- **Some laboratory methods used to detect causes of infectious diseases:**

Microbiologic stains	Gram-staining
	Ziehl-Neelsen stain (detecting acid-fast bacilli Mycobacterium tuberculosis)
	Silver stain (for fungul elements)
	Wright stain (detecting WBCs in stool)
Fluorescent antibody-antigen staining	RSV, parainfluenza, influenza A & B and adenovirus
Direct observation	Wet mount
	Dark-filed microscopy (for Treponema pallidum which is causing syphilis)
Intradermal skin testing	Example: PPD test for Mycobaterium tuberculosis

- **Evaluation of a child with fever:**
  - **Fever is defined as a rectal temperature > 38 C**
  - **When fever is present, serious infections must be evaluated (such as: meningitis, pneumonia, sepsis, enteritis and UTIs) in the following groups:**
    - ✓ Infant < 28 days (why?) → because the immune system is still immature.
    - ✓ Older infant with higher fever (> 39 C) who are sick-looking.
    - ✓ Infants and children with: immunodeficiency, sickle-cell disease or cardiac diseases.
  - **Fever in infants < 3 months:**
    - ✓ Infections are transmitted through: transplacental, during delivery from birth canal or after delivery at nursery or home.
    - ✓ Viruses are most common followed by bacterial infections depending on the age:

Age	Bacterial pathogens	Empiric treatment
0-1 month	GBS; Listeria monocytogens and E.coli	Ampicillin + cefotaxime
1-3 months	GBS, Listeria monocytogens and S.pneumoniae	Ampicillin + cefotaxime (+ vancomycin if bacterial meningitis is suspected)
3 months – 3 years	S.pneumoniae, N.gonorrhea and H.influenzae	Cefotaxime (+ vancomycin if bacterial meningitis is suspected)
3 years – adults	S.pneumoniae and N.gonorrhea	Cefotaxime (+ vancomycin if bacterial meningitis is suspected)

    - ✓ Clinical features (non-specific): fever, irritability, poor feeding, vomiting, diarrhea, cough and rhinorrhea.
    - ✓ Laboratory investigations should include: CBC, blood cultures, chest radiograph, urinalysis and urine culture and CSF analysis.
    - ✓ Hospitalization for:
      - ❖ All infants ≤ 28 days.
      - ❖ Those between 1-3 months with any of the following: toxic-appearance, suspicion of meningitis, pneumonia, pyelonephritis or bone and soft tissue infection.
  - **Fever in children between 3 months – 3years:**

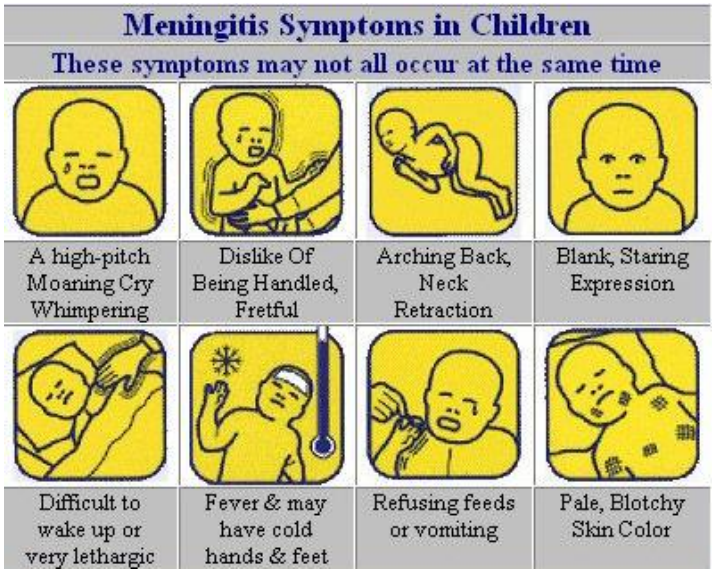
- ✓ The most common causative organism is S.pneumoniae
- ✓ Management:

Child has toxic-appearance	Hospitalization, sepsis evaluation and IV antibiotics
Child is not toxic and temperature < 39	Observe closely at home
Child is not toxic but temperature > 39	Chest radiograph is signs of respiratory distress are present
	Urine culture for males < 6 months and females < 2 years
	Stool culture when there is blood or mucus in stool
	Blood culture for all children
	Empiric antibiotics for all children

- **Fever of Unknown Origin (FUO):**
  - ✓ It is defined as fever which lasts longer than 8 days – 3 weeks in which prior history, physical examination and laboratory investigations all have failed in reaching a diagnosis.
  - ✓ 25% of cases will resolve spontaneously.
  - ✓ All patients will fever lasting > 2 weeks must be hospitalized.

- **Meningitis:**
  - ✓ It is defined as inflammation of the meninges (covering the brain and spinal cord) which can be bacterial or aseptic (mainly viral).
  - ✓ Bacterial meningitis:
    - ❖ Incidence is higher in 1st month of life (caused by: GBS, E.coli or Listeria monocytogens).
    - ❖ *Risk factors include:*
      - ➢ Younger age.
      - ➢ Immunodeficient state.
      - ➢ Anatomic defects (e.g. basilar skull fracture).
    - ❖ *Clinical features:*

Infants and young children (non-specific)	FEVER MAY BE ABSENT; irritability; poor feeding; bulging fontanelle and respiratory distress
Older children	FEVER; altered level of consciousness; nick rigidity; kernig's sign; Brudzinski's sign; photophobia; vomiting; seizures and headache



❖ *Investigations*: blood culture; CT-scan (to evaluate for presence of increased intracranial pressure before doing lumbar puncture) then lumbar puncture for CSF analysis:

WBCs	Glucose	Protein	Gram-stain & culture
Neutrophils	↓	↑	+

❖ *Management (depending on the age):*

0-1 month	Ampicillin + cefotaxime
1-3 months	Ampicillin + cefotaxime (+ vancomycin if bacterial meningitis is suspected)
3 months – 3 years	Cefotaxime (+ vancomycin if bacterial meningitis is suspected)

❖ *Complications*: occurring more with gram (-) bacteria followed by S.pneumoniae, H.influenzae and N.gonorrhea

Hearing loss	25% of patients
Global brain injury	10% of patients
Others	Such as brain abscess

✓ Aseptic meningitis:

❖ *It is defined as inflammation of meninges with the following finding of CSF analysis:*

WBCs	Glucose	Protein	Gram-stain & culture
Lymphocytes	Normal	Normal/↑	Enteroviruses (+); other viruses PCR

❖ *Etiology:*

- Enteroviruses (most common).
- Herpes viruses (HSV, EBV, CMV and varciella zoster virus)
- Mumps.

❖ *Clinical features (mild):* fever, altered level of consciousness, headache, seizures and vomiting.

❖ *TB meningitis (findings of CSF):*

WBCs	Glucose	Protein	Gram-stain & culture
Lymphocytes	↓	↑	AFB smear; culture rarely (+)

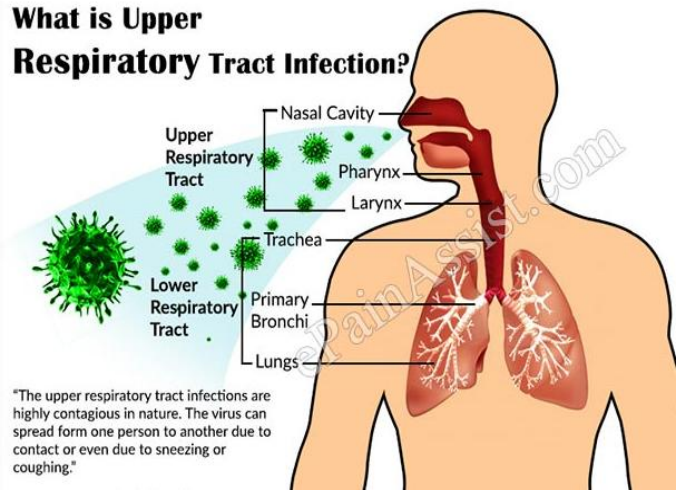
- Notice that brain imaging shows: basilar enhancement.

❖ *Management:*

- Most viral meningitis are self-limited. Enteroviruses have excellent prognosis.
- TB meningitis is treated with: isoniazid, rifampin, pyrazinamide and streptomycin. Prognosis is poor (20% mortality!).

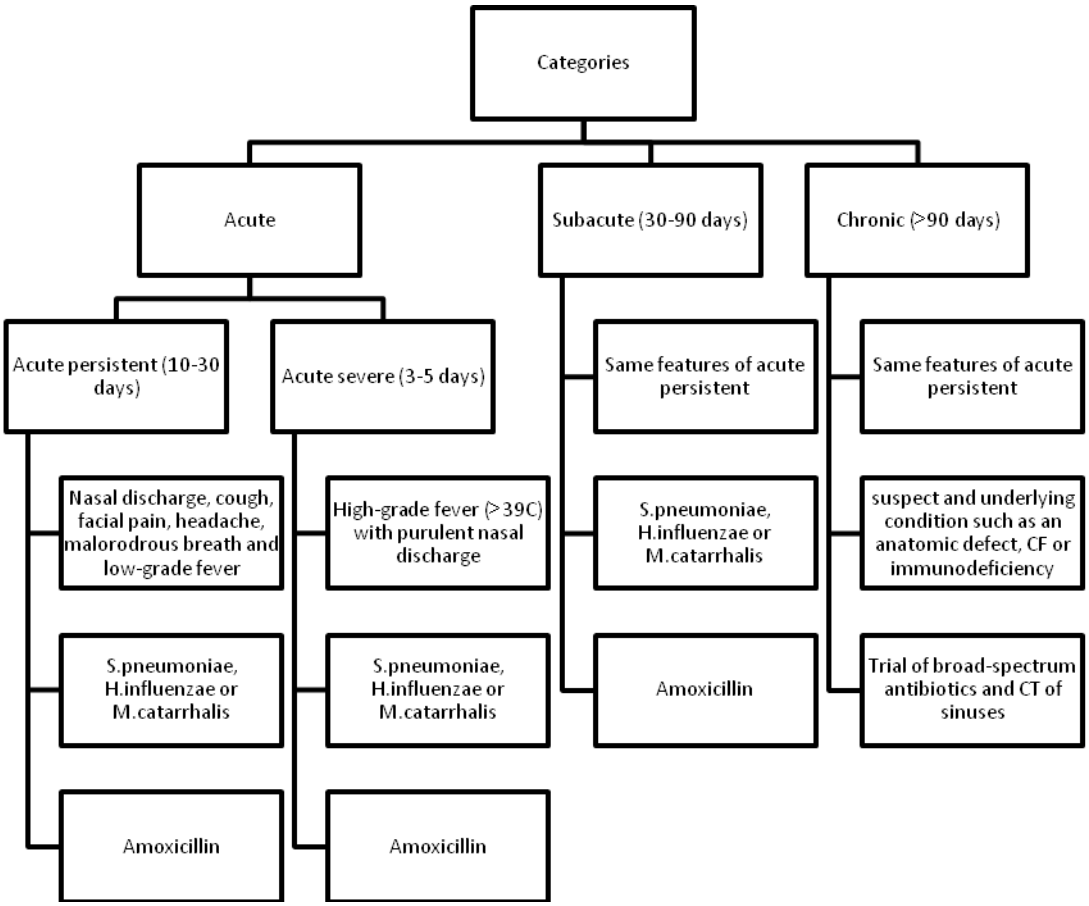
- **Upper respiratory infections:**

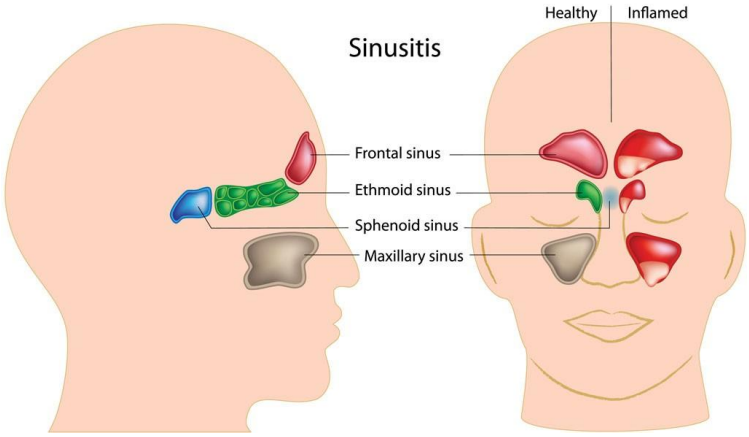
- **Simple upper respiratory infection (common cold):**
  - ✓ Caused by: RSV, parainfluenza virus, rhinovirus or coronavirus.
  - ✓ Clinical features: low-grade fever, cough, rhinorrhea and sore throat. Recovery occurs within 1 week (if lasting > 10 days → suspect bacterial superinfection).
  - ✓ Management: supportive with paying attention to hydration especially in young children.

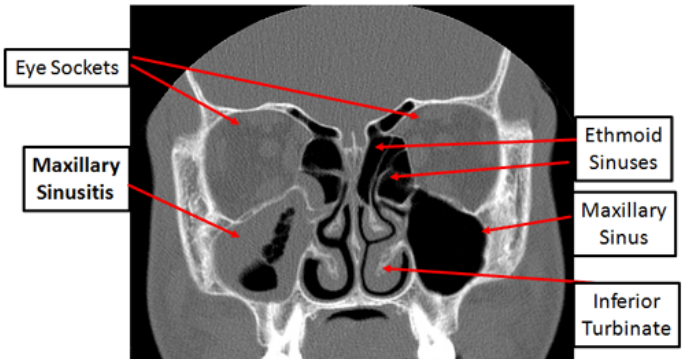


- **Sinusitis:**
  - ✓ Development of sinuses:

Ethmoid and maxillary	Present at birth
Sphenoid	3-5 years
Frontal	7-10 years







- **Pharyngitis:**

Viral	Bacterial
Etiology: those responsible for URI + EBV + CMV + coxsackievirus	**Etiology**: GABHS (S.pyogens)
Clinical features: those of URI; tonsillar exudates may be present • EBV pharyngitis: enlargement of posterior cervical lymph nodes, hepatosplenomegaly and malaise • Coxsackievirus pharyngitis: painful vesicles/ulcers on posterior pharynx and it may present as hand-foot-mouth disease	**Clinical features**: fever, tonsillar exudates, petechiae on soft palate, strawberry tongue and enlarged tender anterior cervical lymph nodes • Diphtheria presents with: gray, adherent tonsillar membrane
Diagnosis: throat culture (gold standard)	
Management: analgesics and hydration	**Management**: oral penicillin VK, single dose IM benzathine penicillin. For penicillin allergic patients: use macrolides

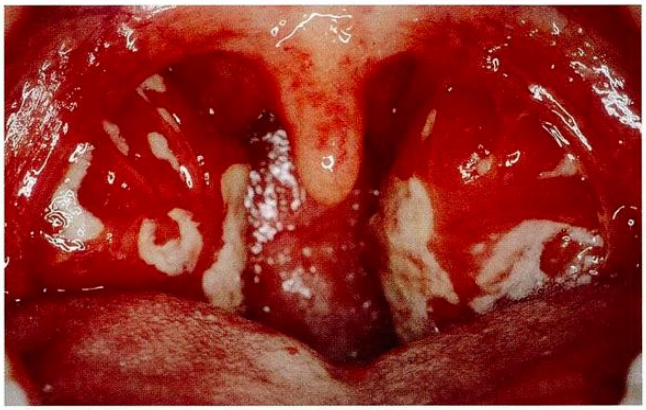
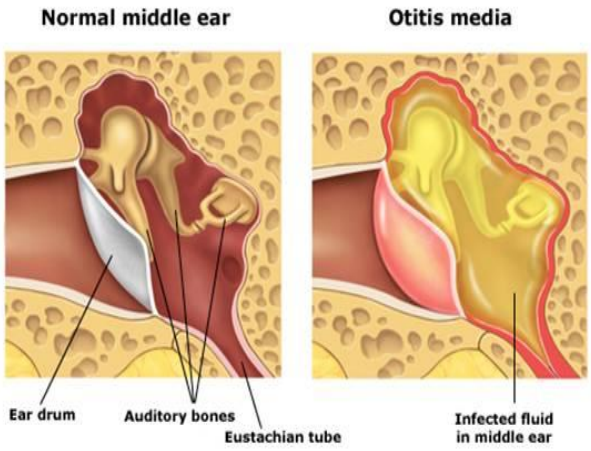


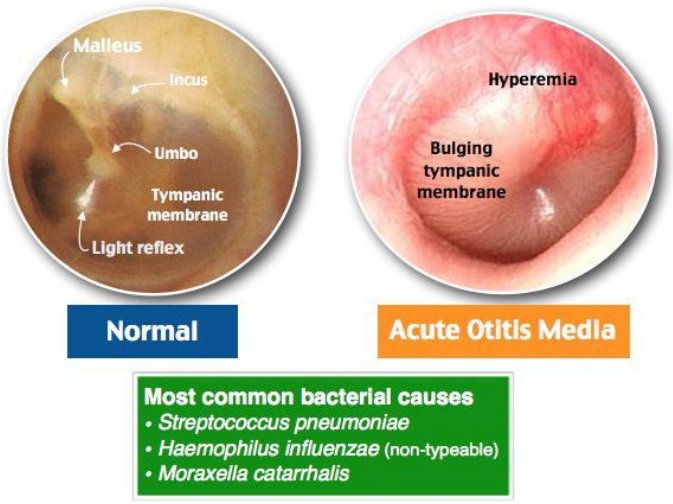
FIGURE 117-8. Marked white exudates on the tonsils of a child with Epstein-Barr virus infection. (Reproduced with permission from Kane KSM, Lio P, Stratigos A, Johnson R: *Color Atlas & Synopsis of Pediatric Dermatology, 2nd ed.* New York, McGraw-Hill, 2010.)

- **Acute otitis media:**
  - ✓ It is an infection of the middle ear space resulting in fluid accumulation.
  - ✓ Causative organisms (similar to those causing sinusitis): S.pneumoniae, H.influenzae and M.catarrhalis.
  - ✓ Clinical features: fever, ear pain and decreased hearing. If there is perforation of tympanic membrane → there will be drainage of pus or fluid.
  - ✓ Diagnosis (principle id to detect presence of fluid in middle ear cavity):



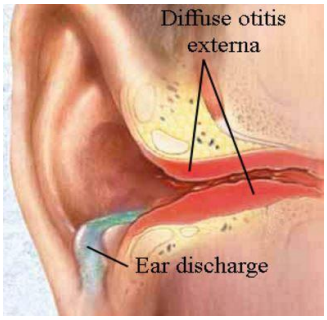
Reliable method	Unreliable method
Pneumatic otoscope	Erythema and loss of tympanic membrane landmarks

  - ✓ Management: amoxicillin + clavulanic acid



- **Otitis externa:**
  - ✓ It is inflammation of External Auditory Canal (EAC).
  - ✓ Causes: excessive removal of wax, excessive moisture/humidity or trauma. All predisposing to infection with Pseudomonas aeruginosa and S.aureus.
  - ✓ Clinical features: pain, itchiness and drainage from the ear.
  - ✓ Diagnosis: erythema and edema of EAC + tenderness on palpation of the tragus.
  - ✓ Management:

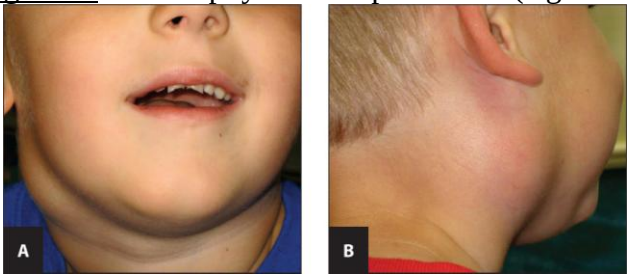
Mild	Acetic acid solution
Severe	Topical antibiotics



- **Cervical lymphadenitis:**
  - ✓ It is defined as enlarged, inflamed, tender cervical lymph nodes.
  - ✓ Etiology and differential diagnosis:

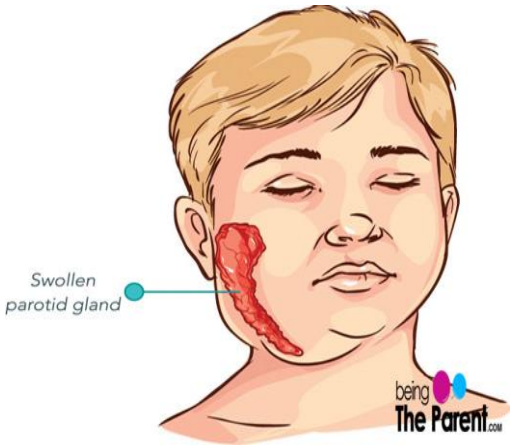
Localized bacterial infection	S.aureus (most common) followed by S.pyogens
Reactive lymphadenitis	Occurring in response to infections of pharynx, teeth or soft tissues of head and neck
Viral	EBV, CMV and HIV
Kawasaki disease	Unilateral cervical lymphadenitis

  - ✓ Clinical features (signs of inflammation): lymph node is enlarged, erythematous, warm and tender.
  - ✓ Management: anti-staphylococcal penicillins (e.g. cloxacillin) for 7-10 days.



- **Parotitis:**
  - ✓ It is defined as inflammation of salivary parotid glands.

Mumps	Bacterial (S.aureus and S.pyogens)
It was the most common cause before vaccination and it causes bilateral involvement	Unilateral involvement
Clinical features: fever and swelling above the angle of the jaw. Diagnosis can be confirmed by CT-scan	
Diagnosis: viral serology	**Diagnosis**: culture of drainage from Stensen's duct
Management: supportive and analgesics	**Management**: antibiotics
Complications: orchitis and epididymitis	**Complications**: abscess and osteomyelitis



- **Skin and soft tissue infections:**
  - **Impetigo:**
    - ✓ It is a superficial skin infection involving the upper dermis.
    - ✓ Caused by: S.aureus (most common) or GABHS.
    - ✓ Clinical features: honey-colored crusts present especially around the nares. Diagnosis is made by visual inspection.
    - ✓ Management: topical mupirocin.
    - ✓ Complications: bacteremia, PSGN or SSSS.

  - **Erysipelas:**
    - ✓ It is a skin infection involving dermal lymphatics.
    - ✓ Caused by: GABHS.
    - ✓ Clinical features: tender, erythematous skin WITH DISTINCT BORDERS involving face and scalp. Diagnosis is made by visual inspection.
    - ✓ Management: antibiotics against GABHS.
    - ✓ Complications: bacteremia, PSGN or necrotizing faciitis.

  - **Cellulitis:**
    - ✓ It is a skin infection involving the dermis.
    - ✓ Caused by: GABHS and S.aureus.
    - ✓ Clinical features: tender, erythematous skin WITH INDISTINCT BORDERS. Diagnosis is made by visual inspection.
    - ✓ Management: 1st generation cephalosporins (cephalexin) or anti-staphylococcal penicillins.

- ✓ Important variants of cellulitis:

Buccal cellulitis	• Unilateral bluish discoloration of the cheek in a young non-immunized child. • **Caused by**: HIB • **Management**: 3rd generation cephalosporins • There is a high rate of bacteremia and minigitis (thus lumbar puncture should be done)
Perianal cellulitis	• Well-demarcated erythematous skin around the anus. • **Caused by**: GABHS • **Management**: 1st generation cephalosporins (cephalexin)
Necrotizing faciitis	• It is a deep cellulitis extending beyond the fascia into muscles. • **Management**: surgical removal of damaged tissues and IV antibiotics.
Staphylococcal Scalded Skin Syndrome (SSSS)	• **Caused by**: S.aureus producing exfoliative toxin. • **Clinical features**: Large sheets of skin will slough several days after illness begins. • **Management**: good wound care and IV antibiotics against S.aureus

- **Scarlet fever:**
  - ✓ It is a toxin-mediated bacterial illness which is resulting in a characteristic skin rash.
  - ✓ Caused by: a stain of GABHS which is producing an erythrogenic toxin.
  - ✓ It is common in winter-spring and is transmitted by large respiratory droplets and infected nasal secretions.
  - ✓ Clinical features: fever followed by exanthema (skin eruption):
    - ❖ It begins on the trunk then extending peripherally.
    - ❖ Sandpaper rash.
    - ❖ Desquamation of dry skin occurs as infection resolves.
  - ✓ Diagnosis: clinical features + positive throat culture for S.pyogens (gold standard).
  - ✓ Management (same as that for bacterial pharyngitis): oral penicillin VK, single dose IM benzathine penicillin. For penicillin allergic patients, use macrolides.
  - ✓ Complications: PSGN and rheumativ fever.


- **Toxic Shock Syndrome (TSS):**
  - ✓ It is a toxin-mediated illness characterized by: fever, shock, desquamating skin rash and multiorgan dysfunction.
  - ✓ Caused by: S.aureus

✓ Diagnostic criteria:

Fever	> 38.5 C
Hypotension	Systolic blood pressure < 90 mmHg
Macular erythroderma	Similar to sunburn
Desquamation	10-14 days after onset
Multiorgan dysfunction	GI: vomiting diarrhea and abdominal pain
	Mylagias
	Pyuria with negative urine culture
	Thrombocytopenia
	Hyperemia of mucuous membranes
Negative culture of blood, CSF and pharynx	Except positive blood culture for S.aureus

✓ Management: supportive measures to reverse the shock + anti-staphylococcal penicillins (cloxacillin).

- **Diarrhea:**

- Diarrheal diseases and resulting dehydration are among the most common causes of childhood morbidity and mortality worldwide. Infection of one of the most common causes of acute diarrhea during childhood.
- **Viral causes:**

Rotavirus (the most common cause of gastroenteritis)	**Norwalk virus**
RNA virus	RNA virus
Feco-oral transmission	Feco-oral transmission
Diarrhea, vomiting and dehydration	Diarrhea, vomiting (being more prominent) and dehydration
Lasting 7 days	Lasting 48-72 hours
Diagnosed by ELISA	Diagnosed clinically
Management: supportive with attention to fluid replacement	

- **Bacterial causes:**

Bacterium	**Features**	**Diagnosis**	**Management**
Enterotoxigenic E.coli	Traveler's watery diarrhea	Stool WBCs absent; culture is diagnostic	Antibiotics (quinolones) + hydration
Enteropathogenic E.coli	Watery diarrhea	Stool WBCs absent; culture is diagnostic	Antibiotics (quinolones) + hydration
Enterohemorrhagic E.coli	Strain O157:H7 causing HUS and resulting bloody diarrhea	Stool WBCs present; culture is diagnostic	If HUS is present avoid antibiotics
Shigella	Bloody diarrhea; children may develop seizures secondary to neurotoxin release	Stool WBCs present; culture is diagnostic	3rd generation cephalosporins
Salmonella	Diarrhea (±blood); in patients with SCD →osteomyelitis	Stool WBCs present/ absent; culture is diagnostic	3rd generation cephalosporins
Campylobacter jejuni	Bloody diarrhea	Stool WBCs present; culture is diagnostic	Erythromycin

Yesinia enterocolitica	Gastroenteritis mimicking appendicitis	-	3rd generation cephalosporin
Clostridium defficile	After antibiotic use	Endoscopy showing pseudomembranes	Metronidazole
Vibrio cholera	Watery diarrhea with massive water loss	-	Fluid replacement is critical

- **Evaluation of diarrhea:**
  - ✓ History must include questions about the following: fever, abdominal pain, vomiting. blood/mucus in stool, recent travel or eating from outside.
  - ✓ Investigations: CBC, serum electrolytes and stool for occult blood and culture. Notice that patients with diarrhea have non-anion gap hyperchloremic metabolic acidosis.

- **Specific viral infections:**

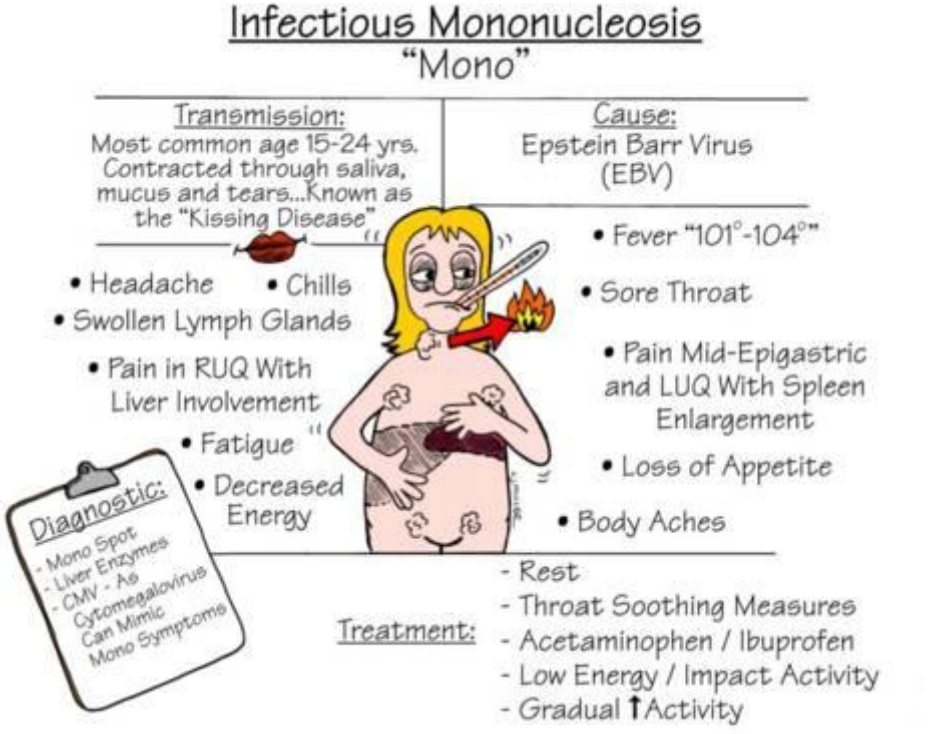
- **Human Immunodeficiency Virus (HIV):**
  - ✓ Worldwide, 1 million children have AIDS while 10 millions have HIV infection.
  - ✓ Transmission of HIV:
    - ❖ *Perinatal transmission composing > 95% of pediatric HIV cases. Perinatal transmission is either transplacental, during delivery through birth canal or via breast-feeding.*
    - ❖ *Factors which increase the risk of transmission*: high maternal viral load, advanced maternal HIV disease, primary maternal HIV infection, prematurity, prolonged rupture of membranes and chorioamnionitis.
    - ❖ *Factors decreasing risk of transmission*: low maternal viral load, delivery through CS and anti-retroviral therapy during pregnancy with prophylactic therapy to the baby.
    - ❖ *Other modes of transmission*: sexual contact, contaminated needles and blood products.
  - ✓ Clinical features: it is asymptomatic during the first year of life but early symptoms may include the following: FTT, loss of developmental milestones, recurrent infections, lymphadenopathy and thrombocytopenia.
  - ✓ Diagnosis:
    - ❖ All infants born to HIV-infected mothers will have transplacentally acquired maternal antibodies that may persist for 18 months.
    - ❖ HIV DNA PCR will be done monthly until 4 months → if still negative → infant is not infected → but still he will be followed up until losing maternal antibodies at 18 months.
  - ✓ Management:

Infants born to HIV-infected mothers	• No breast-feeding. • Zidovudine for 6 weeks (prophylactic) • Sulfamethoxazole/trimethoprim (SMX/TMP) for Pneumocystis Carinii Pneumonia (PCP) prophylaxis until HIV DNA PCR is negative at 4 months of age.
HIV-infected children	• **Anti-retroviral agents (combination therapy):** ✓ Nucleoside Reverse Transcriptase Inhibitors ✓ Non-Nucleoside Reverse Transcriptase Inhibitors ✓ Protease inhibitors • Prophylaxis for opportunistic infections. • All routine childhood immunizations except live varicella vaccine. • Regular monitoring of CD4+ and viral load.

- ✓ Opportunistic infections:

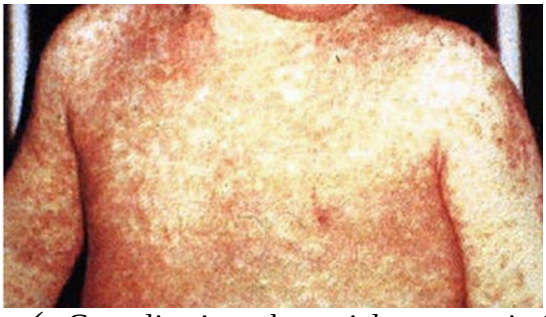
PCP	• Most common in HIV-infected children. • Features: fever, hypoxia and interstitial pulmonary infiltrates. • Management: TMP/SMX
M.avium Complex (MAC)	• Occurring when CD4 count < 50 cells/mm^3
Fungal infections	• Candida (thrush). • Cryptococcus (meningitis and pneumonia)
Viral infections	• CMV (retinitis)
Parasitic	• Toxoplasmosis. • Cryptospordium.

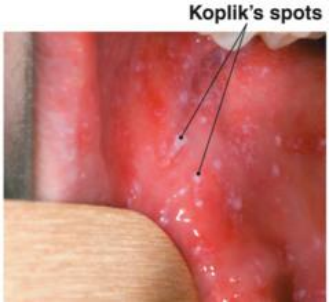
- **Infectious mononucleosis:**
  - ✓ It is caused by EBV which is belonging to herpes virus family; transmitted through saliva and infecting B-lymphocytes.
  - ✓ Clinical features (in older children):
    - ❖ Fever (may last up to 2 weeks).
    - ❖ Hepatosplenomegaly (spleen enlarged in 80% of patients).
    - ❖ Posterior cervical lymphadenopathy.
    - ❖ Scarlatiniform rash.
    - ❖ Pharyngitis (resembling GABHS pharyngitis).
      Symptoms resolve in weeks to months.
  - ✓ Diagnosis:
    - ❖ Atypical lymphocytes, neutropenia, thrombocytopenia and ↑transaminases.
    - ❖ Children < 4 years of age: EBV antibody titers (detecting VCA, EA and EBNA):
      - ➢ Active infection: ↑IgM-VCA
      - ➢ After 2- months of the disease: ↑antibodies to EBNA
    - ❖ Children > 4 years of age: monospot
  - ✓ Management: supportive.
  - ✓ Complications: splenic rupture and association with malignancies (Burkitt's lymphoma and nasopharyngeal carcinoma).



- **Measles:**
  - ✓ It is an RNA virus belonging to paramyxoviridae family. Incidence has declined due to routine vaccination but it is highly infectious when occurring.
  - ✓ Clinical features: fever and the following (in sequence):

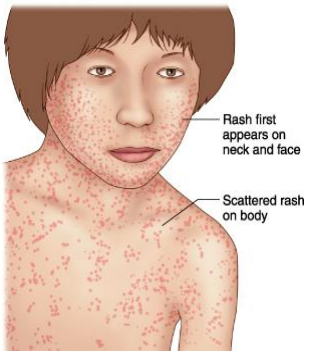
Clinical prodrome (three C's)	Cough, Conjunctivitis and Coryza (flue)
Enanthem (rash on mucous membranes)	Koplik spots (small gray papules on buccal mucosa)
Exanthema (rash on skin)	Erythematous maculopapular rash beginning around neck and ear then descending to chest and upper extremities in the subsequent 24 hours. It will resolve within 1 week





  - ✓ Complications: bacterial pneumonia (most common complication and cause of mortality). Otitis media is also common.
  - ✓ Diagnosis: clinical features and serology.
  - ✓ Management: supportive + vitamin A
- **Rubella:**
  - ✓ It is an RNA virus belonging to togavirus family. Incidence has declined due to routine vaccination but it is highly infectious when occurring.
  - ✓ Clinical features:

Clinical prodrome	Low-grade fever with mild upper respiratory symptoms
Painful lymphadenopathy	Suboccipital, posterior auricular and cervical nodes.
Exanthema	Non-pruritic, maculopapular and confluent. It begins on the face then spreads to the trunk and extremities and resolving within 3-4 days.



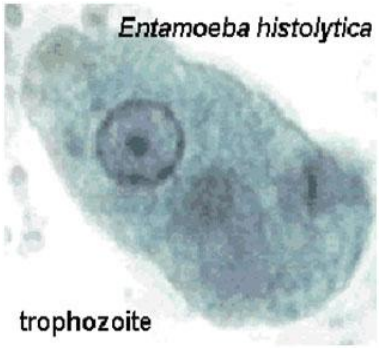
  - ✓ Complications:
    - ❖ *Meningoencephalitis.*
    - ❖ *Polyarteritis*: especially in teenage girls and young women.
    - ❖ *Congenital rubella syndrome:*
      - ➢ It occurs when there is maternal infection during 1st trimester with resultant 30-50% anomalies in infected fetuses.
      - ➢ Presenting features: hepatosplenomegaly, jaundice, thrombocytopenia and purpura (blueberry muffin baby).
      - ➢ Structural abnormalities: congenital cataracts, PDA and sensorineural hearing loss.
  - ✓ Diagnosis: viral culture and serology.
  - ✓ Management: supportive.

- **Specific fungal infections:**
  - **Aspergillosis (mold):**

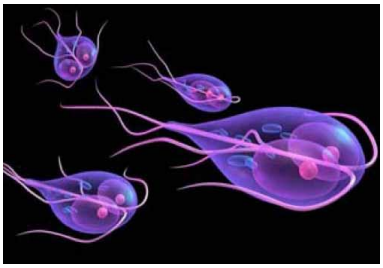
Invasive disease	• In severely immunocompromised patients. • **Management**: high-dose systemic anti-fungal therapy (amphotericin B) + surgery to resect the aspergilloma. • **Prognosis**: poor.
Allergic bronchopulmonary aspegillosis	• **Characterized by**: wheezing, eosinophilia and pulmonary infiltrates. • **Occurring in**: patients with chronic lung disease (e.g. CF). • **Management**: corticosteroids.

  - **Candidiasis (yeast):**
    - ✓ Clinical features: diaper rash, oral thrush and vulvovaginal candidiasis.


    - ✓ Management: topical antifungal therapy.
    - ✓ Invasive candidal infection can result in: fungemia, meningitis, osteomyelitis and endophthalmitis. Management: systemic antifungal therapy.
- **Specific parasitic infections:**
  - **Amebiasis:**
    - ✓ It is caused by Entamoeba histolytica which is transmitted via ingestion of cysts contaminating water and food. After an incubation period of 1-4 weeks, trophozoites will emerge from cysts and invade colonic mucosa.
    - ✓ Clinical features (ranging from mild colitis to severe dysentery): cramping abdominal pain, tenesmus and bloody diarrhea. Abdominal complications include: perforation, hemorrhage, strictures and formation of ameboma. Notice that extra-intestinal amebiasis is represented by liver abscess.
    - ✓ Diagnosis: identifying cysts/trophozoites in stool.
    - ✓ Management: metronidazole + iodoquinol.

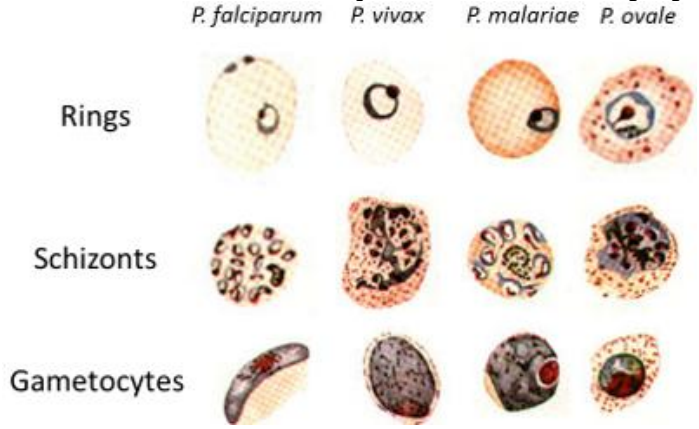


  - **Giardiasis:**
    - ✓ It is caused by Giardia lamblia which is transmitted by ingestion of cysts. It can also be transmitted from person-to-person or from animals such as dogs and cats.
    - ✓ Clinical features: diarrhea which is watery, large-volume and foul-smelling.
    - ✓ Diagnosis: identifying cysts/trophozoites in stool.
    - ✓ Management: metronidazole.

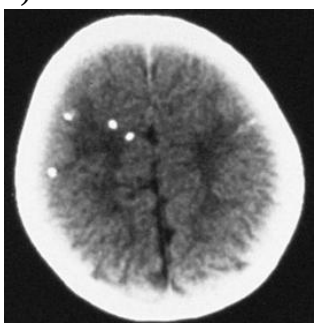


  - **Malaria:**
    - ✓ It is an obligate intracellular bloodborne parasitic infection caused by 4 species of plasmodium: P.vivax (most common worldwide), P. ovale, P.malariae and P.falciparum (most severe).

- ✓ Malaria is the most common important parasitic cause of morbidity and mortality in the world. It is common in tropical and subtropical regions. It is transmitted by infected female Anopheles mosquito.
- ✓ Clinical features:
  - ❖ Cyclic fevers (correlating to rupture of RBCs and subsequent parasitemia): it can be every 48 hours (P.vivax and P.ovale) or every 72 (P.malariae). Fever is associated with chills, headache, vomiting and abdominal pain.
  - ❖ Other features: hemolytic anemia, jaundice and splenomegaly.
- ✓ Diagnosis: giemsa-satined peripheral blood smears
  - ❖ *Thick smears*: malarial screening.
  - ❖ *Thin smears*: malarial identification and staging.
- ✓ Management: antimalarial therapy (chloroquine, quinine, mefloquine and doxycycline).
- ✓ Prevention: avoidance of mosquito bites and chemoprophylaxis.



- **Toxoplasmosis:**
  - ✓ It is caused by the intracellular Toxoplasma gondii which is transmitted by cat feces.
  - ✓ Clinical features: mainly asymptomatic but can present with mononucleosis-like illness: fever, hepatosplenomegaly, lymphadenopathy malaise and rash.
    - ❖ *Congenital toxoplasmosis*: hydrocephalus, intracranial calcifications and chorioretinitis (T.gondii is the most common cause of infectious chorioretinitis).


  - ✓ Diagnosis: serology, PCR or identifying organism in cultures of amniotic fluid, blood or CSF.
  - ✓ Management: indicated for infants with congenital toxoplasmosis and pregnant women with acute toxoplasmosis → sulfadiazine and pyrimethamine.

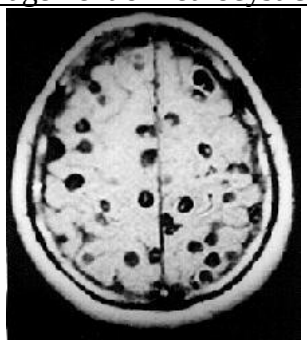
- **Specific helminth infections:**
  - **Groups at high risk are**: travelers, immigrants and homeless individuals.

Infection	Features	Management
Pinworms	• Feco-oral transmission of eggs. • Causing anal pruritis • Detected by cellulose tape test	Mebendazole
Ascaris lumbricoides (roundworms)	• Largest. • Feco-oral transmission of eggs • Causing small bowel obstruction and Loffler syndrome (transient pneumonitis)	
Trichuris trichiura	• Association with Ascaris infection • Most are asymptomatic	
Necator americanus and Ancylostoma duodenale (hookworms)	• Percutaneous infection • Rash and pruritis at site of infection. • Iron-deficiency anemia	

  - **Cysticercosis:**
    - ✓ In endemic areas, 20-50% of epilepsy cases are caused by cysticercosis.
    - ✓ Transmission: feco-oral by ingestion of egg of Taenia solium (pork tapeworm).
    - ✓ Clinical features:

Subcutaneous nodules	Palpated or seen as calcifications on radiograph
Neurocysticercosis	4th ventricle is the most common site of involvement; seizure is the presenting symptom in 70% of cases

    - ✓ Diagnosis: identifying T.solium eggs in stool (only appear in 25% of cases); serology; head CT/MRI
    - ✓ Management of neurocysticercosis: anti-convulsant therapy.




- **Other infections:**
  - **Rickettsial infections:**
    - ✓ Rocky mountain spotted fever:
      - ❖ It is caused by Rickettsia rickettsii (a gram-negative, intracellular, coccobacillus which is transmitted by the bite of a tick).
      - ❖ It is common is school-age children between spring and summer and less than 50% of patients recall a bite of a tick.
      - ❖ *Clinical features (from the name):* fever and petechial rash starting from extremities.
      - ❖ *Laboratory findings*: thrombocytopenia, ↑transaminases and hyponatremia.
      - ❖ *Diagnosis*: clinical features and serology.
      - ❖ *Management*: doxycycline and supportive care.
      - ❖ *Prevention*: avoidance of tick bite and immediate removal of a tick.

- ✓ Cat scratch disease:
  - ❖ It is caused by Bartonella henselae (a gram-negative bacteria).
  - ❖ *Clinical features:*
    - ➢ Fever (in 1/3 of patients).
    - ➢ Papules appear along the of the scratch.
    - ➢ After 1-2 weeks, there will be regional lymphadenopathy (cervical, axillary or inguinal). The lymph node is erythematous, warm and tender.
  - ❖ *Diagnosis*: serology (IgM-B.henselae).
  - ❖ *Management*: supportive care unless there is a systemic disease where azithromycin will be given.

- **Tuberculosis:**
  - ✓ It is caused by the acid-fast bacilli Mycobacterium tuberculosis which is transmitted through respiratory droplets. Notice that children < 12 years are generally not contagious.
  - ✓ Categories:

Exposure	Contact with a sick individual. PPD, physical examination and CXR are all normal
Latent TB	PPD (+) and chest radiograph can be negative or showing pulmonary granulomas/calcifications with or without regional lymph nodes.
TB disease	Signs and symptoms: fever, chills, night sweats, cough and weight loss and cervical lymphadenitis

  - ✓ Radiographic features of TB disease:
    - ❖ Hilar/mediastinal lymphadenopathy.
    - ❖ *Ghon complex*: small parenchymal enlarged hilar lymph nodes.
    - ❖ Lobar involvement, pleural effusion or cavity disease: which typically affects the upper lung segments.
  - ✓ Diagnosis: it is made by

Purified Protein Derivative (PPD): it is given intradermally and the area of induration is measured after 48-72 hours	≥ 5mm an immunocompromised → positive
	≥ 10 mm and is younger than 4 years of age or living in an endemic area → positive
	≥ 15 mm and older than 4 years of age with no risk factors → positive
Culture	From early morning gastric aspirate
Staining	Positive staining for Acid-Fast Bacilli (AFB)
Histology (from a biopsy)	Caseating granuloma

  - ✓ Management:

Latent TB	Isoniazid for 9 months + vitamin B6
TB disease	2 months: isoniazid, rifampin and pyrazinamide
	4 months: isoniazid and rifampin