Asthma and Allergies: An Overview
(with epistaxis too!)

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What is an Allergy/Immunology Specialist?

- Physicians trained in the prevention, diagnosis and treatment of problems involving the immune system.
- These problems include reactions to substances such as food, drugs, chemicals, insect stings and pollens, and allergic conditions such as hay fever, asthma, hives, dermatitis and eczema.
- Immune deficiency (recurrent infections).

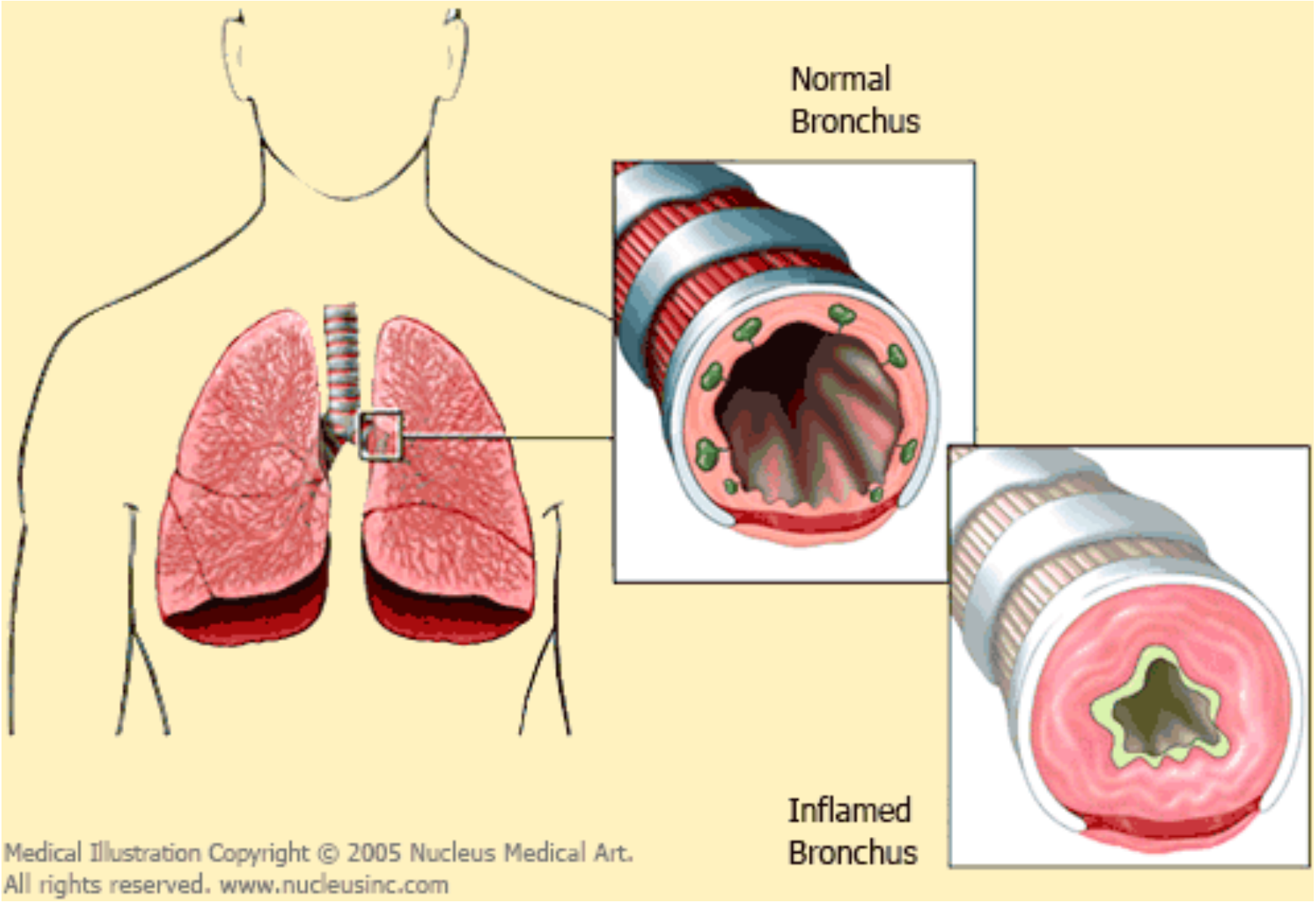
Summary

- Define asthma
- Asthma statistics
- Who is affected by asthma?
- Signs and symptoms of asthma
- Treatment options

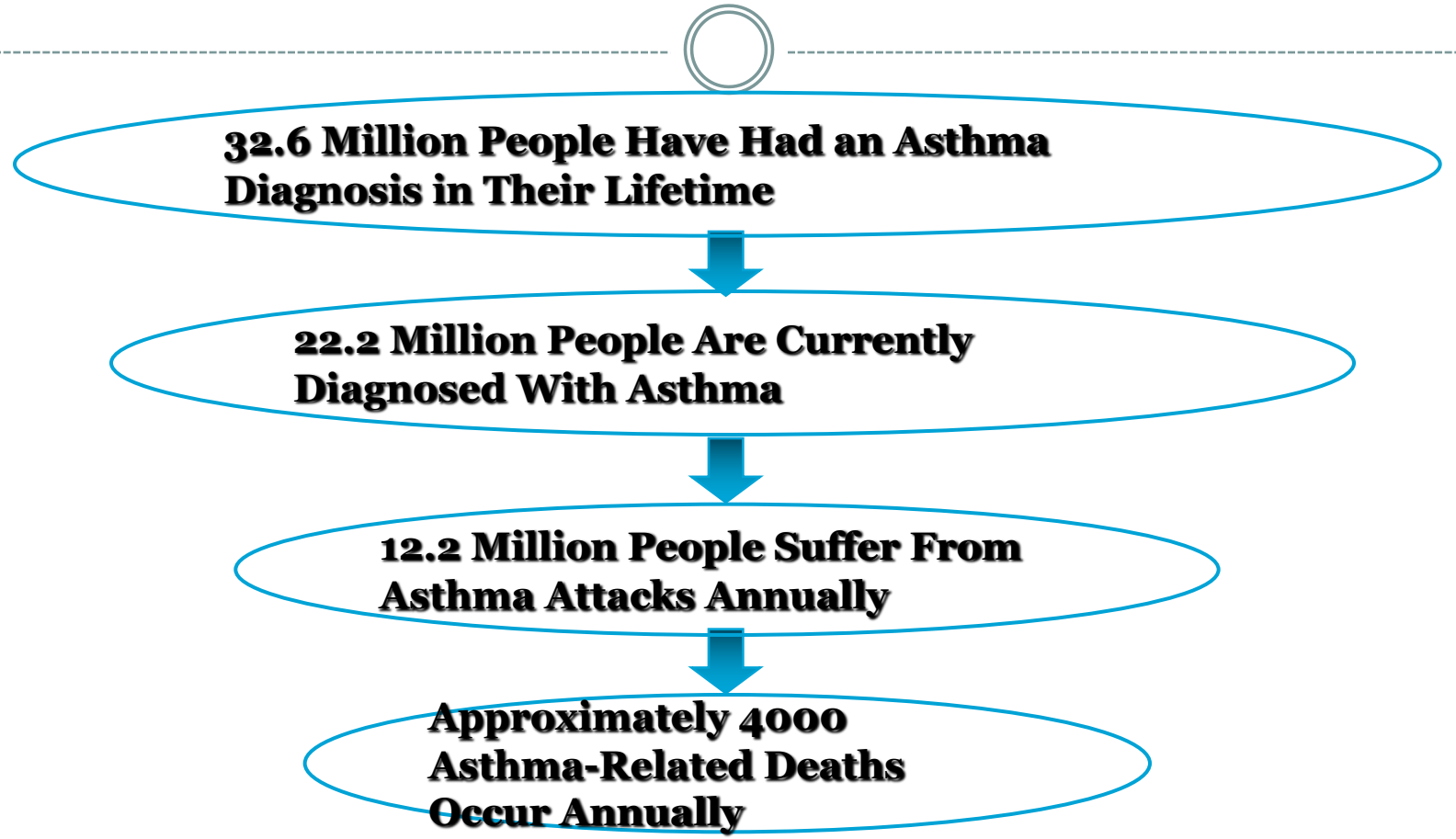
- Define Allergies (Hayfever)
- Signs and symptoms
- Identify Allergens
- Treatment options

What is Asthma?

- Chronic inflammatory disease
- Episodic obstruction of airway
- Reversible
- Increased airway responsiveness to various stimuli ("triggers")
- Often associated with allergy



Asthma Is Prevalent: Significant Morbidity and Mortality



Approximately 11 People Die From Asthma Each Day

Available at: http://www.cdc.gov/nchs/products/pubs/pubd/hestats/asthma03-05/asthma03-05.htm. Accessed February 28, 2007.

Asthma Statistics

- 5 million children with asthma
- Yearly stats:
  - 1.8 million emergency room visits
    - 728,000 of these involved children
  - 0.5 million hospitalizations
  - 11 million office visits
  - 10 million missed school days
  - 100 million restricted activity days

Asthma Related Costs – U.S.

- $8.1 billion annually
- Indirect costs (lost productivity) : $4.6 billion
- Total: $12.7 billion
- Pharmaceutical costs, or medications, represents the largest direct cost
- Severe asthma sufferers spend $12,813 a year caring for their asthma.
- A 5% shift from severe to moderate asthma would save approximately $1.4 billion annually in total costs

(JACI Jun 2003; Miriam Cistemas, MA, et. al).

Who is affected by asthma?

- Children
  - 50-80% with asthma develop symptoms before age 5
- Middle age
- Elderly

Frequency of Asthma in the Elderly >60 yo

- Age at onset
  - 5-6 per 1000 after age 60
- Depending on study
  - Finland 2.9% men 3.8% women
  - England 4.5%
  - French 2.8% men 2.2% women

Isoaho, R et al. 1994. J Clin Epidemiol;47:1109-1118
Parameswaran et al. 1998. Respir Med;92:573-577
Nejjari C, et al. 1996. Respir Med;90:401-408

Distribution of age at onset of asthma in elderly population

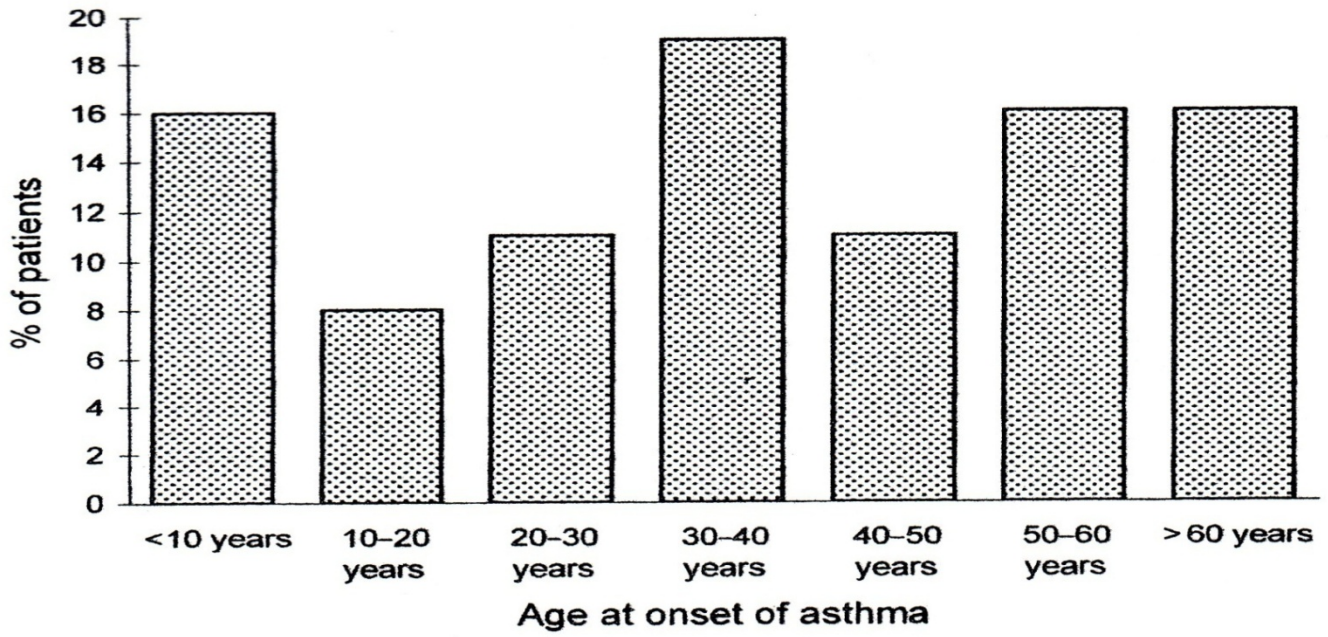


Figure 1. Distribution of age at onset of asthma in the elderly population. The high prevalence of patients starting asthma in childhood that is typical of younger patients is not seen in asthmatics older than 65 years. (Reproduced with permission from Quadrelli, S.A.; Roncoroni, A.J. Is Asthma in the Elderly Really Different? Respiration **1998**, *65*, 347–353.)

Asthma diagnosis missed frequently

- Cardiovascular Health Study
  - Chronic cough 9%
  - Chronic phlegm 8%
  - Attacks of Wheezing 8%
- Diagnosis of asthma reported in 6%
- 8% of elderly individuals have undiagnosed airway obstruction

Enright PL. Chest 1994;106:827-834

Risk Factors for Developing Asthma

- Personal history of allergies
- Atopic dermatitis (eczema)
- Family history of asthma (especially maternal)
- Passive tobacco smoke exposure during infancy and childhood
- Skin test positive to indoor allergens (Mold: Alternaria)

Symptoms of Asthma

- Coughing
- Wheezing
- Shortness of breath
- Chest tightness

Associated Symptoms in Children

- Fatigue
  - Child may slow down, stop playing, irritable
- Complaining
  - Chest “hurts” or “feels funny”
- Avoidance
  - Avoid sports, sleepovers
- Infants may show symptoms
  - Grunting, difficult feeding, rapid breathing

Symptom Patterns

- Seasonal
- Times of year
- Places (basements, work, etc)
- Things (animals, smoke, perfumes etc)
- Day or Night
- Exertional symptoms (exercise?)
- Chest colds lasting > 10 days

Precipitating factors

- Common colds (upper respiratory infections)
- Environmental allergens
- Exercise
- Occupational exposures (paint fumes, latex etc)
- Irritants (smoke, dusts, fumes)
- Emotions
- Drugs (aspirin, ibuprofen (NSAIDS)
- Weather change – cold air

Allergy Statistics -- US

- Allergies affect 40-50 million people
- 14.1 million physician office visits each year are attributed to allergic rhinitis
- 35.9 million people have seasonal allergic rhinitis (hay fever).
- 35 million people affected by chronic sinusitis
  - Ave of 4 days of work missed per year

Allergy Statistics

- Physician diagnosed allergic rhinitis in 40% of children by age 6 – Tucson, AZ
- Allergic rhinitis is familial (genetic)
  - 50-75% of those with allergies have (+) family history
- Increase in prevalence of allergic rhinitis
- "hygiene hypothesis"
  - Decline in childhood infections
  - Kids with older siblings have less allergies
  - Daycare attendance may lead to fewer allergies

Allergens

- Inhalant allergens
  - Pollens
  - Molds
  - Animal products
  - Dusts
- Outdoor vs. Indoor

Pollens

- Germinal cells necessary for plant reproduction
- Sources
  - Trees
  - Grasses
  - Weeds
- Seasonal or cyclic occurrence

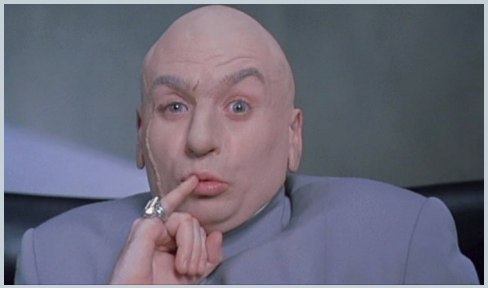
Pollens

- Wind-borne are more clinically relevant than those carried by insects
- Insect-borne pollens are sticky and heavy
- E.g. goldenrod and roses are less important inhalant allergens

Fall Pollens

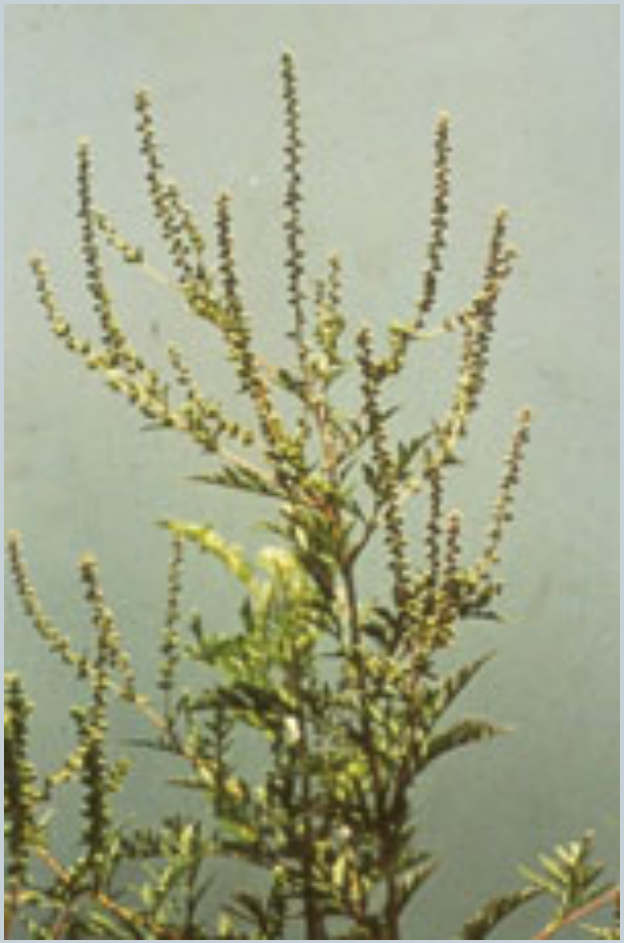
- Ragweed
- Pigweed
- Lamb's quarter

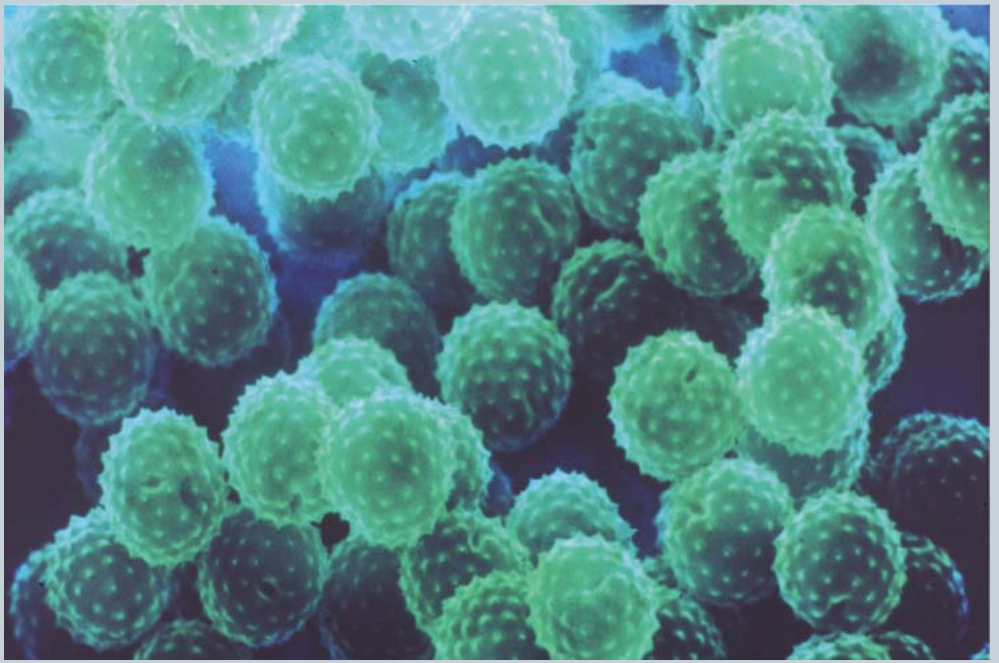
Ragweed



- Grows anywhere
  - Fields, roadsides, vacant lots
- Produces one billion pollen grains per average season
- Grains can travel up to 400 miles
- Prevalent throughout the Northeast, South and Midwest from mid-August to October

Short Ragweed (*Ambrosia artemisiifolia*)





Pigweed

Lamb's Quarter

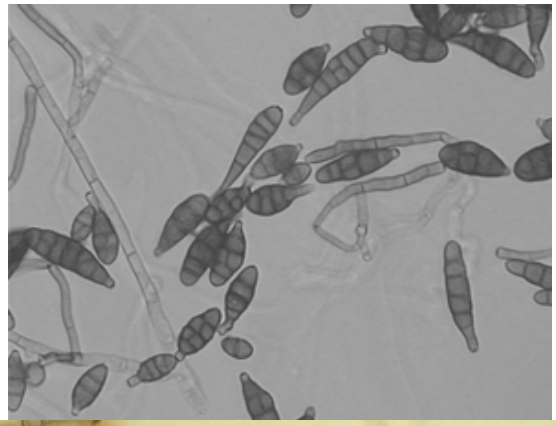
Molds (common)

- Outdoor Molds
  - *Alternaria*
  - *Cladosporium*
  - *Drechslera*
- Indoor Molds
  - *Aspergillus*
  - *Penicillium*

MOLDS

- Most molds produce spores
  - Airborne
  - Inhalants
  - Seasonal or perennial
  - Late Summer early Fall
  - Thrive in heat and humidity
  - Decrease when with frost/snow
  - Decaying leaves and plants

Alternaria and Drechslera



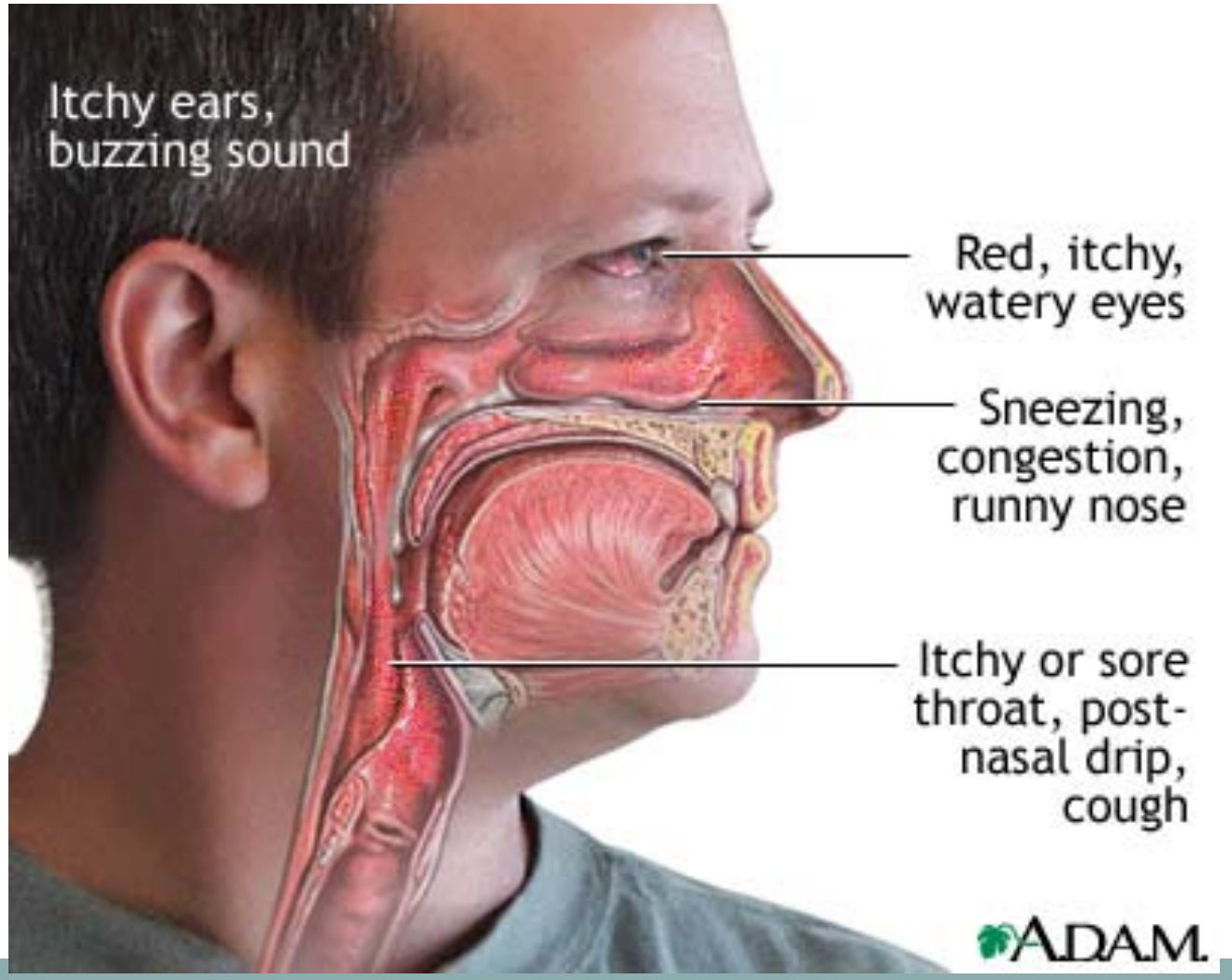
Symptoms of Fall Allergies

- Sneezing
- Clear rhinorrhea (runny nose)
- Ocular pruritus (itchy eyes)
- Nasal pruritus (itchy nose)
- Nasal congestion/obstruction
- Throat itch

Symptoms Cont'd

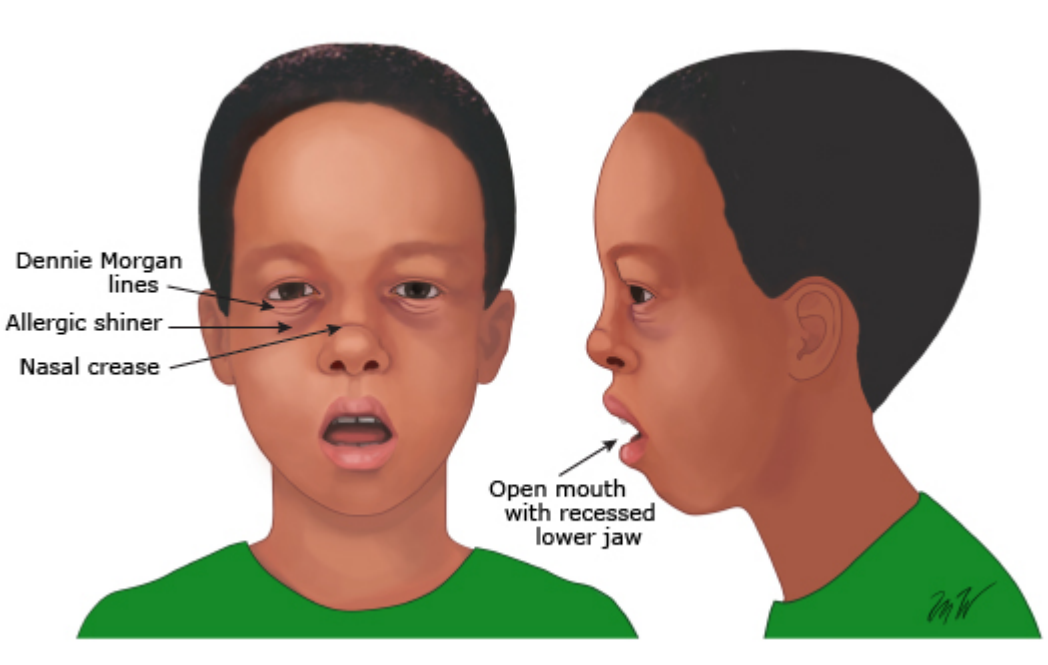
- "Sinusitis"
- Hearing changes
- Loss of taste, smell
- Irritability, fatigue, disordered sleep
- Lack of concentration
- Worsening underlying asthma

Clinical Symptoms



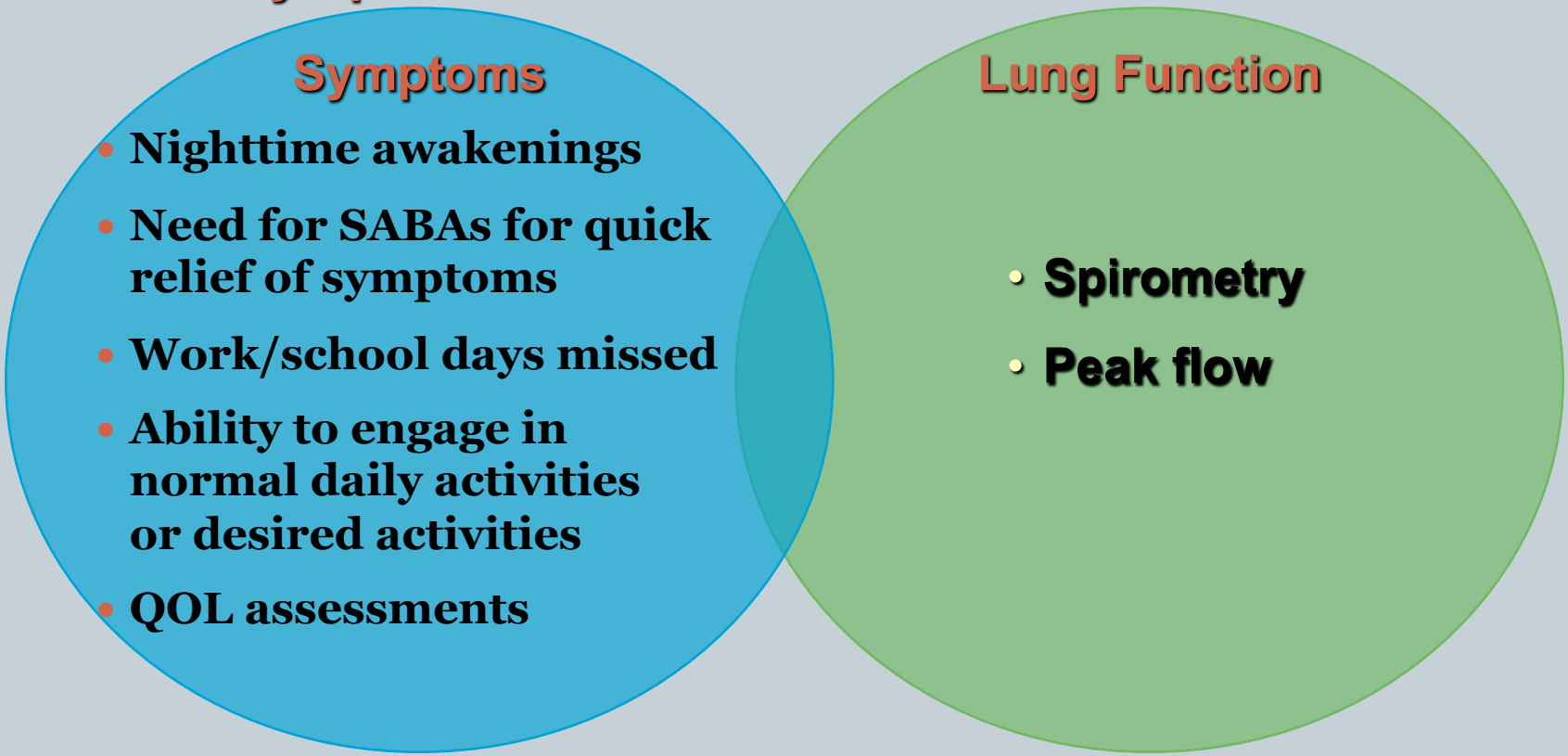
Allergic Salute

Allergic Shiners



Assessing Asthma Severity: Impairment Domain

Impairment = Frequency and Intensity of Symptoms and Functional Limitations



SABAs = short-acting β_2-agonists; QOL = quality of life.

National Asthma Education and Prevention Program. *Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma* (EPR-3 2007). U.S. Department of Health and Human Services. Available at: http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf. Accessed August 29, 2007.

Assessing Asthma Control and Adjusting Therapy in Youths ≥12 Years of Age and Adults

Components of Control		Well Controlled	Not Well Controlled	Very Poorly Controlled
Impairment	Symptoms	≤2 days/week	>2 days/week	Throughout the day
	Nighttime awakenings	≤2x/month	1-3x/week	≥4x/week
	Interference with normal activity	None	Some limitation	Extremely limited
	SABA use for symptom control (not prevention of EIB)	≤2 days/week	>2 days/week	Several times per day
	FEV_1 or peak flow	>80% predicted/ personal best	60%-80% predicted/ personal best	<60% predicted/ personal best
	Validated questionnaires ATAQ ACQ ACT	 0 ≤0.75 ≥20	 1-2 ≥1.5 16-19	 3-4 N/A ≤15
Risk	Exacerbations requiring oral systemic corticosteroids	0-1/year	≥2/year	
		Consider severity and interval since last exacerbation		
	Progressive loss of lung function	Evaluation requires long-term follow-up		
	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		• Maintain current step • Regular follow-ups every 1-6 months to maintain control • Consider step down if well controlled for at least 3 months	• Step up 1 step and • Reevaluate in 2 to 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

Adapted from National Asthma Education and Prevention Program. *Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma* (EPR-3 2007). U.S. Department of Health and Human Services. Available at: http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf. Accessed August 29, 2007.

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

Components of Severity		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
	SABA 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	≥2/year		
		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 Treatment		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 to 6 weeks, evaluate level of asthma control that is achieved and adjust therapy accordingly			

Adapted from National Asthma Education and Prevention Program. *Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma* (EPR-3 2007). U.S. Department of Health and Human Services. Available at: http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf. Accessed August 29, 2007.

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

Components of Severity		Intermittent	Persistent		
			Mild	Moderate	Severe
Impairment	Symptoms	≤2 days/week	>2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	0	1-2x/month	3-4x/month	>1x/week
	SABA 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 Treatment		Step 1	Step 2	Step 3 and consider short course of oral systemic corticosteroids	
		In 2 to 6 weeks, depending on severity, evaluate level of asthma control that is achieved. If no clear benefit is observed in 4 to 6 weeks, consider adjusting therapy or alternative diagnoses			

Adapted from National Asthma Education and Prevention Program. *Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma* (EPR-3 2007). U.S. Department of Health and Human Services. Available at: http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf. Accessed August 29, 2007.

Allergic Rhinitis Treatment Options

- Oral antihistamines
  - Cetirizine, Levocetirizine, Loratidine, Fexofenadine
- Intranasal steroids (INS)
  - Fluticasone (Flonase)
  - Beclomethasone (Qnasl)
  - Mometasone (Nasonex)
  - Budesonide (Rhinocort)
- Intranasal antihistamines
  - Azelastine (Astelin)
  - Olopatadine (Patanase)

Allergic Rhinitis Treatment Options

- Leukotriene modifiers
  - Montelukast (Singulair)
- Mast cell stabilizers
  - Cromolyn sodium
- Anticholinergics
  - Ipratropium bromide (Atrovent)
- Oral decongestants
- Nasal decongestants
- Oral steroids
- Nasal saline irrigation

Allergic Rhinitis Treatment Options

- Immunotherapy (FDA approved)
  - Subcutaneous immunotherapy (allergy shots)
  - Sublingual immunotherapy (sublingual tablet)
    - Grastek (Timothy grass tablet)
    - Oralair (Timothy, Orchard, Kentucky blue, Rye, Sweet Vernal)
    - Ragwitek (Ragweed)
    - Odactra (dust mites)

Asthma Treatment Options

- Short – acting Bronchodilators
  - Albuterol
  - Used as “rescue”
  - Relaxes muscles surrounding airway
  - Does not reduce inflammation

Asthma Treatment Options

- Anti-inflammatory medications
  - Inhaled corticosteroids (ICS)
    - HFA
      - Beclomethasone diproprionate (Qvar)
      - Fluticasone proprionate (Flovent)
    - Dry Powder
      - Mometasone furoate (Asmanex)
      - Budesonide (Pulmicort)
  - Combination (ICS/LABA)
    - Fluticasone/salmeterol (Advair)
    - Budesonide/formoterol (Symbicort)
    - Mometasone/formoterol (Dulera)

Asthma Treatment Options

- Leukotriene Modifiers
  - Montelukast (Singulair)
  - Zafirlukast (Accolate)
- Biologics
  - Omalizumab (anti IgE) (Xolair)
  - Mepolizumab (anti IL-5) (Nucala)
  - Reslizumab (anti IL-5) (Cinqair)
  - Dupilumab (anti IL-4/IL-13) (Dupixent)
  - Benralizumab (anti IL-5r) (Fasenra)

Nosebleeds (epistaxis)

- Very common in children
- Rare under age 2
  - Intentional or unintentional
    - Bleeding disorders
    - May be sign of child abuse

- When did it begin?
- History of recurrent nose bleeds?

Nosebleeds

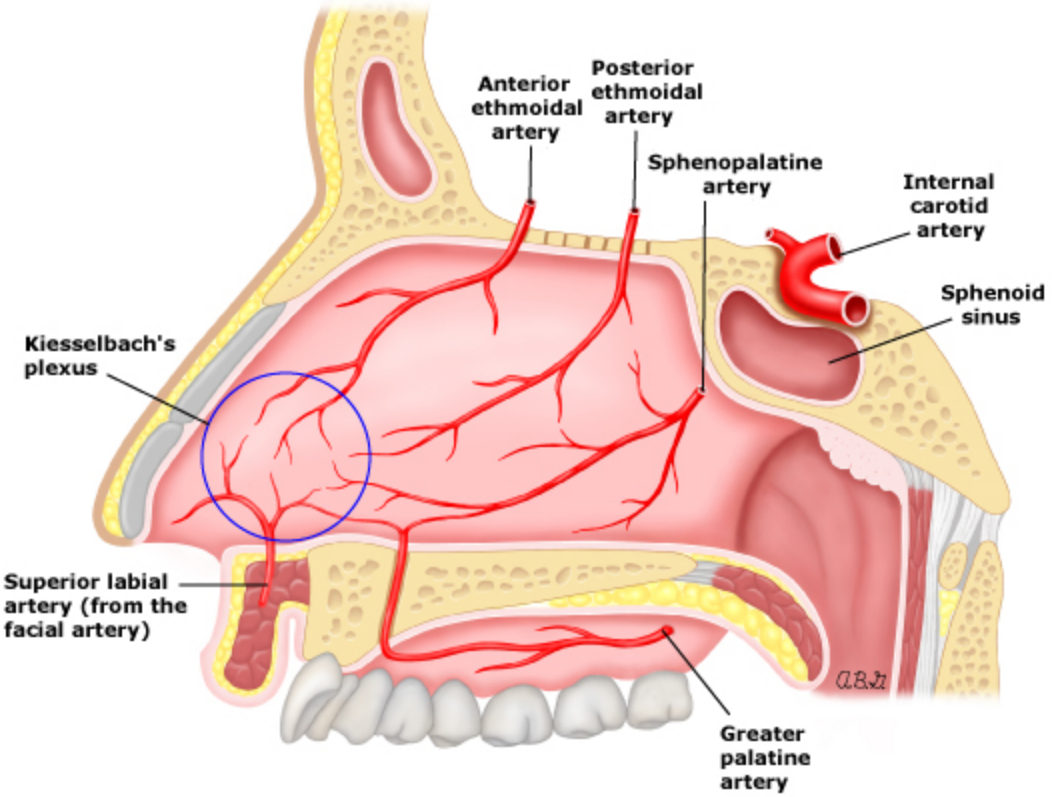
- One sided or both sided (unilateral or bilateral)
  - Minor trauma possible for unilateral
  - Major trauma for bilateral
- Anterior (bleed from front of nose) or Posterior (toward the back near the throat)
  - Anterior is most common type in children
- How much blood was lost?
  - Posterior blood loss may be underestimated
    - Down back of throat or swallowed blood
    - Vomiting

Nosebleed Causes

- Trauma
  - Nose picking
  - Foreign body
  - Facial trauma
  - Child abuse
  - Post operative
- Irritation of mucosa
  - Dry air
  - Allergic rhinitis
  - Common colds
  - Irritants
    - Nasal sprays (Flonase, Nasacort etc)
    - Tobacco smoke
    - Cocaine/heroin
    - Volatile inhalants of abuse
    - Localized infection

Nosebleed Causes

- Septal deviation
- Tumors
  - Hemangiomas, among others
- Bleeding disorders
  - Coagulation disorder
  - Platelet disorder
  - Blood vessel disorder
    - Hereditary hemorrhagic telangiectasia (HHT)
- Medications
  - Aspirin, ibuprofen, among other nsaids
  - Other anticoagulants
  - Valproic acid
- Granulomatous disorders
  - Wegeners
  - Sarcoid
  - Tuberculosis
- High blood pressure



When to Seek Emergent/Urgent Care

- Difficulty breathing resulting from massive bleeding
- Confusion, disorientation, pale, light headed
- Post surgical bleeding
- Associated chest pain
- Bleeding due to trauma, facial fractures, hit in face
- Bleeding doesn't stop after 30 minutes of pressure.
- On blood thinners and bleeding won't stop

Steps to Self-Treat Nosebleeds

- Gently blow nose to remove blood clots
- Lean forward at the waist
- Don't lay flat or tilt head backwards
- Gently grip BOTH nostrils to apply pressure, not the nasal bone itself
- Apply pressure for at least 5 minutes, resist the urge to release pressure early to check if it's still bleeding. Time yourself for 5 minutes (may be 10-15 minutes for adults)
- May apply cold compress to bridge of nose to promote vasoconstriction.

Preventing Nosebleeds

- Don’t pick your nose.
- Humidification
- Nasal saline spritz or gel
- See physician to treat other underlying causes

Questions