternative treatment options.</li> </ul>	<ul style="list-style-type: none"> <li>• Consider short course of oral systemic corticosteroids,</li> <li>• Step up 1–2 steps, and</li> <li>• Reevaluate in 2 weeks.</li> <li>• For side effects, consider alternative treatment options.</li> </ul>

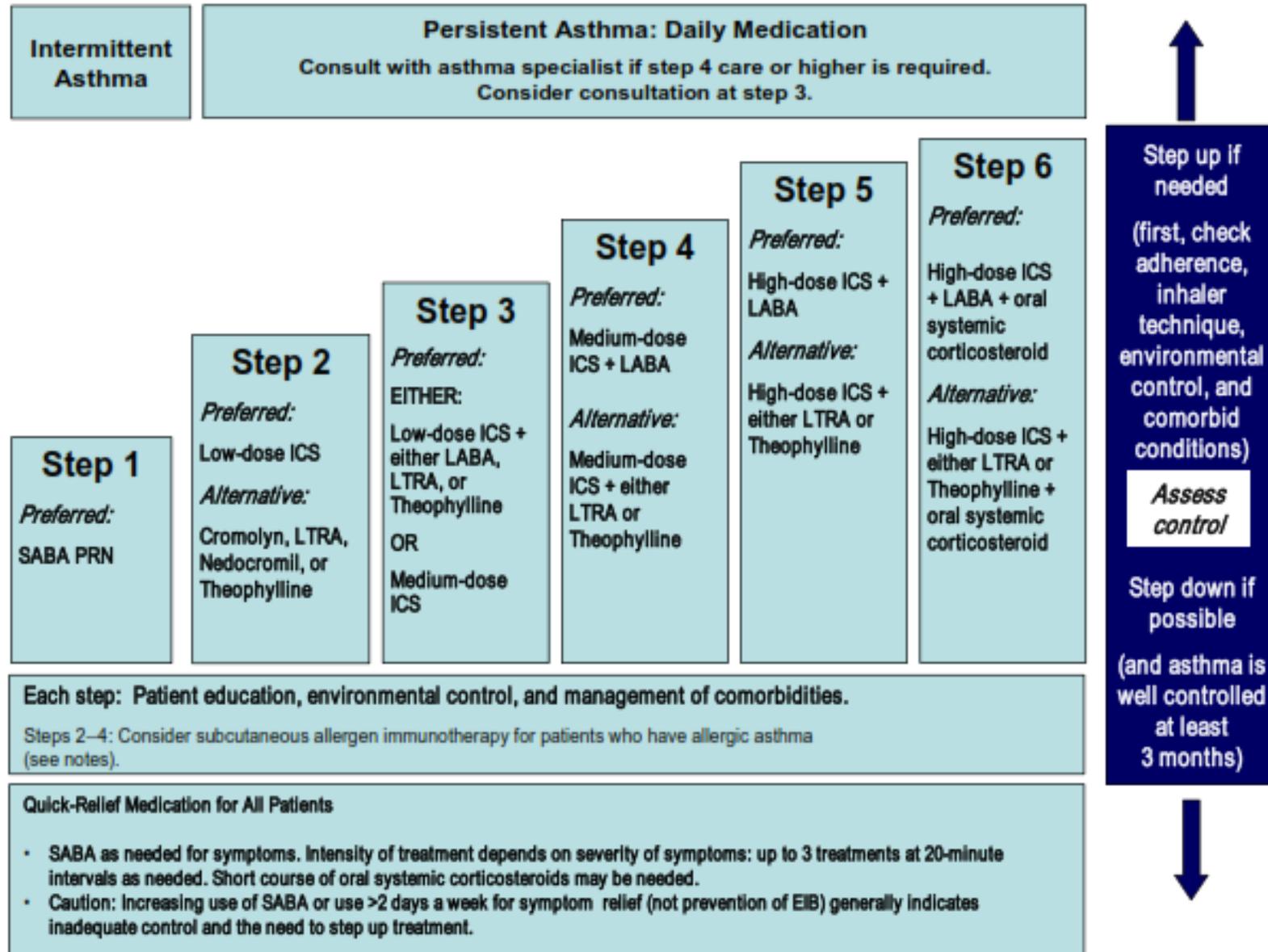
**FIGURE 4–7. ASSESSING ASTHMA CONTROL AND ADJUSTING THERAPY IN YOUTHS ≥12 YEARS OF AGE AND ADULTS**

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 <sub>2</sub> -agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week	Several times per day
	FEV <sub>1</sub> 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)		<ul style="list-style-type: none"> <li>• Maintain current step.</li> <li>• Regular followups every 1–6 months to maintain control.</li> <li>• Consider step down if well controlled for at least 3 months.</li> </ul>	<ul style="list-style-type: none"> <li>• Step up 1 step and Reevaluate in 2–6 weeks.</li> <li>• For side effects, consider alternative treatment options.</li> </ul>	<ul style="list-style-type: none"> <li>• Consider short course of oral systemic corticosteroids,</li> <li>• Step up 1–2 steps, and</li> <li>• Reevaluate in 2 weeks.</li> <li>• For side effects, consider alternative treatment options.</li> </ul>

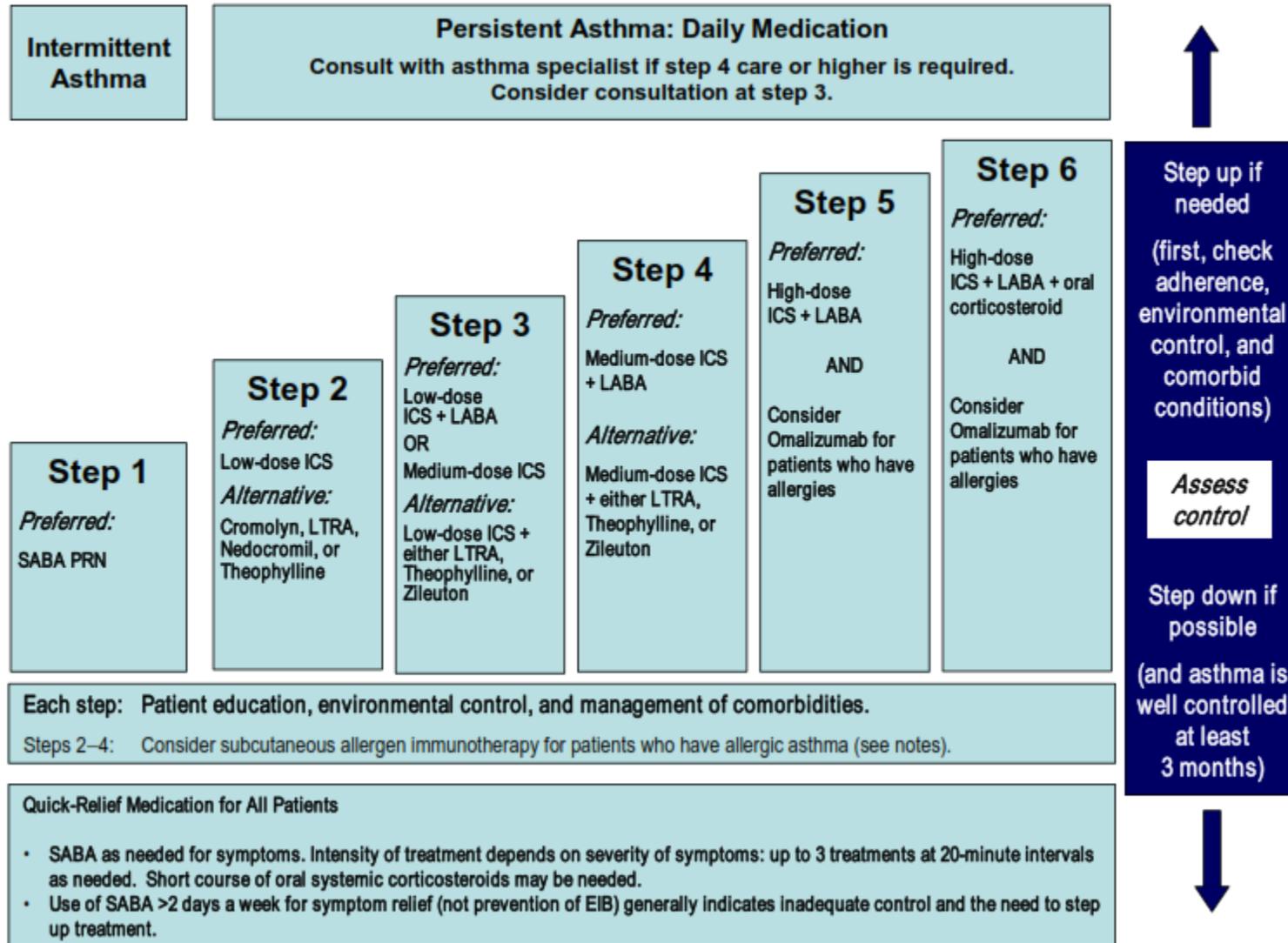
**FIGURE 4-1a. STEPWISE APPROACH FOR MANAGING ASTHMA IN CHILDREN 0-4 YEARS OF AGE**



**FIGURE 4-1b. STEPWISE APPROACH FOR MANAGING ASTHMA IN CHILDREN 5-11 YEARS OF AGE**



**FIGURE 4–5. STEPWISE APPROACH FOR MANAGING ASTHMA IN YOUTHS ≥12 YEARS OF AGE AND ADULTS**



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