

# Asthma

An Evidence-Based Peer to Peer Presentation

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# Why this talk?

- My partner is one of the many organizers for this conference
- I was humbled when doing a “self-assessment” module for my family medicine boards last year
- The consensus statement from the Expert Panel Report 3 (EPR-3) is too long to expect all practitioners to read, came out in 2007
- There are some “gold standards” of treatment that I learned in residency training that no longer apply
- I have always wanted to say goblet cell hyperplasia in public

# What can you expect from this talk?

- A Pretest with followup explanations peppered through the talk
- A brief hx of asthma treatment through the ages (b/c I'm a liberal arts grad, nonscience major)
- A review of the 2007 Expert Panel Reports and an evaluation of evidence for some of the findings.
  - Demographics
  - Pathophysiology
  - Medical evaluation
  - Treatment – chronic as well as acute exacerbations

# What can you expect? (#2)

- An evidence-based review of answers from the pretest (factoids, myth busters and all-around fun – I hope!)
- A quick review of pertinent topic areas – I talk quickly and have a lot to cover!

# Disclosures

- No financial disclosures or conflict of interests
- Treatment of my shortness of breath with inhaler
- New found compassion for shortness of breath



# What I'm not:

- A pulmonologist
- An allergist
- An asthma expert
- A pharmacologist
- A pathologist
- A researcher

I'm not better or different than you (probably a little more up to date?)

# Challenges Inherent in Caring for College Students with Asthma

- Compliance issues
- Categorization
- Fractured care
- High exposure to illnesses
- Environmental control (Dust mite control? Really?)
- Low immunization rates typically
- Peak flow measurements
- Medication costs

# Awesome things about college students

- “Captive” audience
- Follow up appointments
- Resources
- Bright/teachable/receptive
- Ease of follow up
- Generally healthy
- Usually have insurance
- We usually have EHRs that can help us with quality of care – built in assessments for asthma care and exacerbations

# Pre Test

1) All of the inflammatory mechanisms of asthma can be reversed by inhaled corticosteroids

**FALSE**

2) To know how well asthma is controlled peak flows are a must

**FALSE**

3) All steroid inhalers are all the same and they are very affordable

**FALSE**

4) Steroid inhalers work very quickly, usually within a day or two.

**FALSE**

5) Asthmatics with an exacerbation need antibiotics, nebulizer treatment, and need their inhaled steroids doubled

**FALSE**

# Pretest (cont)

6) Everyone needs to be on a combined steroid/LABA

**FALSE**

7) Exercise induced asthma must be treated with pre-participation albuterol

**FALSE**

8) Comorbid conditions are not important to treat to achieve good asthma control

**FALSE**

9) Cockroaches are good for asthma sufferers

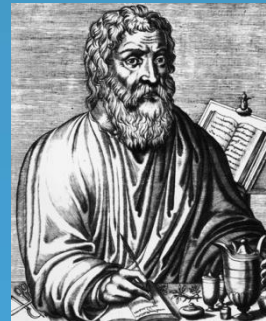
**FALSE**

10) Beer and advil can't make asthma worse

**FALSE**

# History of Asthma

- The term asthma comes from the Greek verb aazein – to pant, to exhale with the open mouth or sharp breath.
- Ancient Egyptian remedy on the Georg Ebers Papyrus. One of the remedies consisted of heating a mixture of herbs on bricks and inhaling the fumes.
- Hippocrates (450 BC) named and described the medical disorder.



# Hx of asthma (cont)

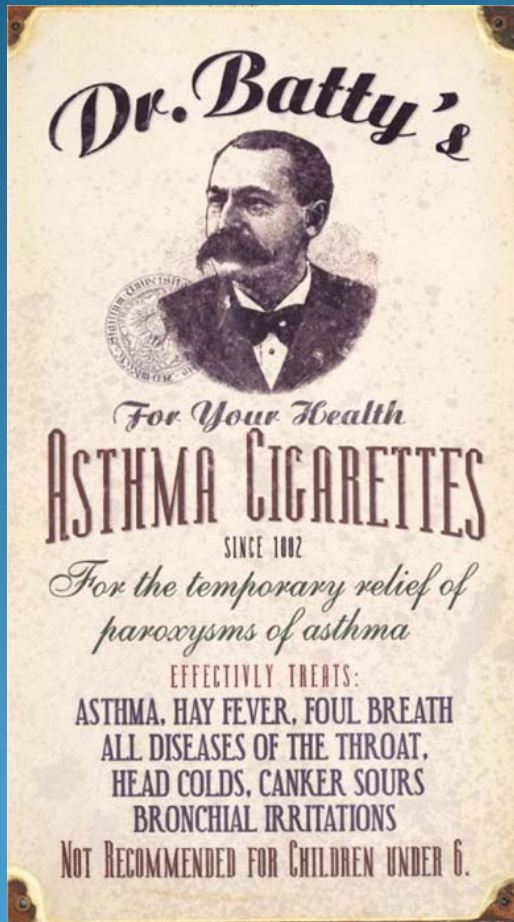
- 1698 One of the first Western medical textbooks, John Floyer described an acute asthma attack as “laborious respiration with lifting of the shoulders and wheezing.”
- 1896 Stedman’s “Twentieth Century Practice”, Sir Thomas Granger Steward and George Alexander Gibson wrote the following

“The treatment of asthma involves the treatment of the patient during fits and between the fits. The general indications are:

- 1) To allay the spasm during the paroxysm
- 2) To find out and remove the exciting cause
- 3) To treat complications and sequelae”

(Rescue treatment, controller treatment and prevention! Sound familiar?)

# History of asthma continued



Belladonna Alkaloids with  
bronchodilator properties

Relaxes smooth muscle

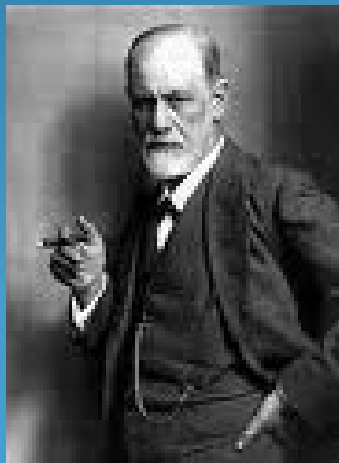
Early 20<sup>th</sup> century

# Asthma History Continued

- Methyl Xanthines Coffee! Aminophylline 1914, Theophylline
- Adrenergic Bronchodilators 1910 Lancet Adrenalin chloride injected subq/ epi and later nebulized and then inhaler
- Oral corticosteroids 1940s and later inhaled corticosteroids

# History (cont) A Diversion

- 1930s-50s Asthma was considered as being one of the “holy seven” psychosomatic illnesses. Etiology considered to be psychological. The asthmatic wheeze was interpreted to be the “suppressed cry of the child for its mother”.



**WHOOOPS!**

The others of the “holy seven”: HTN, RA, peptic ulcer, neurodermatitis, ulcerative colitis, thyrotoxicosis.

# History (cont)

- Specifically targeted asthma treatments began in 1960s and continues today
  - Nedocromil/cromolyn (mast cells)
  - Leukotriene modifiers
  - Anti Ig-E
- Inflammation theory 1960s

Advancing theories and knowledge since then. Better understanding of the inflammation cascade and that the primary problem with asthma is that it is an inflammatory process.

# Summary of history

We've come a long way in treatment and understanding of this fairly common and chronic condition!

# Asthma Demographics

- # of adults with asthma in U.S. 16.4 mil (7%)
- # of children with asthma in U.S. 7 mil (9.5%) and increasing (some estimates of up to 25% among urban kids)
- 5/10/06 Asthma is declared the most common chronic childhood disease
- # of visits with asthma as primary diagnosis 13.3 mil
- Mortality about 4000 per year
- Deaths per 100000 population 1.1

CDC stats from current website 9/2010

# Demographics (the upside)

- The number of deaths due to asthma has declined, even in the face of an increasing prevalence of the disease (NHIS 2005)
- Fewer patients who have asthma report limitations to activities

# Goal for Therapy for Asthma – The Whole Point

- **Reduce Impairment**

- Prevent chronic and troublesome sx's (coughing or breathlessness)
- Maintain (near) normal pulmonary function
- Maintain normal activity levels

- **Reduce risk**

- Prevent recurrent exacerbations of asthma
- Prevent progressive loss of lung function
- Provide optimal pharmacotherapy with minimal or no adverse effects

# Quality of Life

Better lung function OR less symptoms??

**LESS SYMPTOMS**

# Diagnosis

19 yo woman comes in with chief complaint of nighttime coughing awakening her from sleep 2 times per month for the past 2 months, occasional wheezing during the day, worse with exercise, a couple of times per week. No current illness. ROS is otherwise completely negative.

**DOES SHE HAVE ASTHMA?**

No hx of wheezing illness. No seasonal allergies, no atopy. No family hx of asthma. No smoking (not even “socially” on the weekend). No other comorbid conditions.

**DOES SHE HAVE ASTHMA?**

# Diagnosis (cont)

Exam is completely normal.

**DOES SHE HAVE ASTHMA?**

Peak Flows normal.

**DOES SHE HAVE ASTHMA?**

**DOES IT MATTER?**

**YES**

Severity	Daytime Symptoms	Nighttime Symptoms	Lung Fxn (Peak flow rate [PEF] or FEV <sub>1</sub> )	Long-term control >5 years old
Mild Intermittent	≤2 d/wk Exacerbations brief	≤ 2 nights/mo	≥ 80% pred PEF variability <20%	No daily med Monitor inhaler use
Mild Persistent	>2/wk but <1/d Exacerbations may affect activity	>2 nights/mo	≥80% pred PEF variability 20-30%	Low-dose inhaled steroids (alt cromolyn or LTR)
Moderate Persistent	Daily use SABA; exacerbations > 2/week, affects activity	> 1 night/wk	61-80% pred >30% PEF variability	Low to med dose inhaled corticosteroids AND LABA
Severe Persistent	Continual	Frequent	≤ 60% pred PEF variability > 30%	High-dose inhaled steroids and LABA

19 yo woman comes in with chief complaint of nighttime coughing awakening her from sleep 2 times per month for the past 2 months, occasional wheezing during the day, worse with exercise, a couple of times per week. No current illness.

Data from the case:

- > 2/week daytime sxs
- > 2 nights/mo nighttime sxs
- normal PEF
- not ill
- no other medical reasons for symptoms

# Diagnosis (cont)

What's the treatment?

Prn Albuterol?

Mild Persistent Asthma = Inhaled Corticosteroid

What's my point? Asthma is a clinical diagnosis!!  
Inflammatory treatment is the cornerstone of therapy.

# Dx of asthma

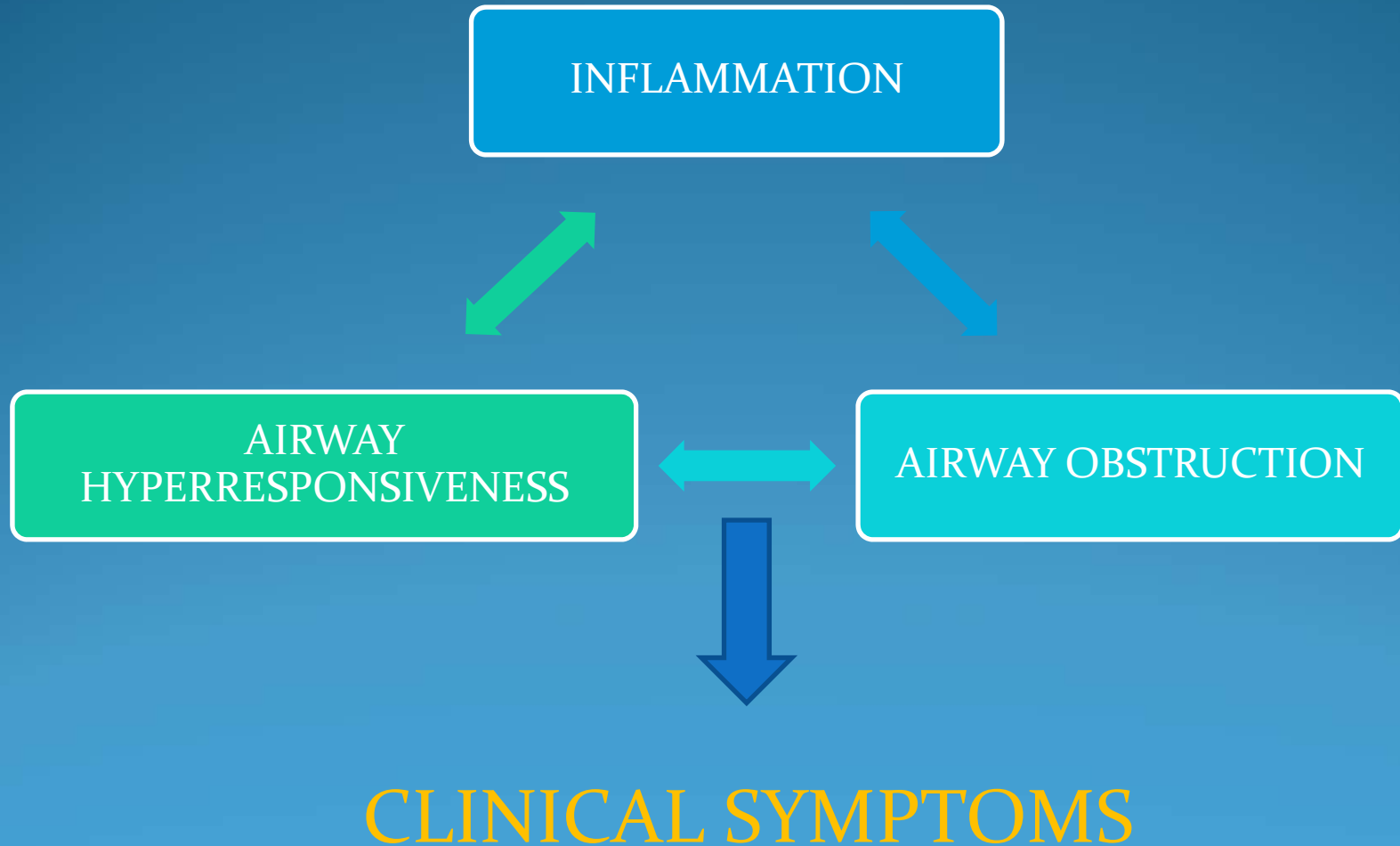
- Episodic symptoms of airflow obstruction are present.
- Airflow obstruction is at least partially reversible.
- Alternative diagnoses are excluded.

## Is spirometry necessary?

No.

It can help in categorizing asthma and optimizing treatment if asthma is more severe or resistant to treatment. However, most of our students have mild asthma. Spirometry is recommended by EPR<sub>3</sub>.

# Pathophysiology



# Pathophysiology

- Mediators: T helper cells (Th<sub>1</sub>, Th<sub>2</sub>), Histamine, leukotrienes, GM-CSF, IL-4, IL-5, IL-9, IL-13, mast cells, TNF- $\alpha$
- Basically – allergic inflammation promotes rapid contraction of airway smooth muscle. Then pro-inflammatory proteins are activated which then mediate both acute and chronic inflammation.

# Pathophysiology (cont)

Current theories (at least in 2007) postulate that the allergic inflammation in asthma arises from an imbalance between Th1 and Th2 cells. Th2 are the destructive cascade mediators. They release cytokines which promote eosinophil growth and migration as well as mast cell differentiation and IgE production. Inhaled antigens activate mast cells and Th2 cells in the airway, causing release of histamine and cysteinyl leukotrienes (including leukotriene C<sub>4</sub>), leading to a rapid contraction of airway smooth muscles.

Th1 produces cytokine interferon-gamma which inhibits the synthesis of IgE and the differentiation of precursor cells to Th2. Also theorized that a relative deficiency of interferon-gamma induces the Th2 cytokine pathway and promotes allergic inflammation responsible for asthma.

WHEW – say that fast 10 times!

# Illustration of TH1/TH2



THelper<sub>1</sub> Cell  
“Good Guy”



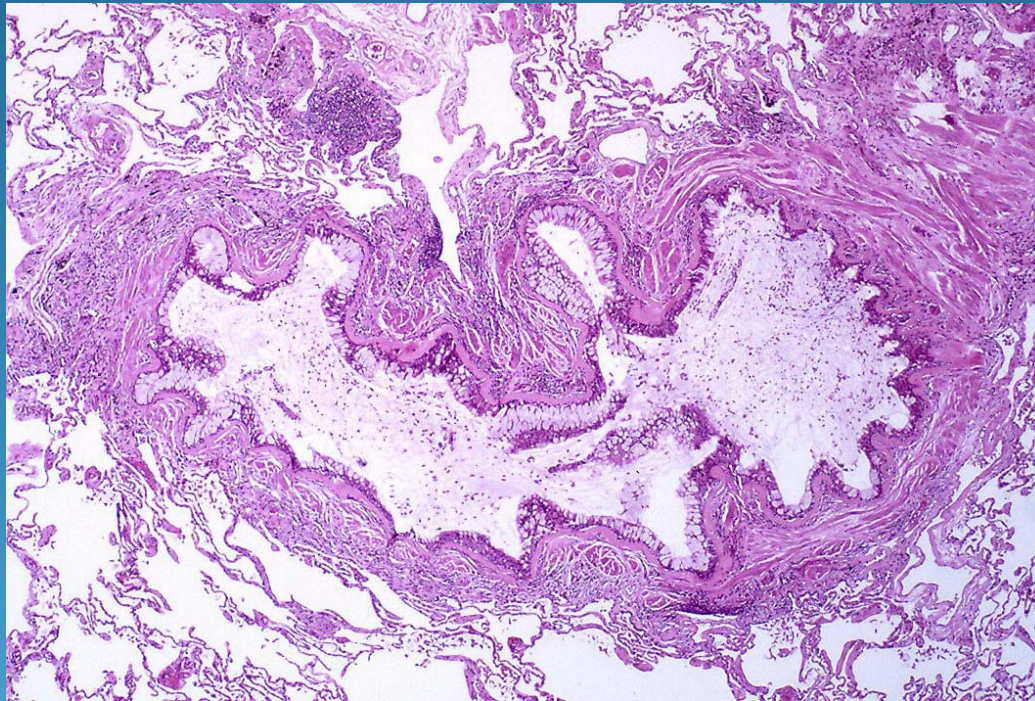
THelper<sub>2</sub> Cell  
“Bad Guy”

# Pretest #1

- 1) All of the inflammatory mechanisms of asthma can be reversed by inhaled steroids

FALSE

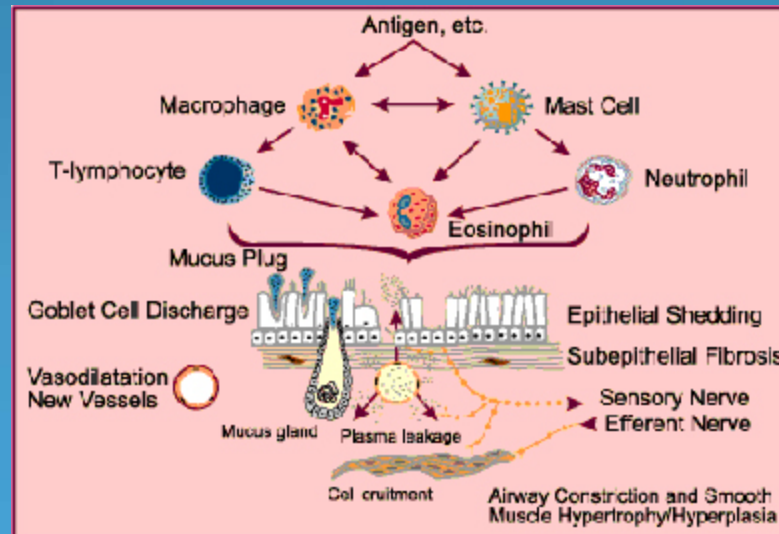
# Asthmatic acute and chronic changes to bronchiole



Obstruction of lumen of bronchiole by mucoid exudate  
Goblet cell metaplasia  
Epithelial basement membrane thickening  
Severe inflammation of bronchiole

# Potentially irreversible airway remodeling

- Subepithelial collagen deposition
- Smooth muscle hypertrophy
- Microvascular hypertrophy
- Goblet cell hyperplasia



# Incomplete Reversal – Good RCTs

Findings of these studies can be summarized by the following: **Most** of the inflammatory processes of asthma are reversible, but **not all in all people**. The smooth muscle wall remodeling in some people does not respond to antiinflammatory treatments.

Bateman et al 2004, O'Byrne and Paraneswaran 2006, Holgate and Polosa 2006

# The Evolution of Expert Panel Reports

- Consensus statements from the National Asthma Education and Prevention Program (NAEPP)
- EPR 1 – 1991
- EPR 2 1997
- EPR 2 update 2002
- EPR 3 2007\*\*

\*\*Available in download PDF format from the website:  
[www.nhlbi.nih.gov/guidelines/asthma/index.htm](http://www.nhlbi.nih.gov/guidelines/asthma/index.htm)

# Evolution of EPRs

- Use of **objective measures** (including patient symptoms) of lung function to assess the severity of asthma and to monitor the course of therapy
- **Environmental control** measures to avoid or eliminate factors that precipitate asthma symptoms or exacerbations
- **Patient education** that fosters a partnership among the patient, his or her family, and clinicians
- **Comprehensive pharmacologic therapy** for long-term management designed to reverse and prevent the airway inflammation characteristic of asthma as well as pharmacologic therapy to manage asthma exacerbations

# SORT Criteria

- Strength of Recommendation Taxonomy
- Evidence-grading scale
- 2004, AAFP
- PRIMARY CARE!
- Patient-oriented recommendations instead of only disease- oriented or focused

# SORT Criteria (Strength of Recommendation Taxonomy)

**Evidence Category A:** Randomized controlled trials (RCTs), rich body of data.

**Evidence Category B:** RCTs, limited body of data.

**Evidence Category C:** Nonrandomized trials and observational studies.

**Evidence Category D:** Panel consensus judgment.

# SORT example

Example : While a number of observational studies suggested a cardiovascular benefit from vitamin E, a large, well-designed, randomized trial with a diverse patient population showed the opposite. The strength of recommendation against routine, long-term use of vitamin E to prevent heart disease, based on the best available evidence, should be A.

**Evidence Category A:** RCT, rich body of data.

# EPR 3 Key Recommendations for Practice – Chosen by Me

1) Managing asthma long term (Evidence A)

Reducing impairment

Reducing risk

2) Step up/down (Evidence A)

3) Inhaled Corticosteroids (Evidence A)

Just mentioning the following findings:

- Written action plans (Evidence B)
- Patient education about inadequate control (Evidence C)
- Validated sx checklists exist and are useful in following control (Evidence C)

# Topics from the pretest

- Inhaled corticosteroids (Evidence A)
- Asthma exacerbation management – how to keep students out of the emergency room (Evidence A recommendations)
- LABA use (Evidence A)
- Exercise-induced bronchospasm (Evidence A treatment)
- Comorbid condition evaluation and treatment(B-D)
- Dust mites (A) & Cockroaches (B)
- Sulfite sensitivity (C) & Aspirin sensitivity (C)

# EPR 3 2007

- Number of pages = 417 (not including the table of contents BUT lots of pages of references)
- 56 individuals noted to be on the committee
- Using past EPR 2 and update in 2004 they divided up topic areas into 4 main ones:
  - 1) Assessment and monitoring
  - 2) Patient education
  - 3) Control of factors contributing to asthma severity
  - 4) Pharmacologic treatment

# EPR 3 (2007)

- What's different
  - Severity is determined by **CURRENT** impairment
  - Severity and control determines level of treatment
  - Current impairment and future risk guide treatment choices
  - 4 severity levels of chronic asthma
    - Mild intermittent
    - Mild persistent
    - Moderate persistent
    - Severe persistent

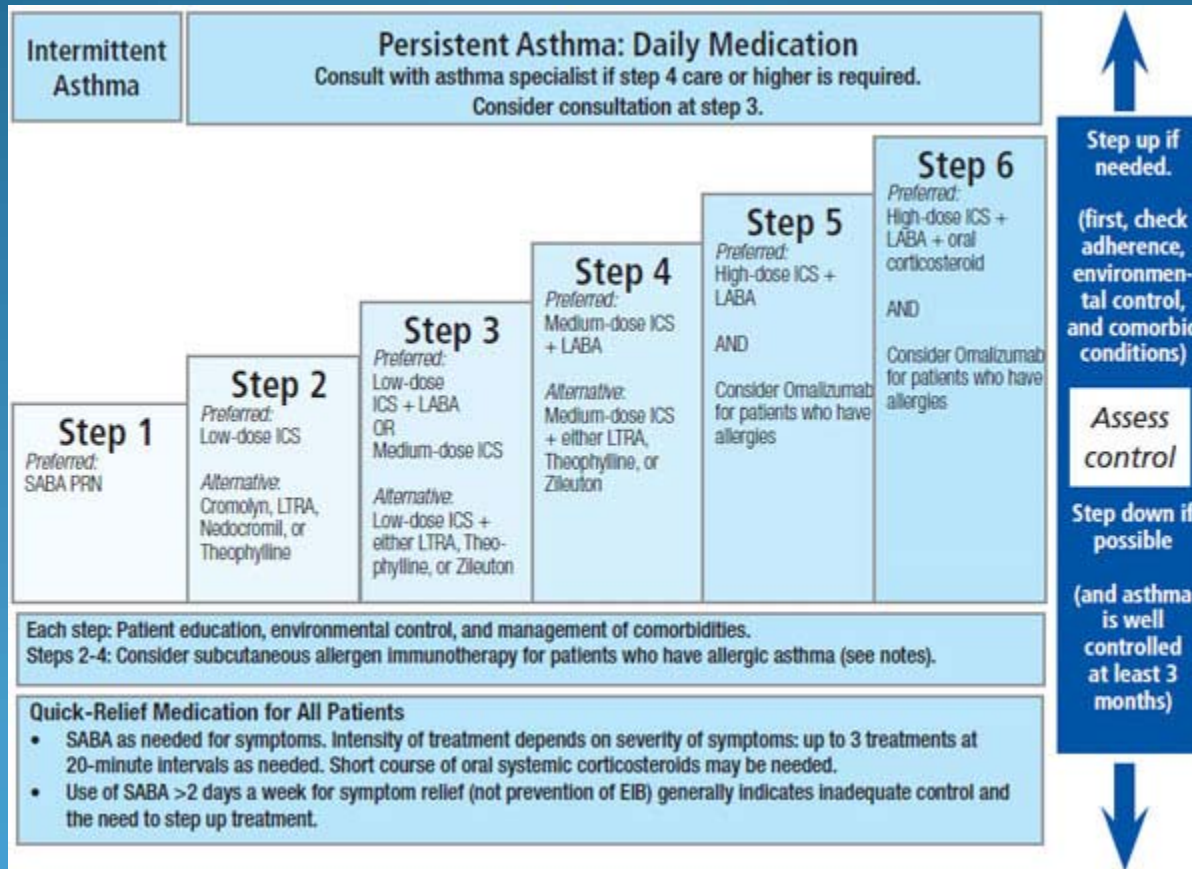
# Pretest #2

2) To know how well asthma is controlled peak flows are a must

FALSE

Severity	Daytime Symptoms	Nighttime Symptoms	Lung Fxn (Peak flow rate [PEF] or FEV <sub>1</sub> )	Long-term control >5 years old
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# Step Up/Down Chart



# SORT criteria

- Inhaled corticosteroids improve asthma control more effectively than any other single long-term controller medication.

## Evidence A

Randomized controlled trials (RCTs), rich body of data.

Pedersen S, O'Byrne P. A comparison of the efficacy and safety of inhaled steroids in asthma. *Allergy*. 1997; 52(39 suppl): 1-34

Hawkins G, McMahon AD, Twaddle S, Wood SF, Ford I, Thomson NC. Stepping down inhaled corticosteroids in asthma; randomised controlled trial. *BMJ*. 2003; 326(7399): 1115

Expert Panel 3 2007

# Pretest #3

3) All steroid inhalers are all the same and they are very affordable

FALSE

# Inhaled Corticosteroids

- The most effective long-term treatment for control of symptoms in all age groups
- Should be used with a spacer if possible or rinse mouth after use
- Can take up to **1-2 months** to achieve full benefit

More effective than leukotriene modifiers, long-acting beta-2 agonists, cromolyn or theophylline in improving

- Pulmonary Fxn
- Preventing symptoms and exacerbations
- Reducing the need for emergency treatment
- Decreasing deaths due to asthma

# Long Term Therapy (from FPM Jan/Feb 2010)

Drug	Low Daily Dose	Med Daily Dose	High Daily Dose
Fluticasone MDI 44,110,220 mcg/puff Flovent BID	88-284 mcg	264-660 mcg	>660 mcg
Budesonide DPI 200 mcg/inhal Pulmicort BID	200-600 mcg	600-1200 mcg	> 1200 mcg
Fluticasone/ salmeterol DPI 100, 250, 500 mcg/50 mcg Advair BID	100-300 mcg (fluticasone)	300-600 mcg (fluticasone)	> 600 mcg (fluticasone)

# Steroid strengths and bioavailability (FPM Jan/Feb 2010)

- Relative strengths:
  - Fluticasone (Flovent) > Budesonide (Pulmicort) = Beclomethasone (QVAR) > Flunisolide (AeroBid) = Triamcinolone (Azmacort)
- Systemic bioavailability (contributes to side effects):
  - 20% - Triamcinolone, Flunisolide and Beclomethasone; 11% - Budesonide; 1% Fluticasone

# Inhaled Steroids – Adverse Effects

- Oral candidiasis
- Dysphonia (hoarseness)
- Reflex cough and bronchospasm
- No clinically relevant changes occur in hypothalamic-pituitary-adrenal axis function at **low** and **medium** doses
- They cost a lot!!

# 2008 Medical Letter cost estimates for Some Inhaled Corticosteroids 1 month supply

Medication	Cost
Beclomethasone HFA MDI (QVAR)	71.25
Budesonide DPI (Pulmicort)	134.88
Fluticasone HFA/MDI (Flovent)	187.20/95.82
Mometasone DPI (Asmanex)	113.92
Triamcinolone (Azmacort)	145.20
Ciclesonide HFA (Alvesco)	139.08
Flunisolide MDI (AeroBid)	90.51

**WOW**

# True/False

- 1) Best choice for a 6 year old with mild persistent asthma is an inhaled corticosteroid
- 2) Best choice for an 18 year old with mild persistent asthma is an inhaled corticosteroid
- 3) Best choice for a pregnant woman with mild persistent asthma is an inhaled corticosteroids
- 4) Inhaled corticosteroids at a low dose do not cause any of the following:
  - Glaucoma
  - Bone loss
  - Growth reduction
  - Cataracts

# True/False (continued)

- Inhaled corticosteroids CAN prevent airway wall remodeling (we already talked about this!)
- During an asthma exacerbation doubling the inhaled corticosteroid dose may be of value

# Pretest #4

4) Steroid inhalers work very quickly, usually within a day or two.

FALSE

# Inhaled corticosteroids

Can take up to **1-2 months** to achieve full benefit

Not particularly helpful in acute exacerbations

# Pretest #5

5) Asthmatics with an exacerbation need antibiotics, nebulizer treatment, and need their inhaled steroids doubled

FALSE

# Treatment of Asthma Exacerbations at Home

- Summarizing EPR 3 results and recommendations
  - 1) Home treatment begins with peak flow measurements
  - 2) Increase the frequency of SABA (**Evidence A**)
  - 3) Initiate oral systemic corticosteroid treatment under certain circumstances (**Evidence A**)
  - 4) Doubling the ICS dose is not sufficient (**Evidence B**) [ see next page]
  - 5) Continue more intensive treatment for several days.
- For asthma exacerbations antibiotics are not helpful unless a bacterial infection is suspected! (**A**)

# The data on doubling inhaled steroids (Myth-Busting)

Flagship study: Lancet 2004 Harrison, et al

390 subjects with asthma who were at risk for exacerbation, monitored peak flows

When peak flows deteriorated or when increase in sxs, given either placebo or steroid inhaler; outcome was number of people starting prednisolone. Risk was 11% for steroid inhaler and 12% for placebo, statistically no difference.

Doubling the dose of inhaled corticosteroid to prevent asthma exacerbations: randomised controlled trial, TW Harrison, J Osborne, S Newton, AE Tattersfield. Lancet, Vol 363 (9405) Pgs 271-275

Current available data suggests that quadrupling the dosage of inhaled corticosteroids **may** be of value in mild to moderate exacerbations. Not enough data at this time to recommend.

# Pretest #6

6) Everyone needs to be on a combined steroid/LABA

FALSE

# Other pharmacologic management

Most common treatments for patients with asthma are as follows:

- 1) LABAs (last up to 12 hours)
- 2) Leukotriene modifiers (montelukast, zafirlukast, zileuton)
  - Montelukast = Singulair
  - Zafirlukast = Accolate
  - Zileuton = Zyflo ER (not readily available)
- 3) chronic oral corticosteroids (only for most refractory disease pts)

Others:

Immune Modulator/IgE antibody: Xolair for persistent allergic asthma (\$600/month). For moderate to persistent asthma that is not well controlled on an inhaled corticosteroid with or without LABA.

# Other pharmacologic treatment

Mast cell stabilizer: Cromolyn (nedocromil no longer available). Relatively ineffective compared to inhaled corticosteroids

Theophylline: rarely used for persistent asthma

Atrovent: has not been approved for use in asthma by FDA. Sometimes used acutely as an adjunct bronchodilator when albuterol itself is ineffective.

# What's upcoming?

Possibly new on horizon: Bronchial Thermoplasty (Aug 2010 Medical Letter). Severe persistent asthma. 3 trials: **modestly** effective in improving some asthma-related outcomes. Reduces smooth muscle mass/airway widening? 3 bronchoscopies 3 weeks apart. \$2500/catheter and a RF controller (\$30000) or leased.

# SMART trial

- 2006
- Large trial salmeterol or placebo was added to usual asthma treatment.
- 13 of 13176 salmeterol-treated patients died compared to 3/13179 of placebo-treated patients.
- Black box warning added about higher risk of asthma-related death for all products containing LABA.

Bottom line – combination treatment LABA + ICS is fine. LABA alone for mild persistent asthma– not so fine. (for now....)

# EPR3 Additional Findings (briefly)

- Written action plans (Evidence B)
- Patient education about inadequate control (Evidence C)
- Validated sx checklists exist and are useful in following control (Evidence C)

Important to know that EHRs can be helpful and that our patients are very educable!! But still EVIDENCE C for symptom checklists and patient education!!

# Validated Questionnaires

- **Asthma-Specific Quality of Life**

- Mini Asthma Quality of Life Questionnaire (Juniper et al. 1999a)

- Asthma Quality of Life Questionnaire (Katz et al. 1999; Marks et al. 1993)

- ITG Asthma Short Form (Bayliss et al. 2000)

- Asthma Quality of Life for Children (Juniper et al. 1996)

- **Generic Quality of Life**

- SF-36 (Bousquet et al. 1994)

- SF-12 (Ware et al. 1996)

Examples can be found on pages 80-81 in EPR<sub>3</sub>

# Questionnaires

Questionnaires generally ask about sxs for past 4 weeks; missing school or work; night sxs, SABA use, and about how well controlled they think their asthma is.

Some are available online. Most questions can be asked at a routine f/u visit, often aided by an EHR.

# Pretest #7

7) Exercise induced asthma must be treated with pre-participation albuterol

FALSE

# Exercise Induced Bronchospasm – Treatment Options

- Exercise may be the only precipitant of asthma sx's in some patients.
- Diagnosis criteria has been relaxed – history of cough, shortness of breath, chest pain or tightness or wheezing with exercise or activity suggests EIB.
- Management strategies recommended by EPR<sub>3</sub>
  - 1) Long-term control therapy, if appropriate (Evidence A)
  - 2) Pretreatment before exercise

# Pretreatment before exercise (cont)

- Inhaled beta2-agonists will prevent EIB in more than 80 percent of patients (**Evidence A**)
- SABA used shortly before exercise may be helpful for 2-3 hrs, LABAs can be protective for up to 12 hrs but frequent and chronic use of LABAs should be discouraged
- Leukotriene inhibitors can be helpful (**Evidence B**). Montelukast decreases exercise-induced bronchospasm in up to 50% with onset of action reported to begin as soon as 2 hrs after admin and persisting for up to 24 hours.
- Cromolyn taken shortly before exercise is another alternative (**Evidence B**)
- Warmup before exercise may reduce the degree of EIB (**Evidence C**)
- A mask or scarf over mouth in the cold may help (**Evidence C**)

# Pretest #8

8) Comorbid conditions are not important to treat to achieve asthma control

FALSE

# Comorbid conditions

- In patients with inadequately controlled asthma, chronic comorbid conditions should be considered.
  - Bronchopulmonary aspergillosis (Evidence A)
  - GERD (Evidence B)
  - Obesity (Evidence B)
  - Obstructive sleep apnea (Evidence C)
  - Rhinitis/sinusitis (Evidence B)
  - Chronic stress/depression (Evidence C)
- EPR 3 panel

# Comorbid conditions (cont)

- Not as simple as treat this and it gets better.
- Example of allergic rhinitis and asthma: Intranasal steroids and nonsedating antihistamines have been reported to decrease ED visits for asthma

Adams et al 2002; Corren et al. 2004; Crystal-Peters et al. 2002

# Comorbid conditions

Of adult patients who have asthma, approximately 5 percent have poorly controlled asthma, with frequent symptoms and exacerbations despite use of high-dose ICS

Little is known about why some patients who have asthma do not respond well to therapy. A high prevalence of comorbidity has been postulated in this group (Heaney et al. 2003).

# Obesity and Asthma

- Cross sectional design 1113 members of a large integrated health care organization, 35 years or older. Mini-Asthma Quality of Life Questionnaire, Asthma Therapy Assessment Questionnaire, and self-reported asthma-related hospitalization.
- Even after adjusting for demographics, smoking status, oral corticosteroid use, evidence of GERD and inhaled corticosteroid use, obese adults were more likely to report poor asthma-specific quality of life, poor asthma control and a history of asthma-related hospitalizations.

# Pretest #9

9) Cockroaches are good for asthma sufferers

FALSE



# Allergens and Asthma

Which of the following allergens is more likely to cause disproportionately higher asthma morbidity among inner-city residents?

Tree pollen

House Mite Allergen

Mold

Cat Dander

Cockroach Allergen

# Cockroaches are Bad

- Evidence: Rosenstreich, DL et al. The role of cockroach allergy and exposure to cockroach allergen in causing morbidity among inner-city children with asthma. NEJM 1997; 336(19) 1356-1363.
- RCT trial; 1992-1993, 476 kids ages 4-9 yrs, baseline and 1 year
- Allergic to cockroach allergen(36.8%), dust mite (35%), cat (22.7%). Highest levels of hospitalization for asthma were for those who had the highest exposure to cockroach allergen in their bedrooms and were allergic. Similar patterns were not found for the combination of allergy to dust mites or cat dander and high levels of the allergen.

# While we're talking about Cockroaches: Dust Mites

## Evidence A

- Encase the mattress in an allergen-impermeable cover.
- Encase the pillow in an allergen-impermeable cover or wash it weekly.
- Wash the sheets and blankets on the bed weekly in hot water.
- A temperature of  $>130^{\circ}\text{F}$  is necessary for killing house-dust mites.

**HOW LIKELY ARE OUR PATIENTS TO COMPLY WITH THIS?**

# Pretest #10

10) Beer and advil can't make asthma worse

FALSE

# Sulfite sensitivity

- Avoiding sulfite containing products may make some patients have less sx's (**Evidence C**). Consider in patients with severe persistent asthma
- Products that can contain sulfites are as follows:
  - Beer
  - Wine
  - Processed potatoes
  - Shrimp
  - Dried fruit

# Sulfites (cont)

- Added sulfites are more common in wine than beer. Sulfite formation can happen naturally as a result of fermentation
- Sulfites are used as a preservative fairly frequently and they inhibit browning and discourage bacterial growth
- FDA estimates that 1/100 people is sulfite-sensitive and that of that group 5% have asthma. Sulfites are required to be labeled on food products by FDA.

# Aspirin Sensitivity

- EPR recommends that clinicians query patient about possible bronchoconstriction by aspirin or NSAIDs (Evidence C)
- A syndrome that often includes rhinorrhea, nasal polyps, sinusitis, conjunctival edema and asthma following aspirin ingestion.
- As many as 20 percent of adults with asthma may have worsening with NSAIDs

# ASA sensitivity continued

- Alternatives that typically do not cause bronchospasm includes acetaminophen (7% cross reactivity), salsalate, or highly selective COX-2 inhibitor celecoxib.
- Cross reactivity can be seen with other NSAIDs including indomethacin, naproxen, ibuprofen, fenoprofen.
- Treatment of choice for patients with aspirin-induced asthma = leukotriene modifiers.

Drazen et al Treatment of asthma with drugs modifying the leukotriene pathway. NEJM 1999; 340(3) 197-206.

# Salsalate

- Weakly inhibits COX-1
- In the family of Non-acetyl salicylates
- Inexpensive (covered for \$4 or \$5 in most 1 month discount prescriptions)
- Use 2000 mg/d or less divided bid-tid (500's and 750's)

Information from UptoDate Revised 5/10

I was taught that this is a good medication to consider in elderly patients due to lower GI bleed risk and cheaper than COX-2 BUT I can't find a reference so it might be true and it might not be true – and we don't treat elderly patients (most of the time!)

# Risk Factors for Death from Asthma

- Asthma hx
  - Previous severe exacerbation (intubation or ICU admit)
  - Two or more hospitalizations for asthma in past yr
  - 3 or more ED visits for asthma in past year
  - Using > 2 canisters of SABA per month

# Risk Factors cont: Asthma Deaths

- Social Hx

Low socioeconomic status or inner-city residence

Illicit drug use

Major psychosocial problems

## Comorbidities

Cardiovascular dz

Other chronic lung dz

Chronic psychiatric dz

# Summary

- It's important to treat our patient's asthma well so that their life is happier.
- We have a receptive and interested patient population.
- Our patients typically have good resources (we're lucky).
- Immunize when able, discourage smoking, think about allergens, sulfites, address comorbid conditions as able, compliance particularly if pt's sx's seems refractory to usual treatment.

# Summary (cont)

- Inhaled corticosteroids are the cornerstone of good treatment of mild persistent asthma and above
- **Do** use symptoms as a way to measure control
- **Don't** double inhaled steroids for exacerbations
- **Don't** put everyone on oral steroids for exacerbations
- **Don't** put everyone on antibiotics for exacerbations
- **Do** look for treatable comorbid conditions
- **Don't** use LABAs alone

THANK YOU!

Questions?

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Wikipedia for some of the asthma history information