PRIMARY CARE
Team 435

Student Led Seminar

Upper Respiratory Tract Diseases

[Color index : Important | Notes | Extra]

Objectives:

- Rhinosinusitis, Pharyngitis, and Otitis Media
  - Etiology
  - Risk factors
  - Relevant microbiology & virology
  - Important of historical clues and clinical findings
  - How to differentiate between viral & bacterial etiology
  - Diagnostic tests and imaging
  - Management (symptomatic, antibiotic choice, antiviral therapy)
  - Prevention and complications
- Allergic rhinitis
  - Definition & classification
  - Assessment of severity & triggers
  - Allergy testing
  - Allergic rhinitis treatment

References:

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Revised by:

Rhinosinusitis

- Inflammation of the sinuses and the nasal mucosa.
- Pathophysiology:
  - Mucosal edema ⟶ obstruction of the sinus ostia , viral and bacterial infections impair the cilia which transport mucus.
  - The obstruction and slowed mucus transport cause stagnation of secretions and lowered oxygen tension within the sinuses. This environment is an excellent culture medium for viruses and bacteria
- Etiology :
  - Infectious
    - **Influenza**
    - **Common cold** :Rhinoviruses, Coronaviruses, and adenoviruses,Human respiratory syncytial virus (in adults) , Parainfluenza viruses.
    - **Bacterial** : Streptococcus pneumoniae , Haemophilus influenzae , Staphylococcus aureus Moraxella catarrhalis.
    - **Fungal** : Aspergillus
  - Non-Infectious
    - Nasal obstruction : allergic rhinitis, nasal polyps, tumors, mucus plug, septal deviation.
    - Primary ciliary dyskinesia (aka:kartagener syndrome)
    - Patients with immune deficiency or hyper inflammatory disease such as Wegener's disease.
    - Cystic fibrosis.
- Duration :
  - Acute (<4 weeks)
  - Subacute from (4 - 12 weeks)
  - Chronic is (≥ 12 weeks)
- Recurrent rhinosinusitis: Four or more episodes per year with complete resolution between episodes; each episode lasts at least seven days

- Signs and symptoms :

Facial pain, pressure, or fullness (pain on bending forward)	Nasal Congestion.	Nasal Discharge.	Hyposmia	Fever and fatigue
Postnasal Drip.	Cough and halitosis.	Sinus Headache.	Toothache	Otalgia

Bacterial vs Viral Rhinosinusitis :

- commonly viral.
- Bacterial:
  - persistent symptoms or signs compatible with acute rhinosinusitis, lasting for ≥10 days without any evidence of clinical improvement.
  - Onset with severe symptoms or signs of high fever (≥38.8/39) and purulent nasal discharge or facial pain lasting for at least 3–4 consecutive days at the beginning of illness.
  - worsening symptoms or signs characterized by the new onset of fever, headache, or increase in nasal discharge following a typical viral URTI that lasted 5–6 days and were initially improving (‘‘double sickening’’)
  - Immunocompromised patient.
- 0.5%-2% of viral Rhinosinusitis are complicated by bacterial infection

Diagnosis:

history	PODs - Pain (site) - Obstruction (uni/bi) - Discharge (Thickness, Consistency, Color, Amount, Frequency) - Smell disorder Other: Fever, Fatigue, Headache, Earache.
Physical examination	- Tenderness overlying sinuses. - Hyponasality. - Purulent nasal secretions. - Erythema (facial, Mucosal). - Oral cavity examination.
investigation	- CBC, ESR (nonspecific). - Culture (if life threatening). - CT (for complications). - MRI (for complications). - Fiberoptic endoscopy (structural lesion).
Radiographic imaging is **not** recommended for evaluating uncomplicated acute rhinosinusitis Sinus CT : define **anatomic** abnormalities and identify suspected complications. MRI: identify suspected tumors or fungal sinusitis, which may involve adjacent soft tissue structures	

Culture: Not routinely done.

Only in :

- Patient In ICU
- Immunocompromised
- Children not responding to medical management..
- Complications.

Imaging:

Done in :

- Complication (orbital, intracranial, or soft tissue involvement)
- Alternative diagnosis (malignancy, other noninfectious causes of facial pain)

When should you suspect & test for MERS-CoV in someone with acute rhinosinusitis?

- History of exposure to a confirmed or suspected MERS-CoV in the 14 days prior to onset of symptoms.
- History of contact with camels or camel products in the 14 days prior to onset of symptoms.
- Unexplained acute febrile (≥38°C) illness, body aches, headache, diarrhea, or nausea/vomiting, with or without respiratory symptoms, AND leukopenia & thrombocytopenia.

Management:

viral	**Supportive care** - may not completely resolve within 10 days but is expected to improve. Symptomatic management: - Rest, fluids - Analgesics paracetamol NSAIDS - Antipyretics - SNI saline nasal irrigation (safe , inexpensive , soften viscous secretions and improve mucociliary clearance) - INCS intranasal corticosteroids (not approved for use in patients with acute rhinosinusitis, current guidelines consider them an option based on an individualized decision) - Decongestants (reduce mucosal edema and facilitate aeration and drainage , does not extend to the paranasal sinuses) - Antihistamine (may complicate drainage by over-drying the nasal mucosa, leading to further discomfort. Therefore, antihistamines should not be used for symptomatic relief of acute sinusitis except in patients with a history of allergy) - Treat complications, e.g. antibiotics for secondary bacterial infection; treatment of exacerbations of COPD or asthma
bacterial	- assurance of follow-up then watchful waiting (without antibiotics). Or - prescribe initial antibiotic therapy for adults with uncomplicated ABRS. Antibiotic therapy is started if: - patient's condition fails to improve by 7 days after ABRS diagnosis. Or - if it worsens at any time. - immunocompromised - Amoxicillin±clavulanate is the first-line therapy for 5 to 10 days for most adults.

Antibiotic failure:

If the patient worsens or fails to improve with the initial management option by 7 days after diagnosis, reassess the patient to:

- confirm ABRS
- exclude other causes of illness
- detect complications.

If ABRS is confirmed:

- antibiotic therapy should be started
- If the patient was initially managed with an antibiotic, the clinician should change the antibiotic.

Complications of rhinosinusitis:

Bony	- Osteomyelitis , Pott's puffy tumor (subperiosteal abscess)
Orbital Most commonly	- Cavernous sinus thrombosis - Inflammatory edema and erythema (preseptal cellulitis) - Orbital abscess - Orbital cellulitis - Subperiosteal abscess
Intracranial	- Cavernous sinus thrombosis - Epidural abscess - Intracranial abscess - Meningitis - Subdural abscess - Superior sagittal sinus thrombosis

Prevention:

- Good Sinus hygiene.
- Hydration (to keep nasal secretions thin).
- Saline nasal sprays (keep the nasal passages moist, helping in removal of infectious agents).
- Smoking cessation.
- Allergen avoidance

SORT: KEY RECOMMENDATIONS FOR PRACTICE

CLINICAL RECOMMENDATION	EVIDENCE RATING	REFERENCES
Radiographic imaging in patients with acute rhinosinusitis is not recommended unless a complication or an alternative diagnosis is suspected.	C	1, 9, 10
Antibiotic therapy is recommended for patients with rhinosinusitis symptoms that do not improve within seven days or that worsen at any time; those with moderate illness (moderate to severe pain or temperature ≥ 101°F [38.3°C]); or those who are immunocompromised.	B	1, 11–13
Amoxicillin is considered the first-line antibiotic for most patients with acute bacterial rhinosinusitis.	A	1, 13
Trimethoprim/sulfamethoxazole (Bactrim, Septra) and macrolide antibiotics are reasonable alternatives to amoxicillin for treating acute bacterial rhinosinusitis in patients who are allergic to penicillin.	C	1
Mild rhinosinusitis symptoms of less than seven days' duration can be managed with supportive care, including analgesics, short-term decongestants, saline nasal irrigation, and intranasal corticosteroids.	A	1, 18, 31

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to https://www.aafp.org/afpsort.xml.

Pharyngitis

Sore Throat Vs. Pharyngitis

Sore Throat

- Refers to pain, itchiness, or irritation of the throat. Patients may have difficulty swallowing food and liquids, and the pain may get worse when they try to swallow

Pharyngitis

- Defined as rapid onset of sore throat and inflammation or irritation of the pharynx.

Types of sore throat

1- Infectious

- **Viral:** Most common, Eg.Influenza virus, Parainfluenza virus, Rhinovirus, Coronavirus, Adenovirus, Respiratory syncytial virus, Epstein-Barr virus
- **Bacterial : Eg.** Group A β-hemolytic streptococcus (GAS) (Most common), Group C & G Streptococcus, Fusobacterium Necrophorum, Chlamydia Pneumoniae, Mycoplasma Pneumoniae.

2- Non-Infectious

- Post-nasal drainage due to allergic rhinitis
- Sinusitis
- Gastroesophageal reflux disease
- Acute thyroiditis
- Persistent cough

Risk of Group A β-hemolytic Streptococcus (According to the Patient's Age Group):

In patients with sore throat, the likelihood of GABHS = (GAS) pharyngitis is highest in:

1. Children from 5 to 15 years of age (37%).
2. Lower in younger children (24%).
3. Adults (5% to 15%).

Alarming symptoms

SHOULD BE ASKED TO RULE OUT SERIOUS ETIOLOGY/COMPLICATIONS IN A SORE THROAT HISTORY:

- **Drooling (**might be a bacterial infection known as epiglottitis that might interfere with breathing**).**
- **Respiratory distress .**
- **Stiff neck** (meningitis)**.**
- Inability to open mouth fully, **trismus = lockjaw** (retropharyngeal abscess)
- **Fevers**, Weight loss, night sweats.
- Muffled voice or hot potato voice (peritonsillar or retropharyngeal abscess).
- History of recent foreign body impaction or oropharyngeal procedure (trauma).

Clinical Characteristics: Bacterial vs.Viral

Viral Sore Throat	Bacterial Sore Throat
★ Cough ★ Conjunctivitis ★ Coryza (inflammation of the mucus membranes of the nose) ★ Hoarseness ★ Diarrhea ★ Discrete ulcerative stomatitis or vesicles ★ Viral exanthema.	★ Tonsillar exudates (White patches or pus on tonsils) ★ Fever ★ Tender anterior cervical adenopathy ★ abdominal pain (especially in children due to abdominal lymphadenopathy).

Diagnosis of sore throat

1-General Approach

- Wide range of illnesses must be considered.
- Infectious causes range from generally benign viruses to GABHS.
- Inflammatory presentations may be the result of allergy, reflux disease or, rarely, neoplasm or Kawasaki disease.
- Integrated information from the history, physical examination, environmental and epidemiologic factors also may need to be assessed.

2-Approach specific to GABHS

Important historical elements include:

- Onset, duration, progression, and severity of the associated symptoms (e.g., fever, cough, respiratory difficulty, swollen lymph nodes),
- Exposure to infections.
- Presence of comorbid conditions (e.g., diabetes).

The pharynx should be examined for:

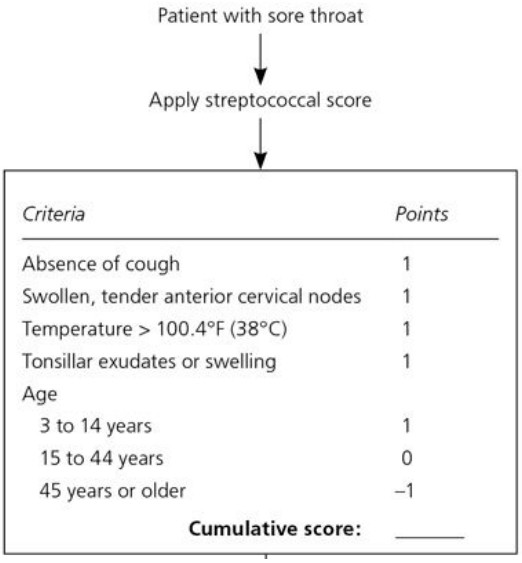
- Erythema, hypertrophy, foreign body, exudates, masses, petechiae, and adenopathy.
- Assess the patient for fever, rash, cervical adenopathy, and coryza. When streptococcal pharyngitis is suspected, listen for the presence of a heart murmur and evaluate the patient for hepatosplenomegaly.

CLINICAL DECISION RULES: (Using Modified/McIsaac Centor Score)

The original **Centor score** uses **four signs and symptoms** to estimate the probability of acute streptococcal pharyngitis in adults with a sore throat.

The score was later modified by adding **age** and validated in 600 adults and children.

The cumulative score determines the likelihood of streptococcal pharyngitis and the need for antibiotics.



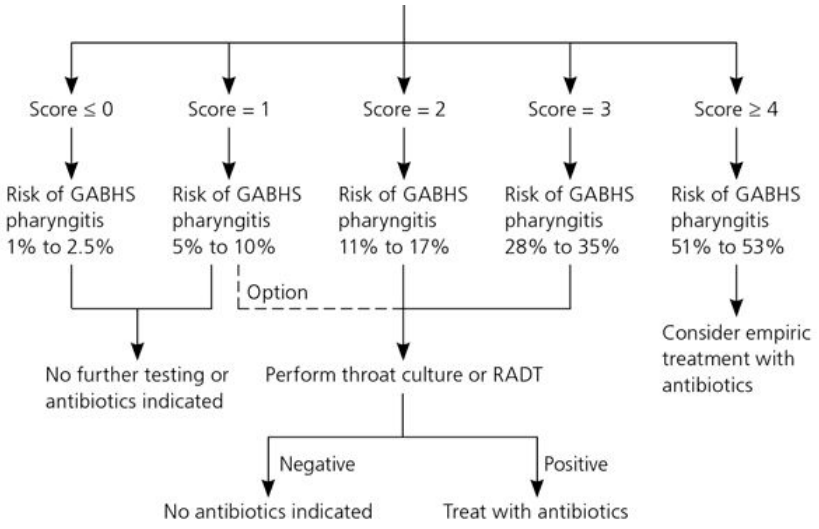


TABLE 1
Selected Laboratory Tests for Identifying the Cause of Pharyngitis

NAME OF TEST	*TYPE OF TEST*	*SENSITIVITY AND SPECIFICITY*
Throat culture	Specimen obtained by throat swab of posterior tonsillopharyngeal area and inoculated onto 5 percent sheep-blood agar plate to which a bacitracin disk is applied; results in 24 to 48 hours	Sensitivity: 97 percent; specificity: 99 percent; results dependent on the technique, medium, and incubation
Rapid antigen detection test or rapid streptococcal antigen test	Detects presence of group A streptococcal carbohydrate on a throat swab (change in color indicates a positive result); results available within minutes; in-office test	Specificity: > 95 percent; sensitivity: 80 to 97 percent, depending on the test
Monospot test	Rapid slide agglutination test for mononucleosis	Overall sensitivity: 86 percent; overall specificity: 99 percent
		First week sensitivity: 69 percent; specificity: 88 percent
		Second week: sensitivity: 81 percent; specificity: 88 percent

Information from references 1,2,4,6,7,11,17, and 23 through 27.

Management of sore throat

Symptomatic	• Advise analgesia and antipyretics (e.g. paracetamol and/or ibuprofen) • NSAIDs (be aware of **GI** and **renal** side effects, **aspirin** should be avoided in **children**)
Antibiotic	• First-line treatment for GABHS pharyngitis includes a 10-day course of penicillin or amoxicillin. • Patients allergic to penicillin can be treated with first-gen cephalosporins (for eg cephalexin) for 10 days, clindamycin or clarithromycin for 10 days, or azithromycin for 5 days antibiotics. • Antibiotics give a modest benefit in **symptom relief** (8h less symptoms) and may confer slight **protection against some complications** (e.g. quinsy = peritonsillar abscess, otitis media)

Reasons To Give Antibiotics Immediately:

- Acute sore throat where **more than 4 centor criteria** are present.
- Patient is **systemically** very unwell.
- Symptoms and signs suggestive of serious illness and/or complications (e.g. peritonsillar abscess, peritonsillar cellulitis)
- High risk of serious complications because of **pre-existing comorbidity** (e.g. significant heart, lung, renal, liver, or neuromuscular disease, immunosuppression, cystic fibrosis, and young children born prematurely)

Pharyngitis Complications

- Quinsy (peritonsillar abscess)
    - *Signs:* unilateral peritonsillar swelling, difficulty swallowing (even saliva), and trismus (difficulty opening jaw).
    - Rx: refer for IV antibiotics + incision and drainage
- Retropharyngeal abscess: Occurs in children
    - *Signs:*inability to swallow, fever.
    - Rx: for IV antibiotics + incision and drainage
- Rheumatic fever:
    - **60%** develop chronic rheumatic heart disease (**70%** mitral valve) Likelihood correlates with severity of initial disease
    - Recurrence may occur after further streptococcal infection or be precipitated by pregnancy or combined hormonal contraception
- Scarlet fever (occurs at the same time with pharyngitis).
- Acute glomerulonephritis.

Prevention of pharyngitis

1) Try to avoid close contact with sick people.
2) If you are sick with flu-like illness, CDC recommends that you stay home for **at least 24 hours** after your fever is gone.
3) Cover your nose and mouth with a tissue when you cough or sneeze. Throw the tissue in the trash after you use it.
4) Wash your hands often with soap and water. If soap and water are not available, use an alcohol-based hand rub.
5) Avoid touching eyes, nose and mouth.
6) Clean and disinfect surfaces and objects that may be contaminated with germs.

General considerations

Chronic GABHS Carrieres..

It is recommended that GAS carriers **do not** ordinarily justify efforts to identify them nor do they generally require antimicrobial therapy because GAS carriers are **unlikely to spread** GAS pharyngitis to their close contacts and are at **little or no risk** for developing suppurative or non-suppurative complications (e.g. acute rheumatic fever)

Contact with GABHS Pharyngitis..
Diagnostic testing or empiric treatment of asymptomatic household contacts of patients with acute streptococcal pharyngitis is **not** routinely recommended.

Otitis media

Etiology:
Usually, AOM is a complication of eustachian tube dysfunction that occurred during an acute viral upper respiratory tract infection. Bacteria can be isolated from **middle ear** fluid cultures in 50% to 90% of cases of AOM and OME.

Causes:

- **Eustachian tube dysfunction/obstruction/abnormality:**
  - Swelling of tubal mucosa (e.g. URTI)
  - obstruction/infiltration of Eustachian tube ostium.
  - Inadequate tensor palati function: cleft palate (even after repair)
  - Abnormal Eustachian tube
- **Disruption of action of:**
  - Cilia of Eustachian tube (Kartagener's syndrome)
  - Mucus secreting cells
  - Capillary network that provides humoral factors, PMNs, phagocytic cell
- **Immunosuppression/deficiency due to:**
  - Chemotherapy, steroids, DM, hypogammaglobulinemia, cystic fibrosis.

Risk factors:

Pediatrics:

- Age (**younger**)
- No breastfeeding (supine Bottle feeding)
- Pacifier use
- Gastroesophageal reflux (GERD)
- Attending **day care** group

All age grous:

- Allergies
- Craniofacial abnormalities
- Exposure to environmental **smoke** or other respiratory irritants
- Family **history of recurrent** acute otitis media
- Immunodeficiency
- Upper respiratory tract infections (**URTI**)

Common causative organism:

Bacterial: (SMH)

- **Streptococcus pneumonia**
- **Haemophilus influenzae**[1]
- **Moraxella catarrhalis**

Viral:

- Rhinovirus
- Parainfluenza virus
- Influenza virus

Signs & Symptoms:

- **Otalgia**
- **Fever** (especially in younger children)
- Headache
- **Deafness**
- **Irritability**
- Otorrhea
- Vomiting
- Loss of appetite

Clinical findings: "by otoscopy"

- Tympanic membrane **Bulging**.
- Tympanic membrane **Impaired mobility.** (can be assessed by pneumatic otoscopy)
- Tympanic membrane **Redness or cloudiness**

Diagnosi Criteria:

- **Moderate to severe bulging of the tympanic membrane.**
- **New onset of otorrhea not caused by otitis externa.**
- **Mild bulging of the tympanic membrane associated with recent onset of ear pain** (less than 48 hours) or **erythema**.

[1] **H. influenzae** has become the **most prevalent organism among children** with severe or refractory AOM following the introduction of the pneumococcal conjugate vaccine.

Management:

First: Antipyretics/analgesics (e.g. paracetamol and/or ibuprofen)

Second: Observation VS Antibiotic therapy When to give antibiotics??!			
Children 6 months or older with otorrhea or severe signs or symptoms	Children 6 to 23 months of age with bilateral acute otitis media without severe signs or symptoms	Children 6 to 23 months of age with unilateral acute otitis media without severe signs or symptoms	Children 2 years or older without severe signs or symptoms
ABx for 10 days	**ABx** for 10 days	Observation **or** **ABx** for 10 days	observation **or** ABx for 5 - 7 days

What are the severe signs or symptoms?

- Moderate or severe otalgia.
- Otalgia for at least 48 hours.
- Temperature of 102.2°F [39°C] or higher.

If symptoms persist 48-72 hours after initiating therapy?
Re-examination: If a bulging, inflamed tympanic membrane is observed, therapy should **be changed to a 2nd line agent.**

Antibiotics Treatment[2]	
1st line	High-dose Amoxicillin (80-90 mg/kg/d into two doses). If allergic: penicillin → Oral cephalosporins, such as cefuroxime (Ceftin)
2nd line	For patients initially on amoxicillin → Amoxicillin/clavulanate For patients initially on oral cephalosporin → intramuscular ceftriaxone, clindamycin, or tympanocentesis may be considered.

Complications:

Inter-temporal Complications:

- Hearing loss & Language delay
- **Mastoiditis** (most common & serious)
- Facial Nerve Paralysis
- Labyrinthitis
- Labyrinthine fistula

Intra-cranial Complications:

- Extradural Abscess
- Subdural Abscess
- Meningitis
- Sigmoid Sinus Thrombosis
- Brain Abscess

Prevention:

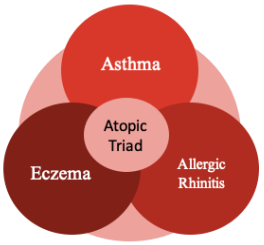
- Parent **education** about risk factors.
- Eliminate bottle propping and pacifiers. (sucking on a pacifier increases the reflux of nasopharyngeal secretions into the middle ear)
- Eliminate exposure to passive **smoke**.
- Pneumococcal and influenza **vaccine**.
- Check for undiagnosed **allergies** leading to chronic rhinorrhea

[2] A common side effect to antibiotic treatment of OM is **diarrhea**.

Allergic Rhinitis

Definition

Is a type of rhinitis, which is an inflammation of the **nasal mucosa**, mediated by an IgE-associated response to ubiquitous indoor and/or outdoor environmental allergens.



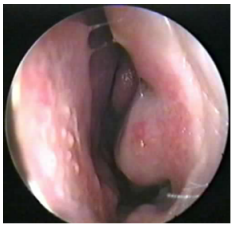
characterized by:

- **Nasal pruritus**
- **Sneezing**
- **Rhinorrhoea** ± Nasal congestion

Clinical signs:

- **Allergic Salute:** The use of the hand palm to rub and raise the tip of the nose
- **Nasal Crease**: results from a chronic upward rubbing of the nose
- **Allergic shiners:** are dark circles under the eyes, caused by venous stasis due to nasal congestion

* Ultimately, prolonged symptoms could lead to facial distortion



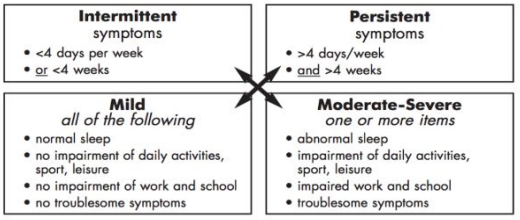
Inflammation and sticky secretion

Classification:

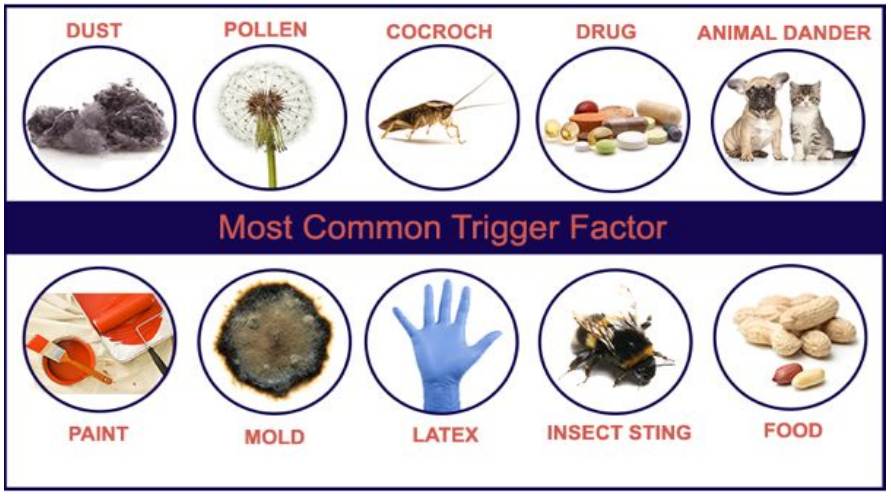
Based on the temporal pattern:	Based on frequency:	Based on Severity:
a.Seasonal (e.g. cyclic pollens) b.Perennial [all year] (e.g. dust mite)	a.Persistent (>4 days/week and >4 weeks) b.Intermittent (<4 days/week or <4wk at a time)	a.Mild b.Moderate c.Severe

ARIA[3] severity Classification

4 categories:(Mildintermittent, Mildpersistent, Moderate-Severeintermittent,Moderate-Severepersistent)



Triggers:



[3] **A**llergic **R**hinitis and his **I**mpact on **A**sthma

Allergy testing:

When?

1. treatment is ineffective.
2. A diagnosis of allergic rhinitis is uncertain.
3. identification of a certain allergen could affect therapy, or to aid in titration of therapy.
4. Coexisting persistent asthma and/or recurrent sinusitis/otitis media.
5. patient's desire to try to avoid the allergen rather than take medications to control symptoms.

Intradermal Skin Tests

AR treatment:

1. **Allergen avoidance:** Is a major principle and first-line therapy for AR.
2. **Mild intermittent** > oral or intranasal Antihistamine
3. **Persistent affect quality of life** > Intranasal corticosteroid alone ,
   a. if still persist > add nasal irrigation or decongestant,
   b. Still persist > consider subcutaneous or sublingual immunotherapy
4. **Severe persistent symptoms** > Intranasal corticosteroid or antihistamine
   a. Still persist > consider subcutaneous or sublingual immunotherapy

*** Immunotherapy:** Only treatment that changes the natural course of allergic rhinitis (acts directly on the cause rather than symptoms)

MCQs

1) A 4 year-old boy brought to the PHC by his mother as chief complaint of sudden onset of **deafness** in his right ear, his mother mention a history of **fever** and **otalgia** for the last week, which has been resolved. **Upon otoscopy examination, what do you expect to see:**

A. Bulging of tympanic membrane
B. Ruptured tympanic membrane
C. Swollen and reddened tympanic membrane
D. Retraction of tympanic membrane

2) A 25 year old male came to the PHC to have a shot of Influenza vaccine. He was ill and his vital signs show fever. In his record there was a documentation of previous allergic reaction to vaccination 5 years ago. **What does the pt. have as contraindication to Influenza vaccine ?**

A. fever
B. headache
C. A previous severe allergic reaction.
D. Muscle and joint pain

3) A 13-year-old adolescent boy presents with fever and sore throat for the last 2 days. His vital signs was: temperature 38°C puls: 120 beats /min. upon physical examination there was tender, enlarged left cervical lymphadenopathy. His pharynx is erythematous but without tonsillar enlargement or exudate. He had no cough. **What is the best step in management?**

A.Treat empirically with antibiotic.
B.Order rapid strep test and, if positive, treat with antibiotics.
C.Neither further testing nor antibiotics.
D.Order throat culture and, if positive, treat with antibiotics

4) A pt. Come to the PHC complaining of runny nose and itchiness. You were attending that clinic and the doctor ask you "**Which conditions are associated with allergic rhinitis**":

A.Asthma
B.Allergic dermatitis
C.Allergic conjunctivitis
D.All of the above

5) Which of the following is the most sensitive physical finding for otitis media?

A.Redness.
B.Immobility.
C.Bulging.
D.Decreased light reflex.
E.Decreased hearing.
5) B

Answers: 1) B 2) C 3) A 4) D