



Improving the Management of Asthma

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Objectives

At the conclusion of this program the participants will be able to:

1. Understand the stages of Asthma
2. Know the triggers of Asthma
3. Understand the basics of Asthma Management

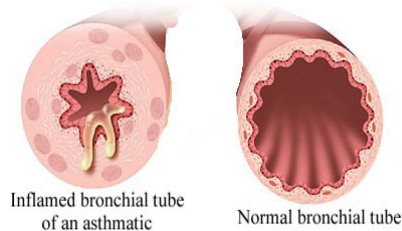
2

Clinical Review

- What is asthma?
 - A chronic lung condition characterized by:
 - Inflammation (swelling & constricting) of the airways
 - Increased sensitivity of the airways to a variety of “triggers” that make asthma worse
 - Airflow obstruction (tightening of the muscles or “Bronchospasm”) that is reversible to a significant degree
 - Remodeling

3

Clinical Review



4

Morbidity & Mortality

- CDC estimates
- 12,000 asthma related deaths occur annually
- 5,000 deaths due to asthma as the primary cause
- Approximately 7,000 cases have asthma mentioned on death certificate as a contributing factor
- African Americans die at a rate of two times higher than that of Caucasians and three times that of Hispanics

5

Morbidity & Mortality

- CDC estimates for children < 15 years of age:
 - 1.8 million asthma-related outpatient visits to emergency rooms in 2000 (more than 728,000 of these involve children under 18)
 - Accounts for 14 million lost school days annually
 - It is the leading cause of school absenteeism attributed to chronic conditions (3 times the rate of children without asthma)
 - 10.4 million asthma related outpatient visits to private MD offices and hospital clinics in 2000
 - 164,000 hospitalizations
 - 8.7 million prescriptions (under age 17)

6

Trends in Asthma Morbidity & Mortality

- Approximately 17 million Americans have asthma, of those 5 million are children
- 13.9 million outpatient visits to private physician offices and hospital clinics
- 3rd leading cause of preventable hospitalizations
- Accounts for \$8.1 billion in direct medical expenses and \$4.6 billion in indirect expenses

7

Trends in Asthma

- Third leading cause of hospitalization among children under the age of 15 and it is the first-ranking chronic condition
- Leading discharge diagnosis in children's hospitals
 - 15-30 percent of all patients discharged
- Financial Impact
 - Approaching \$2 billion a year in direct costs
 - Approximately \$1 billion a year in indirect costs

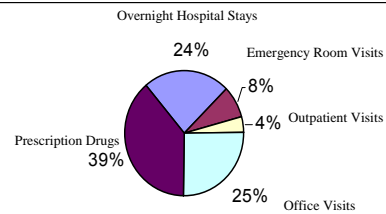
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Prevalence

- Estimated 5 million American children < 18 yrs. old
- Fastest growing segment for prevalence
 - 1980-1994
 - 160 percent, among children age 0-4
 - 74 percent, among children age 5-14
- 50-80 percent of children with asthma develop symptoms prior to age 5

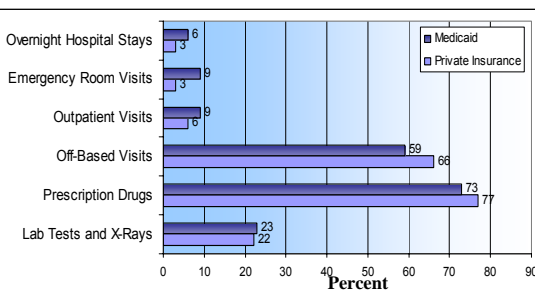
9

Proportion of Total Asthma-Related Expenditures for Children, by Type of Service, 1996



Note: Expenses for laboratory, x-ray and medical equipment services are included with expenditures for the site of service.
Source: Center on an Aging Society analysis of data from the 1996 Medical Expenditure Panel Survey.¹⁰

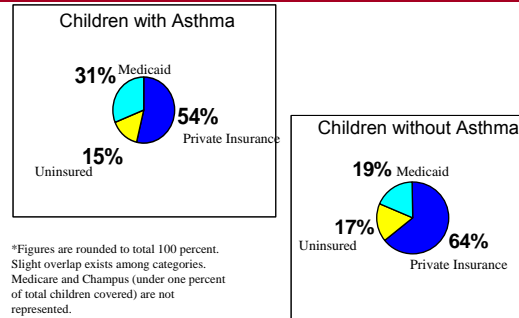
Health Service Use by Children with Asthma, by Insurance Type, 1996 (Use of Services two or more times in the past year)



11

Source: Center on an Aging Society analysis of data from the 1996 Medical Expenditure Panel Survey.

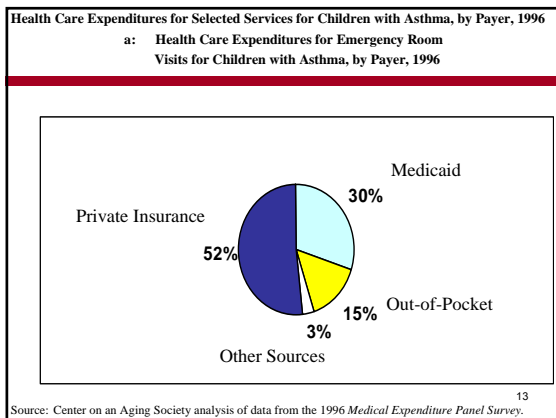
Insurance Coverage for Children with and without Asthma, 1996*



*Figures are rounded to total 100 percent. Slight overlap exists among categories. Medicare and Champus (under one percent of total children covered) are not represented.

12

Source: Center on an Aging Society analysis of data from the 1996 Medical Expenditure Panel Survey.



- ### Medicaid Issues
- Lack of consistent healthcare provider
 - Use of ER as primary medical contact
 - Prescriptions not filled
 - Prescription limitations such as co-pays, limited drug coverage for adults
 - Higher risk of exposure to triggers of asthma
 - Allergens
 - Tobacco smoke
- Source: Power Point Presentation Titled: Asthma in Medicaid A Medical and Sociologic Problem by David Tinkelman, MD, National Jewish Medical and Research Center

- ### Medicaid Sociologic Issues
- Lack of consistent healthcare provider
 - Lack of access to appropriate educational materials
 - Lack of access to newest medications
 - Lack of access to specialists
 - Insurance coverage changes
 - Crowding in homes
 - Cultural/language issues
- Source: Power Point Presentation Titled: Asthma in Medicaid A Medical and Sociologic Problem by David Tinkelman, MD, National Jewish Medical and Research Center

- ### Factors Associated with Onset of Asthma
- Allergy (Atopy)
 - Genetic predisposition to allergy, single most predisposing factor
 - Family History
 - 1/3 of asthmatics have family members with asthma
 - Perinatal exposure to smoke and aeroallergens (second hand smoke)
 - Airway structure narrowing
 - Low Birth Weight
 - Smaller airways
 - Greater with African Americans

- ### Factors Associated with Onset of Asthma
- Low Birth Weight (cont.)
 - < 2500 grams or 5 lbs 5 oz more predisposed
 - Mechanical ventilation
 - Male Gender
 - Among children 0-17 years old
 - After 17 years females are then 10 percent more likely to be diagnosed

- ### Four Components of Effective Asthma Management
- Assess and Monitor
 - Control of Asthma Triggers
 - Asthma Management: Pharmacologic Therapy
 - Asthma Management: Patient Education

Assessment

Measures of Assessment and Monitoring

- Two aspects:
 - Initial assessment and diagnosis of asthma
 - Periodic assessment and monitoring



19

Initial Assessment

- Establishing a diagnosis
 - Episodic symptoms of airflow obstruction
 - Airflow obstruction is partially reversible
 - Exclude alternative diagnoses
- Methods of establishing a diagnosis
 - Medical history
 - Physical examination
 - Pulmonary Function
 - Additional test (allergy, CSR, GERD)
- Does patient have history or presence of episodic symptoms of airflow obstruction
 - Wheeze, shortness of breath, chest tightness or cough
 - Asthma symptoms vary throughout the day

20

Assessment

- Initial Assessment and Diagnosis of Asthma
 - Methods for establishing diagnosis
 - Detailed medical history
 - Physical Exam (unable to do)
 - Spirometry to demonstrate reversibility (recommended)
 - Does patient have history or presence of episodic symptoms of airflow obstruction
 - Symptoms
 - Wheeze
 - Cough
 - Shortness of breath
 - Chest tightness
 - Nocturnal awakening

21

Assessment

- Ask about symptom patterns (cont.)
 - School absences
 - Limitation of daily activities
 - Use of short acting bronchodilators & other meds
- For infants
 - Difficulty with feeding (grunting sounds, poor sucking)
 - Changes in respiratory rate
 - Altered sleep patterns
 - Retractions
 - Irritability, lethargy
 - Decreased appetite, weight loss

22

Assessment

- Children with asthma need to be monitored regularly
 - Schedule at least 2 visits/year for a child whose asthma is under control
 - Child using daily therapy may require at least 3-4 visits/year
 - The child with unstable asthma may require visits at least every 2 weeks until asthma is stable
- Ask about symptom patterns
 - Nighttime or early morning
 - Daytime symptoms
 - Coughing
 - Wheezing
 - SOB
 - Rapid Breathing
 - Chest tightness

23

Assessment

- For older children
 - Fatigue (slows down or stops playing, increased irritability)
 - Complaints about “not feeling well”
 - Avoidance of certain activities (sports, gym class, sleep-overs)
 - Poor school performance

24

Assessment

- Periodic Assessment and Monitoring
 - Patients should be seen by a clinician at least every 1-6 months
 - Teach all patients/families with asthma to recognize symptoms that indicate inadequate asthma control

25

Assessment

- Guidelines for Referral to an Asthma Specialist
 - Based on the NIH guidelines referral for consultation or care to a specialist in asthma care (allergist, pulmonologist) is recommended when:
 - Patient has had a life-threatening asthma exacerbation
 - Patient is not meeting goals of asthma therapy
 - Other conditions complicate asthma
 - Patient requires additional education
 - Patient has severe persistent asthma
 - Patient requires continuous oral corticosteroid therapy or high dose inhaled corticosteroids

26

Wheezing Infant: When is it Asthma?

- Patterns of wheezing in infants
 - Those who develop asthma
 - Those who do not develop asthma
- Both groups generally benefit from a trial of treatment
- Risk factors for asthma
 - Family history of asthma
 - Plays a major role, genetics unknown
 - Passed to children mainly from mother
 - Atopy (allergy) could be the most predisposing factor
 - Perinatal exposure to aeroallergens & irritants
 - (e.g., passive smoke), linked to abnormal lung functions, airway hyper-reactivity and allergy in the newborn

27

Wheezing Infant: When is it Asthma?

- Risk factors for asthma (cont.)
 - Viral respiratory infections
 - Smaller airways at birth & in early life
 - Congenital (inherited factors)
 - Smoking by mother during pregnancy
 - Maternal viral illnesses during pregnancy
 - Premature babies
 - Male Gender
 - Among children 0-17
 - Females then are 10 percent more likely to develop asthma
 - Low birth weight
 - < 5 lbs/5 oz

28

Transient Wheezing

- Airflow obstruction that may or may not respond to bronchodilators and is usually limited to the first three years of life
 - Wheezing < age 3 does not necessarily correlate with diagnosis of asthma
 - Viral associated
 - Some degree of airflow obstruction
 - Non-asthmatic, smoking mothers
 - No longer wheezing by age 6

29

Stages of Asthma Severity

Clinical features (Based on past 4 weeks)		
	Days w/symptoms	Nights w/symptoms
Step 1 Mild Intermittent	≤2days/wk	≤2 nights/month
Step 2 Mild Persistent	≤ 2/week but < 1x/day	>2 nights/month
Step 3 Moderate Persistent	Daily	>1 night/week
Step 4 Severe Persistent	Continual	Frequent

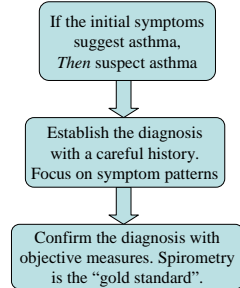
30

Differential Diagnosis in Pediatrics

- Bronchiolitis
- Cystic Fibrosis
- Bronchopulmonary dysplasia
- Congenital heart disease
- Congenital airway malformations
- Aspiration
- Foreign body
- Transient wheezing

31

Diagnosing



32

Medical History

- Family history of allergy and asthma
- Child's symptoms
 - Coughing
 - Wheezing
 - Shortness of breath or rapid breathing
 - Chest tightness
 - When do symptoms occur?
 - What causes symptoms?
 - What makes symptoms worse?

33

Medical History

- Frequency and severity of child's symptoms
 - Do symptoms interfere with daily activities?
 - Do symptoms limit physical activity?
 - Do symptoms interfere with sleep?
 - Do symptoms interfere with school performance or activities?
 - Has the child needed to go to the emergency room or hospital?
- Medications the child is using
 - How many doses of short acting bronchodilator is the child using?
 - Daily/weekly

34

Monitoring Signs & Symptoms

- Symptoms
 - Cough
 - Wheezing
 - Shortness of breath or rapid breathing
 - Chest tightness
- Symptom Patterns
 - Perennial, seasonal or both
 - Continual, episodic or both
 - Onset, duration, frequency
 - Diurnal variations, especially nocturnal & on awakening in early morning
 - Exercise induced cough or SOB

35

Pulmonary Function Testing

- Spirometry
 - Recommended to establish a diagnosis of asthma, but may not be feasible in young children
 - Some children cannot conduct the maneuver adequately until after age 7. For these children, clinical judgment and/or response to asthma treatment may be the only reliable means for diagnosing asthma

36

Example: Pulmonary Function Test

PFT Results						
Result	Pred	Pre	% Prd	Post	%Prd	%Chg
FVC (L)	2.66	■2.02	76%	3.09	116%	53%
FEV1 (L)	2.36	■1.17	49%	2.56	108%	119%
FEV1/FVC	0.86	■0.58	67%	0.83	97%	43%
FEF25-75% (L/s)	2.75	■0.99	36%	2.44	88%	147%
PEFR (L/s)	5.04	■1.59	32%	■3.06	61%	92%
Vext %	-----	1.30	-----	11.09	-----	755%

37

Monitoring Peak Flows

- When spirometry is not available
- Child is unable to perform (generally for children > 5 years old)
- Spirometry results are normal but the child has asthma symptoms
- PF meters are a *monitoring* tool. They aid in:
 - Assessing severity of asthma
 - Guide treatment or medication needs

38

Control of Asthma Triggers

- Indoor Irritants
 - Children absorb more of the harmful substance in the air, this is generally related to the rate and depth of breathing and they also have an immature immune system
 - Tobacco smoke (smoke outdoors, smoking cessation for parents)
 - Permit NO smoking around the child or in the child's home
 - Smoke – fireplaces or wood burners
 - Try to eliminate from house
 - Check for efficient ventilation
 - Pesticides
 - Try not to use a spray
 - If spraying, utilize a mask
 - Keep children out of area
 - Check with daycares or schools to see when & if they are spraying with pesticides

39

Control of Asthma Triggers

- Indoor Allergens
 - Dust Mites
 - Dependent on moisture
 - Wash stuffed toys weekly in hot water
 - Encase pillows, mattress and box springs
 - Wash bedding weekly in hot water/fragrance-free detergent
 - Air purifiers
 - Remove carpeting
 - Vacuum 1-2 times/week, more often may stir up more dust mites
 - Begin dusting in bedroom
 - Cockroaches
 - Proteins found in droppings or body parts

40

Control of Asthma Triggers

- Cockroaches (cont.)
 - Mainly seen in inner city populations
 - Do not leave food/garbage exposed
 - Reduce indoor humidity
 - Fix leaky faucets
 - Use traps or poison baits (boric acid traps)
- Mold & Mildew
 - Fix leaky faucets
 - Avoid vaporizers
 - Exhaust fan/dehumidifier
- Dander
 - Old skin cells which are shed, all warm blooded animals
 - Cats, problem with their saliva. Saliva is deposited on their skin every time they lick themselves. It then dries, flakes and becomes airborne

41

Control of Asthma Triggers

- Dander (cont.)
 - Remove pet from home or at least patient's bedroom
 - Keep off furniture/upholstery
 - Wash pet weekly & brush often (wear a mask & do outside)
 - Wash hands after touching
- Outdoor Irritants
 - Repeat exposure to irritants plays a role in airway sensitivity
 - Car exhaust & diesel fumes
 - Soot particles inhaled from diesel exhaust may trigger asthma
 - Problem with children sitting in school buses or school buses that idle too long
 - Diesel fumes contain 40 chemicals listed as hazardous air pollutants under the clean air act

42

Control of Asthma Triggers

- Outdoor Irritants (cont.)
 - Smog & Pollution (ozone)
 - Known to increase ER visits & hospital admissions for asthma
 - Stay inside, lower levels in the AM
 - Avoid exertion or outdoor exercise (modify routine)
 - Ozone is worse near freeways (cars pull in outside air)
 - Pollens (highest in AM after sunrise)
 - Keep windows & doors closed during peak seasons
 - Pollens more problematic on sunny, windy and low humidity days
 - Do not hang wash outside, pollens may cling to wash
 - If windows/doors are open, vacuum. Pollens can accumulate indoors.

43

Control of Asthma Triggers

- Viral Infections
 - Most common precipitant of asthma exacerbations among children < 5 years of age
 - Viral infections can exacerbate asthma
 - Flu shot
 - Know signs & symptoms of infections and when to call physician
- Exercise (EIA or EIB)
 - May be the only precipitating factor to one's asthma
 - Generally begins during exercise and reaches a peak 5-10 min. after stopping. May resolve on its own.
 - Recommendations: warm up & cool down periods. Discuss medication options with MD

44

Control of Asthma Triggers

- Stress/Emotions
 - Laughing and crying may both precipitate flare-ups
 - Stress
 - Proactive vs. Reactive
 - Tension may constrict airflow causing muscles to tighten
 - Stress, may make asthma more difficult to manage, patients forget to take their meds
- Sinusitis/Rhinitis
 - If one parent has allergic disease, the estimated risk of the child to develop allergies is 48 percent; the child's risk grows to 70 percent if both parents have allergies
 - Asthma is often associated with either, due to inflammation of the upper airway, contributes to lower airway sensitivity or asthma symptoms

45

Control of Asthma Triggers

- Sinusitis/Rhinitis (cont.)
 - Rhinitis
 - Inflammation of nasal walls, can be seasonal or perennial
 - » Seasonal - "hay fever" tends to affect sufferers in spring/summer and or early fall. Sneezing, itchy eyes & runny nose are general problems due to sensitivity to airborne pollens or mold spores
 - » Perennial – year round, triggered by sensitivity to allergens such as dust, dander or mold
 - Antihistamines/nasal sprays
 - Sinusitis
 - Infection of the sinuses treated with antibiotics. If untreated could lead to asthma flare-ups.
- GERD
 - Gastroesophageal reflux disease, cause of heartburn

46

Control of Asthma Triggers

- GERD (cont.)
 - May be associated with half of the episodes of coughs & wheezes in asthmatics
 - Acid back-up in the airways may cause asthma symptoms
 - Suspect if asthma attacks follow episodes of heartburn or attacks are worse after eating or exercise
- NSAIDs and Acetaminophen
 - 10 percent of asthmatic adults and children have aspirin-induced asthma
 - Asthma gets worse when patients take aspirin
 - Aspirin usually reduces inflammation in other disorders, it may have the opposite effect in many asthmatics
 - Reason unknown, AIA often develops after viral infection

47

Control of Asthma Triggers

- Immunotherapy
 - Allergy shots
 - Allergen immunotherapy is a form of treatment aimed at decreasing your sensitivity to substances called allergens
 - Involves injecting increasing amounts of an allergen to a patient over several months
 - Works like a vaccine. Your body responds to the injected amounts of a particular allergen, given in gradually increasing doses, by developing an immunity or tolerance to the allergen.
 - Immunotherapy can lead to decreased, minimal or no allergy symptoms when you are exposed to the allergen(s) included in the allergy vaccine
 - Build-up phase: involves receiving injections with increasing amounts of the allergen(s). The frequency of injections during this phase generally ranges from 1-2 times a week for 3-6 months

48

Control of Asthma Triggers

- Immunotherapy
 - Maintenance phase: this phase begins when the effective therapeutic dose is reached

49

Asthma Management: Pharmacologic Therapy

- Long Term Control
 - Improves lung function and decreases the need for quick relief medications
 - Reduces inflammation & prevents permanent injury in the lungs
 - Generally, taken daily for long periods of time to maintain and prevent exacerbations
 - Meds need to build up in system to work effectively (7-10 days)
 - Rinse after use to prevent "thrush"

50

Asthma Management: Pharmacologic Therapy

- Long Term Control Medications
 - Cromolyn Sodium (Intal)/Nedocromil Sodium (Tilade)
 - Inhaled anti-inflammatory agents
 - Available as a MDI, Cromolyn is also available as nebulizer
 - Alternative therapy to low-doses of inhaled steroids in mild persistent asthma
 - Nedocromil may also be added to inhaled steroids in moderate asthma
 - Can be used to prevent symptoms to anticipated exposures (dust, exercise)
 - May have an unpleasant taste
 - Inhaled Corticosteroids
 - Most potent & effective long-term anti-inflammatory medication currently available
 - Available as MDI & dry powder inhaler (DPI)

51

Asthma Management: Pharmacologic Therapy

- Inhaled Corticosteroids (cont.)
 - Used for management of persistent asthma at all levels
 - Broad action on inflammatory processes
 - Possible growth delay
 - Spacer/holding chamber should be used, rinse after use
 - Examples of Inhaled Corticosteroids:
 - Flovent®
 - Pulmicort® (also comes in nebulized form)
 - Azmacort®
 - AeroBid®
 - Beclorvent® (qvar for kids >5 years old)

52

Asthma Management: Pharmacologic Therapy

- Oral corticosteroids
 - Broad anti-inflammatory effects
 - Short term "burst" (3-10 days)
 - Long term use is associated with systemic effects
 - Use lowest possible dose and/or alternate day dosing in severe persistent asthma
 - Do not necessarily have to be tapered
 - Examples of oral corticosteroids:
 - Orapred
 - Medrol
 - Prelone
 - Pediaapred
 - Prenisone

53

Asthma Management: Pharmacologic Therapy

- Leukotriene modifiers
 - Stabilize airways, prevent symptoms, FDA approved for allergies
 - Available as tablets
 - May be considered as alternative therapy to low doses of inhaled steroids for children with mild persistent asthma, position of Leukotrienes has not been fully established
 - Examples of Leukotriene Modifiers:
 - Zflo
 - » Elevations of liver enzymes have been seen
 - Accolate
 - Singulair
- Long acting Beta 2 agonist
 - Relax bronchial smooth muscle
 - Should not be used to treat acute symptoms or exacerbations

54

Asthma Management: Pharmacologic Therapy

- Long acting Beta 2 agonist (cont.)
 - Add-on therapy to inhaled steroids for long-term control of symptoms, especially nighttime symptoms
 - Available as MDI, DPI and tablets
 - Inhaled route is preferred
 - Slower onset and longer duration of action than short term Beta 2 agonist
 - Examples of long action Beta 2 agonist:
 - Serevent
 - Volmax
 - Proventil Repetabs
- Methylxanthines (Theophylline)
 - Produce mild to moderate bronchodilation

55

Asthma Management: Pharmacologic Therapy

- Methylxanthines (Theophylline) (cont.)
 - Add-on therapy to anti-inflammatory meds for long-term control of symptoms
 - Theophylline is an alternative, but not preferred therapy for persistent asthma
 - Available as tablets/capsules
 - Monitoring is required, serum levels 5-15 mcg/mL
 - Side effects increase with increasing serum levels
 - Nausea
 - Insomnia
 - Hyperactivity

56

Asthma Management: Pharmacologic Therapy

- Quick Relief Medications
 - Give prompt relief of bronchoconstriction and accompanying acute symptoms: coughing, wheezing, shortness of breath or rapid breathing, chest tightness
 - Short-acting Beta 2 agonists
 - Relax bronchial smooth muscle, resulting in bronchodilation usually within 5-10 minutes of administration (MDI or nebulized)
 - Therapy of choice for relieving acute symptoms and preventing exercise-induced bronchospasm
 - Overuse indicates a need to evaluate and possibly increase (or start) long term control therapy
- **RULES OF TWO**

57

Asthma Management: Pharmacologic Therapy

- Rules of Two
 - When you need more than just rescue medication for asthma consider the "Rules of Two"
 - Does your patient take their quick relief inhaler more than- TWO TIMES A WEEK?
 - Does your patient awaken at night with asthma more often than- TWO TIMES A MONTH?
 - Does your patient refill their quick relief inhaler more than- TWO TIMES A YEAR?
 - If the patient has answered "yes" to any of these questions, it's time for them to ask their physician or pharmacist about a long-term control medication or anti-inflammatory

58

Asthma Management: Pharmacologic Therapy

- Steroids and Linear Growth Risks
 - The potential small risk of adverse effects on linear growth is well balanced by efficiency
 - The clinical significance of the findings is unclear
 - Monitoring growth is recommended
 - Poor asthma control itself can result in retarded linear growth
 - Adverse effects on linear growth appear to be dose dependent
 - High doses of inhaled steroids have greater potential for growth suppression, but less potential than the alternative of oral steroids
 - Some caution (e.g., monitoring growth, stepping down therapy when possible) is suggested while this issue is studied further

59

Asthma Management: Pharmacologic Therapy

- New Medications on the Horizon
 - Symbicort (over 12 years old), combination of Pulmicort and Foradil
 - Generic version of Flonase intranasal corticosteroid
 - Patanol, nasal spray for allergic rhinitis
 - Advair DPI down to age 4 years (presently 12 & over)
 - Xopenex MDI (currently only available for nebulizers)
 - Xolair (currently only for > 12 years old)
 - Alvesco (new steroid possibly for children 4 years & older)

60

Asthma Management: Education

- Medication administration may be given by inhalation or orally (tablet)
 - Inhaled route is generally preferred
 - Higher concentrations can be delivered more effectively to the airways
 - Systemic side effects are avoided or minimized
 - The onset of action of short-acting Beta 2 agonists is substantially shorter when inhaled
 - Dosages reaching the airway will vary considerably depending on the route of administration (and the devices used for inhaled medications)
 - The ability of individual children to use different devices for inhaled medications may vary considerably

61

Asthma Management: Education

- Children < 2 years
 - Nebulizer therapy with face mask may be preferred for administering cromolyn and short acting Beta 2 agonist
 - Short-acting Beta 2 agonists are available as liquids, but:
 - The onset of action is slower (approx. 30 minutes)
 - Adverse effects are more likely
 - Drugs administered by MDI may be given using a spacer/holding chamber & face mask
 - Dose will vary
 - Inhaled steroid should always be given with a spacer/chamber

62

Asthma Management: Education

- Children between 3 and 5 years
 - Inhaled medications are preferred
 - Some children can use an MDI and spacer/holding chamber
 - If the desired therapeutic effects are not achieved, or if the child cannot use an MDI with spacer/chamber, a nebulizer of MDI plus spacer/chamber with face mask may be required
- For school-age children
 - Inhaled medications are preferred
 - MDI's, DPI's and nebulizers may be used
 - The child should be able to produce the necessary effort and coordination needed for the specific device

63

Asthma Management: Education

- For school-age children (cont.)
 - All inhaled steroids by MDI should be used with spacer/chamber
 - Alright to do MDI without spacer/chamber if good technique is demonstrated

64

Asthma Management: Education

- How to Use a Chamber
 - Shake the inhaler
 - Fit the inhaler into spacer opening
 - Press the inhaler once only
 - Breathe in *slowly and deeply* through the spacer mouthpiece
 - Hold your breath for 5-10 seconds
 - Or if breathless take 2-3 normal breaths keeping the spacer in your mouth all of the time
 - Repeat these steps for further doses
 - Wash your spacer once a week with warm water and dishwashing liquid
 - Don't rinse, drip dry – this reduces the electrostatic charge so that the medicine does not stick to the spacer sides

65

Asthma Management: Education

- Peak Flow Monitoring
 - Patients with moderate-to-severe persistent asthma should have a peak flow meter and learn their peak flow
 - During an asthma episode the airways begin to narrow slowly, this change can be measured by a peak flow meter
 - Provides objective data for the patient and physician
 - Peak flow rates often drop before a patient can detect or see any signs of an attack
 - Children as young as five years old can learn how to use a peak flow meter

66

Asthma Management: Education

- How to Use a Peak Flow Meter
 - Place the indicator at the base of the numbered scale
 - Stand up
 - Take a deep breath
 - Place the meter in your mouth and close your lips around the mouthpiece. Do not put your tongue inside the hole.
 - Blow out as hard and fast as you can
 - Write down the number you get
 - Repeat first 6 steps two more times
 - Write down the highest of the three numbers achieved

67

Asthma Management: Education

Find Your Personal Best Peak Flow Number

WHAT IS NORMAL?

Your personal best peak flow number is the highest peak flow number you can achieve over a 2-week period when your asthma is under good control. Good control is when you feel good and do not have any asthma symptoms.

68

Asthma Management: Education

- Asthma Action Plan
 - Joint development of treatment goals
 - Teaches asthma self-care by providing instructions on actions to take based on your asthma symptoms and peak flow numbers
 - Written plan of action, is a customized plan to help manage asthma episodes. The action plan is based on changes in respiratory symptoms and peak flow numbers.
 - Action plans should include the following information:
 - Peak flow numbers and zones
 - Green Zone 80-100 percent of PB, no problems
 - Yellow Zone 50-80 percent of PB, change in medication may be needed
 - Red Zone 50 percent or less or PB, seek medical attention

69

Asthma Management: Education

- Asthma and the School Child
 - One of the most important environments to be safeguarded
 - Physician should work closely with school personnel to help them understand asthma, its impact and how to meet the needs of children with asthma
 - Action plan (care plan) should always be available to school personnel
 - The action plan (care plan) for the child should include:
 - The early warning signs of an asthma episode
 - What medications the student uses and how they are taken
 - When to contact the physician or emergency room
 - Common asthma triggers in the school environment:
 - Dust mites
 - Chalk dust

70

Asthma Management: Education

- Common asthma triggers in the school environment (cont.):
 - Animals
 - Strong odors (perfumes, paints, chemicals)
 - Mold (older schools)
 - Exercise (gym class or playground)
 - Weather (gym class)
- What do school personnel need to know
 - Early warning signs of an asthma episode
 - How to treat an asthma episode
 - What medications the child uses
 - How to help the child with asthma follow his/her management plan at school
 - Laws surrounding inhalers
 - Phone numbers for MD, parents and ER

71

Asthma Management: Education

- School health personnel should also know
 - How to use devices to deliver asthma medications
 - MDI's, dry powder inhalers, nebulizers, spacers
 - How to use a peak flow meter
- Taking medications at school may be difficult
 - Many children with asthma want to hide their need for medications
 - Poorly informed school authorities sometimes make it impossible for children to take their medication
 - It may be disruptive for children to go to another part of the school building to take their medication
- Encourage parents to
 - Meet with the teachers, school nurse and perhaps the principal at the beginning of the school year to make them aware of the child's asthma

72

Asthma Management: Education

- Encourage parents to (cont.)
 - Explain the child's asthma, what medications he/she uses, and the possible side effects
 - Explain that the student should be treated "normally" like other children
 - Encourage school personnel to allow the student to take his/her medications as required, without making it a "big deal"

73

Conclusion

- Stages of Asthma
- Triggers of Asthma and ways to avoid
- Asthma Management
 - Assessment and Diagnosis
 - Peak Flow Measurements
 - Medication Management
 - Education

74