Asthma Management of Pediatrics

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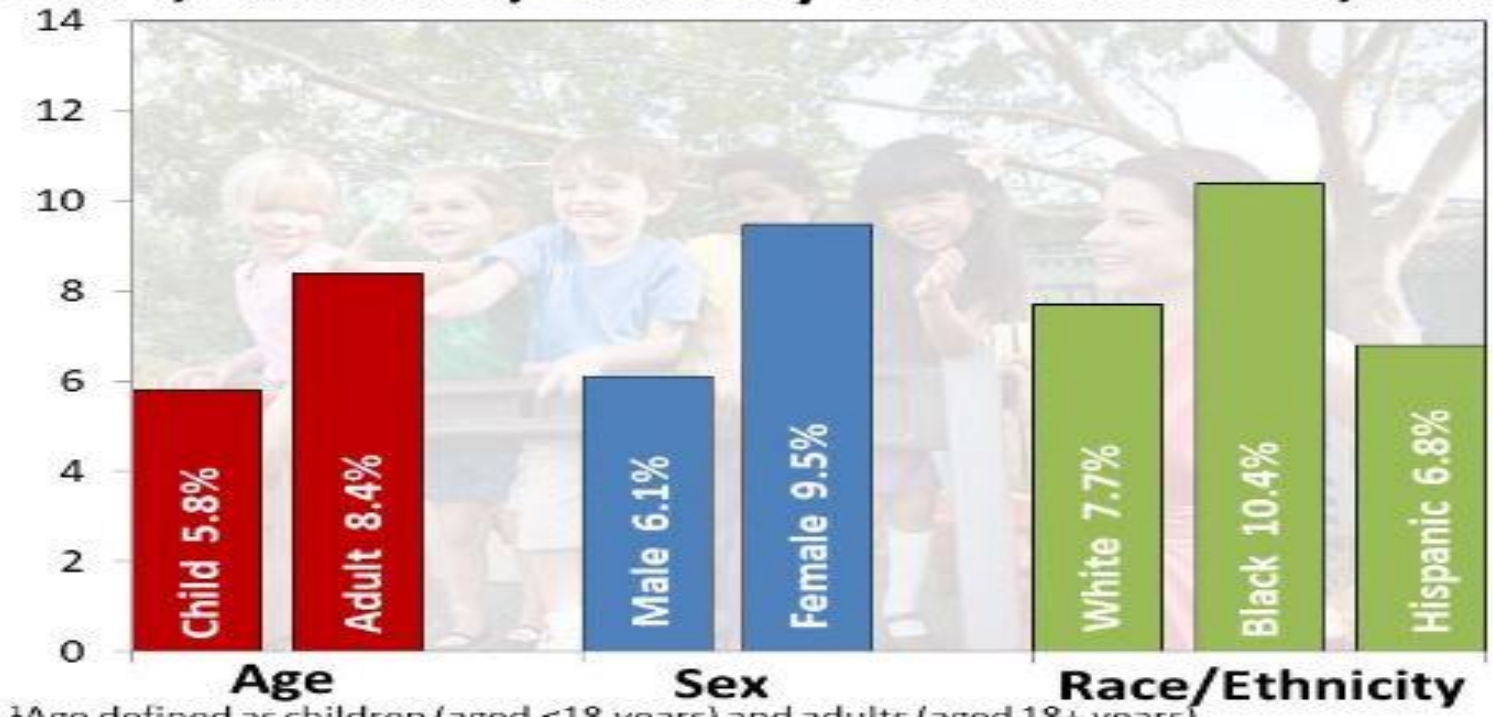
Objectives

- Prevalence of asthma in children
- Identify pediatric patients with asthma or at risk for asthma
- Assess severity of asthma
- Medical management using stepwise approach
- Identify aggravating or precipitating factors
- Understand necessity for parental and patient education

Percentage of People With Current Asthma by Age[1], Sex[2,3], and Race/Ethnicity[3]: United States, 2020

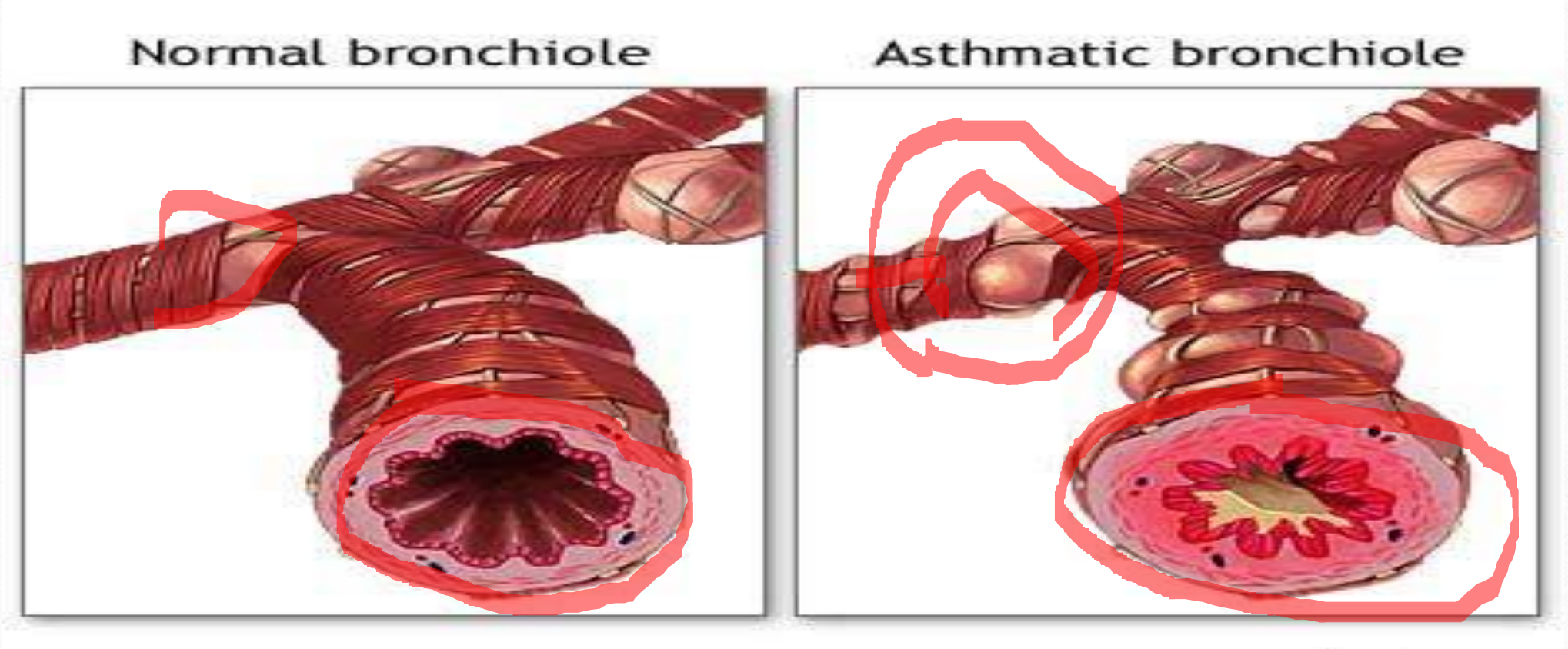


[1]Age defined as children (aged <18 years) and adults (aged 18+ years)
[2]Sex is defined as persons who answered "male" or "female" to the question "Are you male or female?"
[3]Sex and race/ethnicity include all ages
Source: National Health Interview Survey, National Center for Health Statistics, Centers for Disease Control and Prevention

What is asthma?

- Asthma is a *chronic* disease characterized by increased *responsiveness* of the airways to various stimuli and manifested by widespread *obstruction*, which *changes* in severity either spontaneously or as a result of therapy
- Usually associated with airflow obstruction within the lung
- Reversible either spontaneously or with treatment

Inflammation



DIAGNOSING ASTHMA IN CHILDREN

Consider asthma if…

- Patient has recurrent coughing, wheezing, shortness of breath, or chest tightness relieved by a bronchodilator
- Parental history
- Atopic dermatitis
- >12% increase in FEV_1 post-bronchodilator on spirometry
- Conditions such as aspiration, GERD, airway anomaly, foreign body, cystic fibrosis, vocal cord dysfunction, etc have been ruled out

Cough or Asthma?

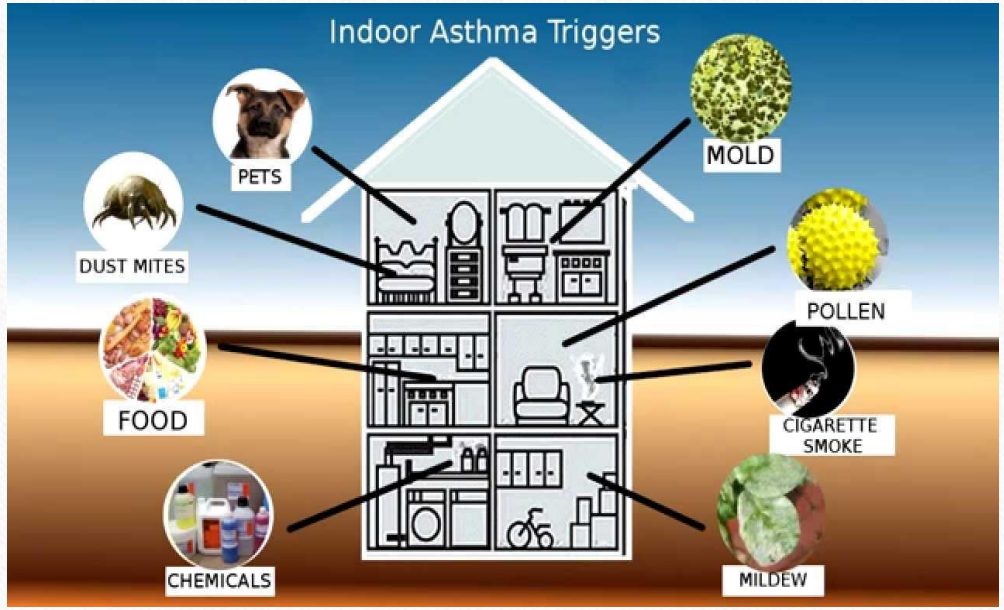
- Consider asthma in children with:
  - Nocturnal awakening because of cough
  - Cough that is associated with exercise/play
  - Cough without wheeze is often not asthma

All that wheezes may not be asthma

- Wheezing with upper respiratory infections is very common in small children, but:
  - Many of these children will not develop asthma
  - Asthma medications may benefit patients who wheeze whether or not they have asthma
  - RSV infection often results in wheezing

Triggers

- **Infections**: viral respiratory illness (rhinovirus, influenza, RSV, parainfluenza, and sinus infections
- **Allergens**: seasonal allergens, indoor allergens, pets
- **Irritants**: cigarette smoke, wood smoke, other pollutants, weather changes



What are our roles as caregivers?

- Identify patients with asthma or a high likelihood of developing asthma
- Current medication management guidelines and strategies for prevention
- Educate patients and parents on recognition of symptoms, appropriate use of medications, and tools that may be used to track progress or assess control
  - (e.g. peak flow meters, asthma control tests)
- Ensure patient and parental understanding of diagnosis of asthma, management of asthma (maintenance therapy as well as relief of acute symptoms)

Asthma exacerbations and severity

- Ranges in severity
  - Intermittent
  - Mild persistent
  - Moderate persistent
  - Severe persistent

Asthma classification

Mild intermittent	daily symptoms < 2/week night symptoms < 2/month
Mild persistent	daily sx >2 per week but < daily night > 2/month
Moderate persistent	daily symptoms sx > 2x / week affect activity night symptoms > 1/week
Severe persistent	continuous symptoms limited activity

Treatment

Mild intermittent	albuterol prn
• Mild persistent	low dose inhaled corticosteroid or Singulair© albuterol prn
Moderate persistent	low to medium dose inhaled corticosteroid and long acting beta2-agonist
Severe persistent	high dose inhaled corticosteroid and long acting beta2-agonist consider daily po corticosteroids

QUICK GUIDE TO ASSESSING SEVERITY: Persistent versus Intermittent

Consider diagnosis of persistent asthma if…

- symptoms greater than 2 days per week
- night awakenings greater than 2 times per month secondary to asthma
- patients require more than 2 steroid bursts per year
- FEV_1 <80%
- If the child is greater than **5 years** old and FEV_1/FVC <80%
- If the child is between **8-19 years** of age and the FEV_1/FVC <85%

ASSESSING CONTROL
"Well-controlled" asthma

- Daytime symptoms less than 2 days per week
- Night awakenings secondary to asthma less than 2 times per month
- Ability to perform activities without limitations
- Less than 2 steroid bursts per year
- FEV_1 greater than or equal to 80% predicted
- FEV_1/FVC 80% (>5 years old) and 85% (8-19 years old)
- *Consider "stepping down" regimen if patient has been well-controlled for 3 months or more consecutively and reassess every 3-6 months*
- *Refer to specialist if control can't be obtained in 3-6 months using step guidelines or if patient has 2 or more emergency room visits or hospitalizations in 1 year*

ASSESSING CONTROL
Considerations for why patients' asthma may not be controlled…

- Patient and /or parents are non-compliant or don't understand medication regimen
- Patient has not been educating on the appropriate techniques which increase efficacy of medications
- *Encourage patient compliance by taking time to educate them and their parents on how to effectively use nebulizers, spacers with and without masks, DPIs, twisthalers, peak flow meters, etc.*
- *Also, ensure asthmatic patients have an* asthma action plan *detailing which medications they should take and when they should use them*
- *A new asthma action plan should be given every 6 months or whenever a change in the medication regimen is made*

ASTHMA TREATMENT: Stepwise Approach[2]

Intermittent Asthma

- Step 1 (all ages):
- Short acting beta agonist (e.g. albuterol prn)
- *If symptoms greater than 2 days per week (other than exercise induced symptoms) patient is not well-controlled and the next step needs to be considered*

[2]***COLORADO CLINICAL GUIDELINES COLLABORATIVE: ASTHMA STEPWISE APPROACH*** pp 8

ASTHMA TREATMENT: Stepwise Approach[2]

Step 2 (all ages):

- Low-dose inhaled steroid (preferred) (Examples: Pulmicort, Flovent, QVAR, Asmanex)
- Leukotriene blocker (Example: Singulair)
- *If symptoms greater than 2 days per week (other than exercise induced symptoms) patient is not well-controlled and the next step needs to be considered*

[2]COLORADO CLINICAL GUIDELINES COLLABORATIVE: ASTHMA STEPWISE

ASTHMA TREATMENT: Stepwise Approach[2]

Step 3

- **Low-dose inhaled steroid + leukotriene blocker (ages 0-18)**

OR

- Medium-dose inhaled steroid + referral (ages 0-4)
- Low-dose inhaled steroid with long-acting beta agonist (ages 5-18)

OR

- Medium-dose inhaled steroid (ages 5-18)
- *For all ages, if step 4-6 required consult with a specialist*

[2]***COLORADO CLINICAL GUIDELINES COLLABORATIVE: ASTHMA STEPWISE APPROACH*** pp 8

Childhood Asthma Control Test for children 4 to 11 years.

How to take the Childhood Asthma Control Test

- Step 1 Let your child respond to **the first 4 questions (1 to 4)**. If your child needs help reading or understanding the question, you may help, but let your child select the response. Complete the remaining **3 questions (5 to 7)** on your own and without letting your child's response influence your answers. There are no right or wrong answers.
- Step 2 Write the number of each answer in the score box provided.
- Step 3 Add up each score box for the total.
- Step 4 Take the test to the doctor to talk about your child's total score.

19 or less

If your child's score is 19 or less, it may be a sign that your child's asthma is not controlled as well as it could be. No matter what the score, bring this test to your doctor to talk about your child's results.

Have your child complete these questions.

1. How is your asthma today?

 0 Very bad	 1 Bad	 2 Good	 3 Very good

2. How much of a problem is your asthma when you run, exercise or play sports?

 0 It's a big problem, I can't do what I want to do.	 1 It's a problem and I don't like it.	 2 It's a little problem but it's okay.	 3 It's not a problem.

3. Do you cough because of your asthma?

 0 Yes, all of the time.	 1 Yes, most of the time.	 2 Yes, some of the time.	 3 No, none of the time.

4. Do you wake up during the night because of your asthma?

 0 Yes, all of the time.	 1 Yes, most of the time.	 2 Yes, some of the time.	 3 No, none of the time.

SCORE

Please complete the following questions on your own.

5. During the last 4 weeks, how many days did your child have any daytime asthma symptoms?

5 Not at all	4 1-3 days	3 4-10 days	2 11-18 days	1 19-24 days	0 Everyday

6. During the last 4 weeks, how many days did your child wheeze during the day because of asthma?

5 Not at all	4 1-3 days	3 4-10 days	2 11-18 days	1 19-24 days	0 Everyday

7. During the last 4 weeks, how many days did your child wake up during the night because of asthma?

5 Not at all	4 1-3 days	3 4-10 days	2 11-18 days	1 19-24 days	0 Everyday

TOTAL

The answers below should not be added to the total score. These answers should be discussed with your child's doctor.

In the past 12 months, how many emergency department visits has your child had due to asthma (that did not result in a hospitalization)? _____

In the past 12 months, how many inpatient hospitalizations has your child had due to asthma? _____

Peak flows


Green Zone
(Safety)
personal best
Yellow Zone
(Caution)
personal best
Red Zone
(Danger)
personal best

Classifying Asthma Severity and Initiating Treatment in Children 0 to 4 Years of Age

Components of Severity		Classification of Asthma Severity (0–4 years of age)			
			Persistent		
		Intermittent	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 $beta_2$-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		
		← Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time. → Exacerbations of any severity may occur in patients in any severity category.			
Recommended Step for Initiating Therapy (See figure 4–1a for treatment steps.)		Step 1	Step 2	Step 3 and consider short course of oral systemic corticosteroids	
		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.			

Adapted from: National Asthma Education and Prevention Program. *Expert Panel Report 3 (EPR-3): Guidelines for the Diagnosis and Management of Asthma.* US Department of Health and Human Services. Available at: http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf. Accessed July 5, 2012

Classifying Asthma Severity and Initiating Treatment in Children 5 to 11 Years of Age

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 $beta_2$-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	• Normal FEV_1 between exacerbations • FEV_1 >80% predicted • FEV_1/FVC >85%	• FEV_1 = >80% predicted • FEV_1/FVC >80%	• FEV_1 = 60–80% predicted • FEV_1/FVC = 75–80%	• FEV_1 <60% predicted • FEV_1/FVC <75%
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 Therapy (See figure 4–1b for treatment steps.)		Step 1	Step 2	Step 3, medium-dose ICS option	Step 3, medium-dose ICS option, or step 4
				and consider short course of oral systemic corticosteroids	
		In 2–6 weeks, evaluate level of asthma control that is achieved, and adjust therapy accordingly.			

Assessing Asthma Control and Adjusting Therapy in Children 5 to 11 Years of Age

Components of Control		Classification of Asthma Control (5–11 years of age)		
		Well Controlled	**Not Well Controlled**	**Very Poorly Controlled**
Impairment	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 $beta_2$-agonist use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week	Several times per day
	Lung function • FEV_1 or peak flow • FEV_1/FVC	 >80% predicted/ personal best >80%	 60–80% predicted/ personal best 75–80%	 <60% predicted/ personal best <75%
Risk	**Exacerbations requiring oral systemic corticosteroids**	**0–1/year**	**≥2/year (see note)**	
		Consider severity and interval since last exacerbation		
	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.		
Recommended Action for Treatment **(See figure 4–1b for treatment steps.)**		• Maintain current step. • Regular followup every 1–6 months. • Consider step down if well controlled for at least 3 months.	• Step up at least 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.

Diagnosis of Exercise-Induced Bronchospasm (EIB) / Exercise-Induced Asthma (EIA)

EIA Therapy—General Principles

- EIA may reflect suboptimally controlled asthma
  - May require adjustment of overall therapy of asthma.
- Goal:
  - Facilitate normal activity levels, including competitive sports.
- Individualize therapy
- Child needs to understand and be a partner in therapy.

Diagnosis of EIB

- Normal PFT at rest
- No other stimulus for bronchospasm
- Most common in allergic rhinitis patients
- Diagnoses:
  - 10% decrease FEV_1 after 8 minutes of exercise at 90% maximum predicted heart rate
- Rx: B-agonist before exercise, LTRA daily (Leukotriene receptor antagonists)

Summary

- Childhood asthma can be controlled
- The patient and family must be objective about their care and do peak flows and other measures of compliance
- Step up and step down as needed for 3 months and then re-evaluate
- Let kids be kids
- Watch allergens and irritants

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