Pediatric Upper Respiratory Tract Infections (URTI)

1. Anatomy & The Common Cold (Acute Rhinitis)

- **Upper Airway:** Nasal cavities, pharynx (naso/oro/laryngopharynx), larynx, trachea.
- **Lower Airway:** Main bronchi, lungs (bronchioles, alveoli).
- **Common Cold:** Acute viral infection. Prominent rhinorrhea & nasal obstruction. **Absent/mild systemic symptoms** (unlike flu).
- **Etiology:** **Human Rhinoviruses (HRV)** cause >50% of colds. Other agents: Coronaviruses (incl. SARS-CoV2), RSV, Adenovirus, etc.
- **Epidemiology:** 6-8 colds/year in young children (10-15% have ≥12/yr). Incidence higher in daycare for first 3 years.
- **Clinical:** Fever common in infants, uncommon in older kids. Cough may persist 1-2 weeks post-resolution. Secretion color/consistency changes naturally and **DOES NOT indicate bacterial superinfection**.
- **Treatment:** Supportive. Hydration, Paracetamol. Topical adrenergic agents (Xylometazoline) NOT recommended <6 yrs (risk of rhinitis medicamentosa with prolonged use). 1st-gen antihistamines reduce rhinorrhea slightly; 2nd-gen have NO effect.
- **Complications:** **Most common is Acute Otitis Media (AOM)**. Exacerbation of asthma.

2. Sinusitis

Infection of the paranasal sinuses. Maxillary and ethmoidal sinuses are **present at birth** (maxillary can be infected in infancy). Sphenoidal present by 5 yr. Frontal begins at 7-8 yr (completely developed in adolescence).

> **MEMORY AID: SINUS DEVELOPMENT TIMELINE**
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> **M.E. at birth, Sphenoid at 5, Frontal is Final (7-8)**
> **M**axillary & **E**thmoidal = birth. **S**phenoid = 5 yrs. **F**rontal = 7-8 yrs.

- **Bacterial Etiology:** 1. *S. pneumoniae* (~30%) 2. *H. influenzae* (Nontypeable, ~20%) 3. *M. catarrhalis* (~20%)
- **Diagnosis (Differentiating bacterial from viral):** Clinical diagnosis based on ONE of three criteria:
    1. **Persistence:** Symptoms ≥ 10 days without improvement.
    2. **Severe:** Temp ≥ 39°C (102°F) + purulent discharge ≥ 3 days.
    3. **Worsening:** Recurrence of fever/cough after initial improvement ("double sickening").

  Note: Routine X-rays/CTs are NOT recommended for uncomplicated cases.
- **Treatment:** **Amoxicillin-clavulanate (High dose: 90 mg/kg/day)**. Penicillin allergy: Clindamycin ± 3rd gen cephalosporin, Levofloxacin.
- **Complications:** Orbital/periorbital cellulitis. Intracranial (epidural abscess, meningitis). **Pott puffy tumor:** Osteomyelitis of frontal bone.

> **MEMORY AID: THE "BIG 3" URTI BACTERIA**
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> For Sinusitis AND Otitis Media, remember **S.H.M.**:
> **S**trep pneumo, **H**. influenzae, **M**oraxella catarrhalis.

3. Pharyngitis & Tonsillitis

Inflammation mostly viral. Bacterial mostly Group A Strep (GAS). Extremely uncommon before 2-3 years of age.

- **Viral Causes:**
  - **Adenovirus:** Pharyngoconjunctival fever.
  - **Coxsackie A16:** Hand-foot-mouth disease (vesicles on palms/soles/mouth) & Herpangina (posterior oropharynx vesicles/ulcers).
  - **HSV:** Gingivostomatitis (anterior pharynx).
  - **EBV:** Mononucleosis (treat severe cases with systemic steroids).
- **Group A Streptococcus (GAS):** Peak in winter/spring, 5-15 yr olds. Presents with rapid onset sore throat, fever, white/gray tonsillar exudate, **petechiae/"doughnut" lesions** on palate, tender anterior cervical lymph nodes. Ear pain common but TM is normal. **Usually lacks cough or rhinorrhea.**
- **Scarlet Fever:** Caused by GAS. Fine red papular "sandpaper" rash, circumoral pallor, **Pastia's lines** (intense rash in creases), and **Strawberry tongue**.
- **Diagnosis: Throat culture is the Gold Standard.** Rapid Antigen Detection Test (RADT) is less sensitive; a negative RADT must be confirmed with a culture.
- **Treatment:** Oral Penicillin/Amoxicillin for **10 Days** or single IM Benzathine penicillin. Allergy: 1st gen Cephalosporin (if non-anaphylactic) or Macrolide/Clindamycin.

> **MCQ TRAP: GAS COMPLICATIONS**
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> Treatment of GAS pharyngitis **prevents Acute Rheumatic Fever (ARF)** if started within 9 days.
> Treatment **DOES NOT prevent Acute Post-Streptococcal Glomerulonephritis (APSGN).**

4. Deep Neck Infections

Feature	Retropharyngeal Abscess	Peritonsillar Abscess
Typical Age	**Toddlers < 3-4 years** (retropharyngeal nodes involute after age 5)	**Adolescents**
Key Findings	Muffled "hot potato" voice, neck stiffness (torticollis), refusal to move neck, **bulging posterior pharyngeal wall**.	Trismus (lockjaw), asymmetric tonsillar bulge with **displacement of the uvula**.
Pathogens	Polymicrobial (GAS, anaerobes, S. aureus)	Polymicrobial (GAS, anaerobes)
Diagnosis & Tx	CT neck. IV Antibiotics (3rd gen Ceph + Clinda/ Amp-sulbactam). Drainage if respiratory distress or no improvement.	Clinical diagnosis (uvula shift). Surgical drainage (aspiration/incision) + Antibiotics. Fear of rupture leading to aspiration.

5. Otitis Media (AOM vs OME)

Peak incidence 6-20 months. Most common cause of acquired hearing loss in kids.

- **AOM (Acute Otitis Media):** Acute infection. Symptoms: ear pain (tugging), irritability, fever. Exam: **Bulging TM, erythematous, landmarks obscured, NOT mobile** on pneumatic otoscopy.
- **OME (Otitis Media with Effusion):** Fluid without acute infection. Often presents as conductive hearing loss (>20 dB), fullness, balance issues.
- **Bacteriology (AOM):** Same as sinusitis (S. pneumo, H. flu, M. cat). Viral in 25-30% (RSV, flu, adeno).
- **Treatment AOM:** 1st line: **Amoxicillin/Amox-Clav (High dose 80-90 mg/kg)**. Duration: 10 days for <2 yo; 5-7 days for >2 yo.
- **Treatment OME:** No antibiotics initially. If MEE persists >3 months with hearing loss, ENT referral for Tympanostomy tubes.

6. The Stridor Conditions (Upper Airway Obstruction)

Condition	Croup (Viral LTB)	Acute Epiglottitis	Bacterial Tracheitis
Etiology	Parainfluenza types 1, 2, 3	*H. influenzae* type B (HiB)	*S. aureus* (mean age 5-7y)
Clinical	18-24 mo. **Barking cough**, coryza prodrome, inspiratory stridor. Worse at night.	Rapid/fulminant, high fever, **Drooling**, Tripod position, cyanosis.	Follows viral croup. High fever, "toxicity", brassy cough. **Lies flat, NO drooling.**
X-Ray Sign	Steeple sign (AP view)	Thumb sign (Lateral view)	Ragged tracheal air column
Treatment	**Dexamethasone** (0.15-0.6 mg/kg PO/IM). Nebulized Epinephrine for moderate/severe.	**DO NOT examine throat blindly.** Intubate in OR/ICU. 3rd gen Ceph.	Intubation (often required). Vancomycin/Clindamycin + 3rd gen Cephalosporin.

**Spasmodic Croup: Similar to viral but older kids, sudden night onset, NO viral prodrome, linked to atopy/allergies.*