Advanced Asthma Management: WORKING WITH SUB-SPECIALISTS

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Today's Presenters

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Outline

- Role of the sub-specialist in asthma care
- Diagnostic testing in pediatric asthma
- Common co-morbidities and challenges
- Co-management

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Objectives

At the end of this session, participants will be able to:

1. Name three indications for referral of a pediatric patient with asthma to a sub-specialist.
2. Describe the role of allergy testing in children with asthma.
3. Explain to a family the value of spirometry and other pulmonary function testing.
4. Identify two common co-morbidities of asthma and one primary care management option for each.

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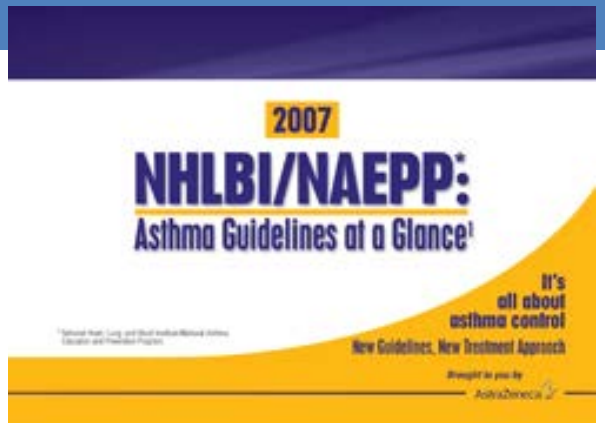
GIP Priority Messages



1. Assess asthma severity
2. Use inhaled corticosteroids
3. Assess and monitor asthma control
4. Control environmental exposures
5. Use asthma action plans
6. Schedule follow up visits

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Case #1: CJ

- 8 year old girl
- One month of cough, worse at night, keeps her up at least 3 nights/week
- Concurrent sx of allergic rhinitis
- PMH “chronic bronchitis”
- FH mom - childhood asthma
  brother - asthma
- SH new dog and cat in home

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What are your next steps?

A. Give trial of beta agonist
B. Take thorough history of cough, "bronchitis" diagnosis
C. Educate re possible environmental triggers
D. Consider starting allergy medications
E. Refer to a specialist for further evaluation

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4 months later…

- Trial of albuterol prn + daily nasal steroid & antihistamine → cough improves temporarily
- 2 ED visits for asthma exacerbations
- Rx ICS and montelukast with minimal improvement
- CJ thinks she is taking her inhaler correctly

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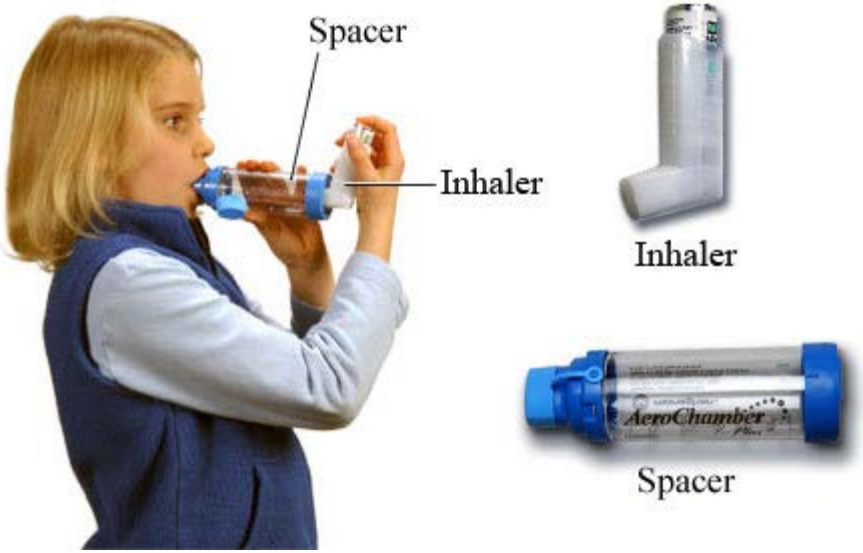
What can you do now?

A. Review with her the proper technique for taking her inhaler
B. Review with the family the asthma action plan
C. Instruct her to remove the cat and dog from the home
D. Tell her she is going to grow out of asthma and not to worry
E. Refer her to a pulmonologist and/or allergist



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Role of the General Pediatrician

1. Initiate treatment: inhaled steroids, beta-agonist

2. Identify co-morbid conditions
   - Allergic Rhinitis/Eczema
   - Reflux

3. Evaluate response

4. If not improving, consider:
   - Step up therapy (increase ICS, add montelukast)
   - Refer to Pulmonary Medicine and/or Allergy

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Role of Pulmonologist

- Evaluate/treat co-morbidities affecting airway
  - Allergic Rhinitis
  - Reflux
  - Sleep Apnea
- Assess Lung Function
  - Basic Spirometry
  - Complete PFTs
  - DLCO
  - Exercise PFTs
- Basic screening
  - Anatomical defects (imaging)
  - Genetic Diseases (Cystic Fibrosis)
  - Immune issues
  - Rheumatologic disorders
- Consider bronchoscopy
  - Visualize airway
  - Airway dynamics
  - Bronchoalveolar lavage

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Role of Allergist Immunologist

- Evaluate/treat co-morbid atopic disorders
  - Allergic rhinoconjunctivitis
  - Atopic dermatitis
  - Food allergy
- Assess aeroallergen sensitization
  - Skin prick testing
  - Intradermal skin testing (if indicated)
  - Education regarding allergen avoidance
- Consider starting allergen immunotherapy
- Consider starting immunomodulator (omalizumab, anti-IgE)
- Primary immunodeficiency evaluation
  - Recurrent or severe pulmonary infections

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When to refer?

- History of life-threatening asthma exacerbation
- Hospitalization or >2 courses of oral steroids in a year
- Child >5 years requiring step 4 care or higher or child <5 years requiring step 3 care or higher
- Uncontrolled asthma after three to six months of active therapy and appropriate monitoring
- Diagnosis of asthma is uncertain
- Other complicating co-morbidities (nasal polyposis, chronic sinusitis, severe rhinitis, allergic bronchopulmonary aspergillosis, vocal cord dysfunction, etc.)
- Additional diagnostic tests are needed (skin testing for allergies, pulmonary function testing, bronchoscopy)
- Patient may be a candidate for allergen immunotherapy

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National Asthma Education and Prevention Program: Expert panel report III: Guidelines for the diagnosis and management of asthma.(NIH publication no. 08-4051). Bethesda, MD: National Heart, Lung, and Blood Institute, 2007.

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Children 0 to 4 years of age

Intermittent asthma

Persistent asthma: daily medication
Consult with asthma specialist if step 3 care or higher is required.
Consider consultation at step 2.

Step 1

Preferred:
SABA PRN

Step 2

Preferred:
Low-dose ICS

Alternative:
Cromolyn or Montelukast

Step 3

Preferred:
Medium-dose ICS

Step 4

Preferred:
Medium-dose ICS + either LABA or Montelukast

Step 5

Preferred:
High-dose ICS + either LABA or Montelukast

Step 6

Preferred:
High-dose ICS + either LABA or Montelukast

Oral systemic corticosteroids

Step up if needed

(first, check adherence, inhaler technique, and environmental control)

Assess control

Step down if possible

(and asthma is well controlled at least 3 months)

Patient education and environmental control at each step

Quick-relief medication for all patients

- SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms.
- With viral respiratory infection: SABA q 4–6 hours up to 24 hours (longer with physician consult). Consider short course of oral systemic corticosteroids if exacerbation is severe or patient has history of previous severe exacerbations.
- Caution: frequent use of SABA may indicate the need to step up treatment. See text for recommendations on initiating daily long-term-control therapy.

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Children 5 to 11 years of age

Intermittent asthma

Persistent asthma: daily medication
Consult with asthma specialist if step 4 care or higher is required.
Consider consultation at step 3.

Step 1

Preferred:
SABA PRN

Step 2

Preferred:
Low-dose ICS

Alternative:
Cromolyn, LTRA, Nedocromil, or Theophylline

Step 3

Preferred:
EITHER:
Low-dose ICS + either LABA, LTRA, or Theophylline
OR
Medium-dose ICS

Step 4

Preferred:
Medium-dose ICS + LABA

Alternative:
Medium-dose ICS + either LTRA or Theophylline

Step 5

Preferred:
High-dose ICS + LABA

Alternative:
High-dose ICS + either LTRA or Theophylline

Step 6

Preferred:
High-dose ICS + LABA + oral systemic corticosteroid

Alternative:
High-dose ICS + either LTRA or Theophylline + oral systemic corticosteroid

Step up if needed
(first, check adherence, inhaler technique, environmental control, and comorbid conditions)

Assess control

Step down if possible
(and asthma is well controlled at least 3 months)

Each step: patient education, environmental control, and management of comorbidities.
Steps 2-4: consider subcutaneous allergen immunotherapy for patients who have allergic asthma (see footnotes).

Quick-relief medication for all patients

- SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed. Short course of oral systemic corticosteroids may be needed.
- Caution: Increasing use of SABA or use >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and the need to step up treatment.

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Case #2: Dan

- 10 year old boy
- Moderate persistent asthma based on impairment
- One significant exacerbation q 1-2 years
- Unresponsive to moderate-dose ICS and LTRA
- Mom and dad smoke, but only “outside”

Referral to pulmonologist initiated

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Before sending Dan to a specialist, what steps can you take?

A. In office technique training
B. Review asthma action plan with the family
C. Discuss environment triggers
D. Recommend that parents stop smoking
E. Nothing because referral was initiated

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Pulmonary Function Tests

- What are they?
  - Procedures that measure mechanical and functional aspects of the respiratory system
- Why do them?
  - Diagnostic tool
  - Determine/quantify extent of respiratory disability
  - Assess the reversibility of disease process
  - Assess effectiveness of treatment
  - Monitor the course of illness
  - Evaluation for surgery

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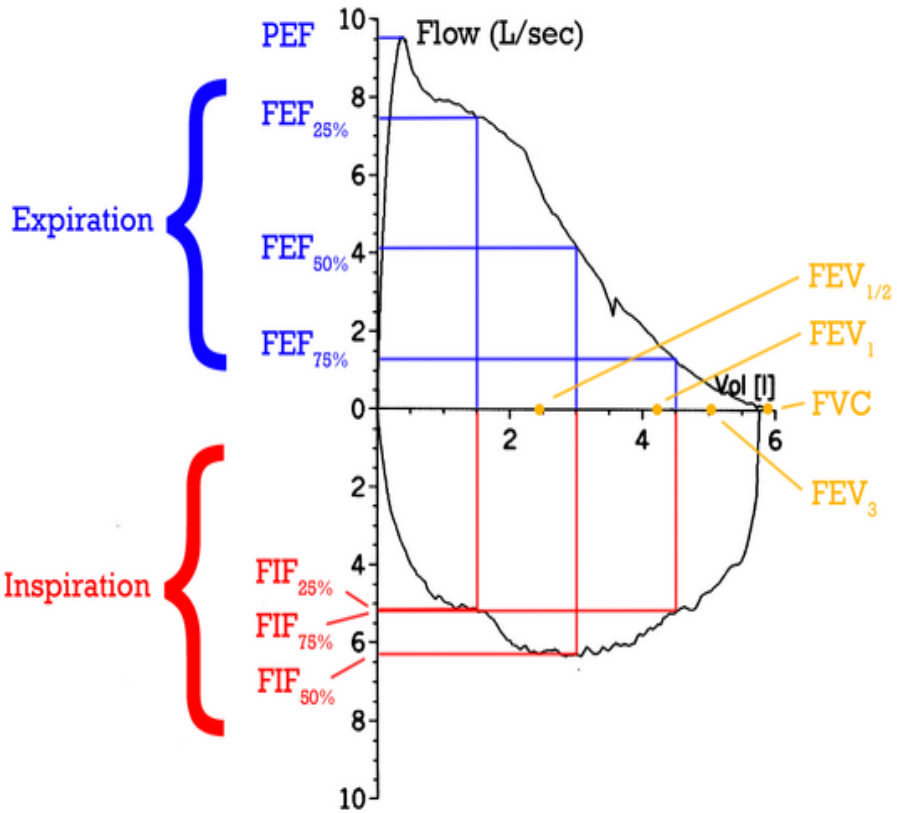
Spirometry

- Normal values
  - $FEV_1 \geq 85\%$ (pred)
  - $FVC \geq 80\%$ (pred)
  - $FEV_1/FVC \geq 80$
  - $FEF_{25\text{-}75\%} \geq 60\%$ (pred)
- PEFR – large airways
  - Effort dependent
- $FEF_{25\text{-}75}$ – smaller airways
  - Effort independent
  - Sensitivity for disease:
    - $FEF_{25\text{-}75} > FEV_1 > FVC$



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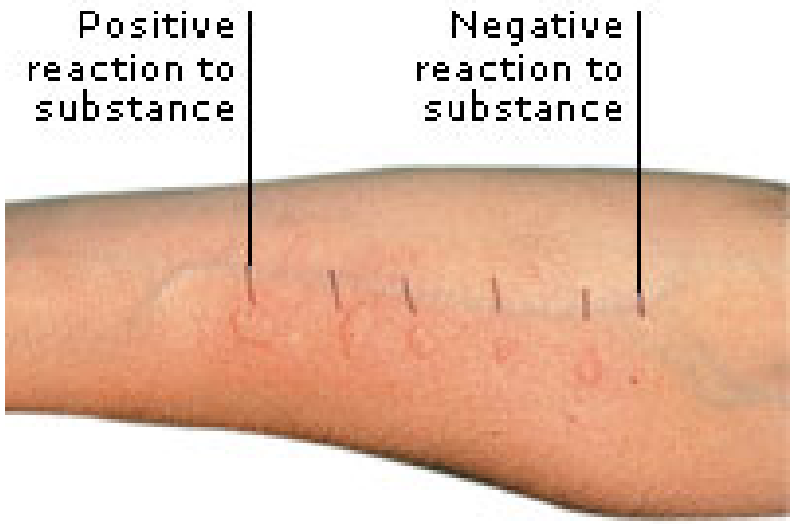
PFTs in Asthma

- Pre/Post bronchodilator spirometry
  - Always perform at initial visit
  - Perform at subsequent visits if improvement noted previously
- Exercise PFTs
  - Exercised induced symptoms with ? response to bronchodilator
  - Highly competitive athlete
- Methacholine/cold-air challenge
  - Normal pre-post bronchodilator spirometry
- Complete PFTs (with lung volumes)
  - Concern for restrictive lung disease
  - Persistently decreased FVC in spirometry

Skin Prick Tests

- Assess local IgE response in epidermis
- Source of allergen:
  - Commercially prepared extract
  - Some extracts are standardized in potency units (grass, dust mites, ragweed)
- H1 Antihistamines stopped 7 days prior to skin testing
- Wheal and flare response measured after 15 minutes
  - Positive = wheal $\geq$ 3mm after saline control subtracted



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Skin Prick Tests

- Allergens routinely tested in patients with persistent asthma and/or chronic rhinoconjunctivitis
  - Tree, grass, and weed pollens, with choices reflecting regional pollens
  - Molds, including Alternaria alternata, Penicillium notatum, Aspergillus fumigatus, and Cladosporium
  - Dust mites, including Dermatophagoides pteronyssinus and Dermatophagoides farinae
  - Animal danders, including cat pelt and dog epithelium
  - *Inner city environments*: cockroach, mouse, rat

- Contraindications:
  - Poorly controlled asthma, reduced lung function
  - Serum IgE testing may be performed (though less sensitive), and skin testing performed once asthma controlled

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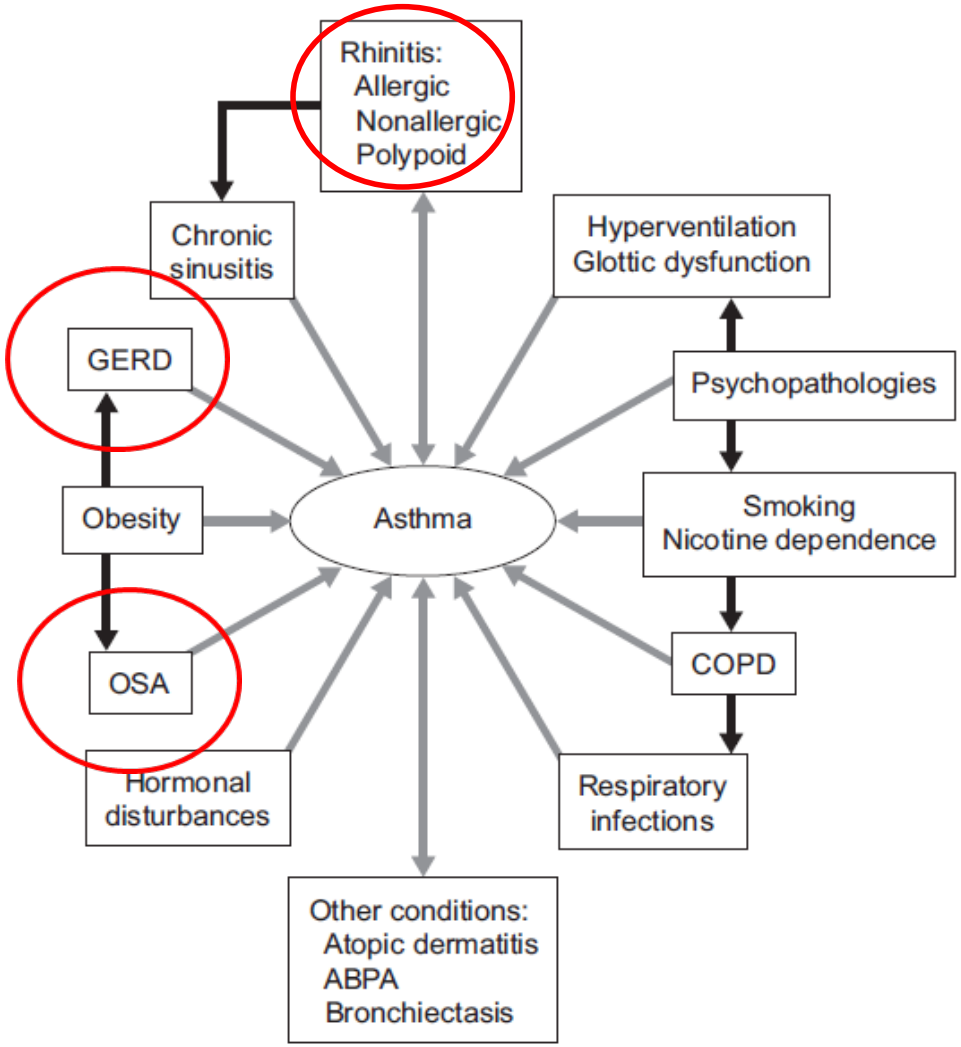
Asthma Co-morbidities



L-P. Boulet Eur Respir J 2009; 33: 897–906

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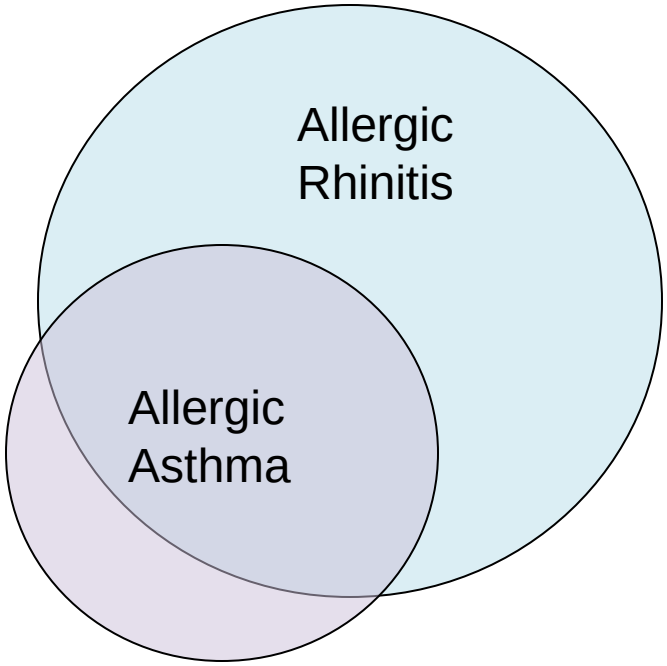
Allergic Rhinitis & Asthma



- 40% of patients with AR have asthma
- Up to 80% of asthmatics have AR
- AR is a risk factor for development of asthma
  - Tucson Study of Obstructive Lung Disease
  - Odds ratio (OR) for development of asthma in those with AR versus without AR = 2.59

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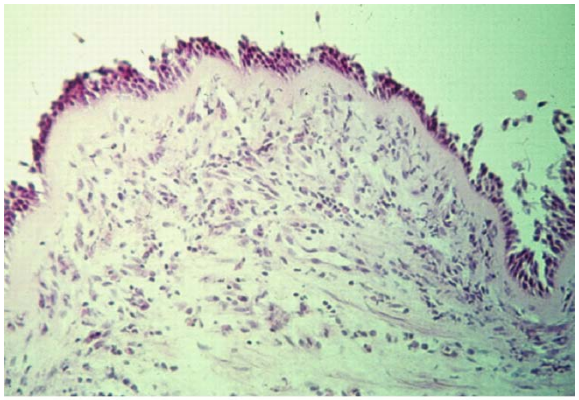
AR & Asthma: “One airway hypothesis”

- AR is often associated with ***nonspecific bronchial hyperreactivity*** on bronchial challenge (methacholine, histamine, or cold air)
- Patients with AR and no asthma show ***abnormalities of the lower airway*** (thickened reticular basement membrane, mucosal eosinophilia)



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AR & Asthma:
Effect of AR therapy on asthma

- Watson et al – RCT of AR treatment with intranasal steroid X 4 weeks in children with AR and asthma
  - Treatment group showed improvement in airway hyperresponsiveness (by methacholine challenge) and in asthma symptom scores

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Treatment: Subcutaneous Allergen Immunotherapy ("Allergy Shots")

- Indications for AIT:
  - Symptoms of allergic rhinitis, allergic conjunctivitis, allergic asthma, or any combination after exposure to aeroallergens **AND**
    - Demonstrable evidence of clinically relevant specific IgE **AND**
    - At least one of the following:
      - Poor response to pharmacotherapy, allergen avoidance, or both
      - Unacceptable adverse effects of medications
      - Wish to reduce or avoid long-term pharmacotherapy and the cost of medication
      - Coexisting allergic rhinitis and asthma
      - Possible prevention of asthma in patients with allergic rhinitis
- Practice Parameters for Allergen Immunotherapy
  - "AIT in children might *prevent* the new onset of allergen sensitivities or progression to asthma"
    - Follow-up study of 147 patients in AIT RCT 10 years prior showed OR=0.4 for asthma in those treated with AIT versus placebo

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Effectiveness of AIT

- Multiple placebo-controlled studies have demonstrated effectiveness of AIT for allergic rhinoconjunctivitis and asthma with following allergens:
  - Tree pollens (birch and mountain cedar)
  - Grass pollens (timothy and grass mixes)
  - Weed pollens (ragweed and Parietaria)
  - Animal danders (cat and dog)
  - Dust mites (Dermatophagoides pteronyssinus and D. farinae)
  - Molds (Alternaria and Cladosporium)
  - Cockroach
- Who benefits most?
  - Patients in whom allergen exposure clearly elicits symptoms
  - New-onset allergic asthma
- Contraindication – Severe or unstable asthma
  - Increased risk of systemic allergic reactions to AIT, including severe bronchospasm

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Case #3: Kai

- 14 years old, overweight
- 3 ED visits for asthma in past year
- “Can’t breathe at night”
- School performance declining
- On daily ICS+LABA x 2 years

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What would you do with this patient?

A. Assume because he is a teenager he is not taking his meds and not interested in school
B. Take a thorough history of nocturnal breathing issues, sleep location, etc.
C. Develop a weight management plan with family
D. Refer to a sub-specialist (which and why?)

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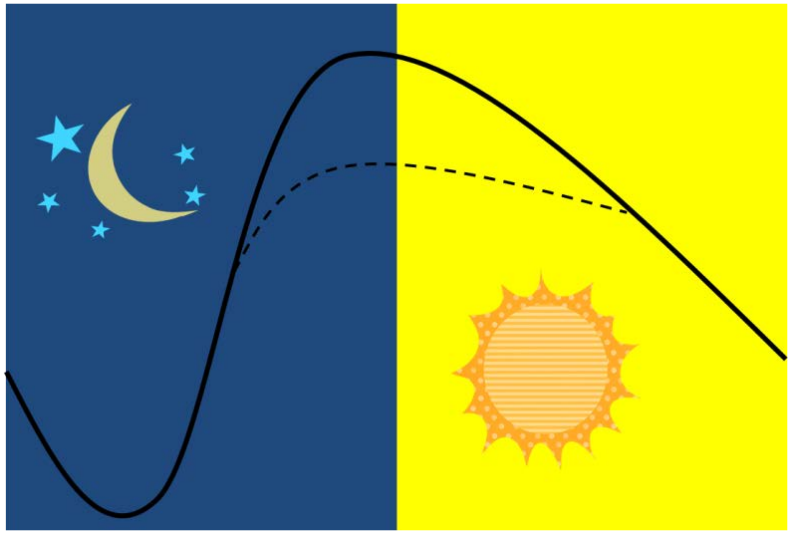
Nocturnal asthma symptoms disrupt sleep

- No definitive causal mechanism has been identified
- Circadian variation in endogenous cortisol
  - Cortisol trough coincides with peak nocturnal asthmatic symptoms
- Blunted natural cortisol peak in asthma
  - Glucocorticoid therapy: PM dosing improves lung function/decreased symptoms



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Nocturnal Asthma or Obstructive Sleep Apnea (OSA)?

Presenting complaints in OSA

- Frequent awakenings/restlessness
- Excessive daytime sleepiness ***OR*** hyperactivity
- 'Heroic' snoring/witnessed apnea
- Drooling/mouth breathing/grinding teeth
- Bedwetting

Asthma presenting as OSA

- Frequent awakenings
- Shortness of breath
- Cough
- Wheezing
- Poor quality sleep
- Decreased daytime performance

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Journal of Clinical Sleep Medicine, Vol.5, No. 1, 2009

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Treating OSA in Asthma

- Evaluate for
  - Allergic Rhinitis
  - Reflux
- Remove AR triggers from sleep environment
- Maximize asthma therapy (ICS)
- Treat reflux
- Consider montelukast
  - 'Step-up' asthma therapy
  - AR therapy
  - Tx for mild/moderate OSA
- Consider intranasal steroids
  - AR therapy
  - Tx for mild/moderate OSA
- Anticholinergic therapy
  - Vagus (cholinergic) mediated bronchoconstriction

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Gastroesophageal Reflux Disease (GERD)

- Common symptoms
  - Associated with feeds
    - Hiccupping/Belching
    - Irritability
    - Vomiting
  - Abdominal/throat pain (young children)
  - Heartburn (older children)
  - Food avoidance
  - Chronic nasal congestion ('nasopharyngeal reflux')
- Asthma/OSA symptoms:
  - Cough/wheeze
    - Usually soon after laying down
  - Frequent waking
  - Nocturnal irritability
- Medical therapy
  - Trial acid suppression
    - H_2 blocker
    - Proton pump inhibitor
    - Consider pro-motility agent

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When should I consider a polysomnograph?

- Not responding to medical therapy after 1-2 months
- Declining daytime performance
- Considering referral for surgical management (ENT)
- Consider referral to Pulmonary/Sleep clinic first
- AASM 2011 Practice Parameters:
  - PSG indicated in chronic asthma only if clinical suspicion for sleep related breathing disorder (Levels 3 and 4)*
  - Conflicting low level evidence of increased risk
  - Regular clinical screening for signs/symptoms OSAS

*Level 3: Retrospective, narrow spectrum, reference standard not applied by performer/interpreter of test
*Level 4: Reference standard not applied independently, expert opinion, descriptive case series

Courtesy of Dr. Judith Owens

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How would you co-manage each of these children?

CJ
- Asthma and AR
- Allergy referral for skin testing and recommendations

Dan
- Poorly controlled asthma
- Pulmonary referral for spirometry and r/o alternative dxs

Kai
- Poorly controlled asthma vs. OSA vs. AR
- Pulmonary +/- Allergy referral for dx testing

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PCP has primary role in education, support, and longitudinal care.

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Questions?

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