

# Common Childhood Infectious Diseases

**Dr. Sarah Alsubaie**

Associate Professor & Consultant  
Pediatric Infectious Diseases and Infection Control  
King Saud University Medical City  
King Saud University



## Definitions

**Exanthem:** A skin eruption occurring as a symptom of a general disease.

**Enanthem:** Eruptive lesions on the mucous mb



# Causes of fever and rash

## Maculopapular rash

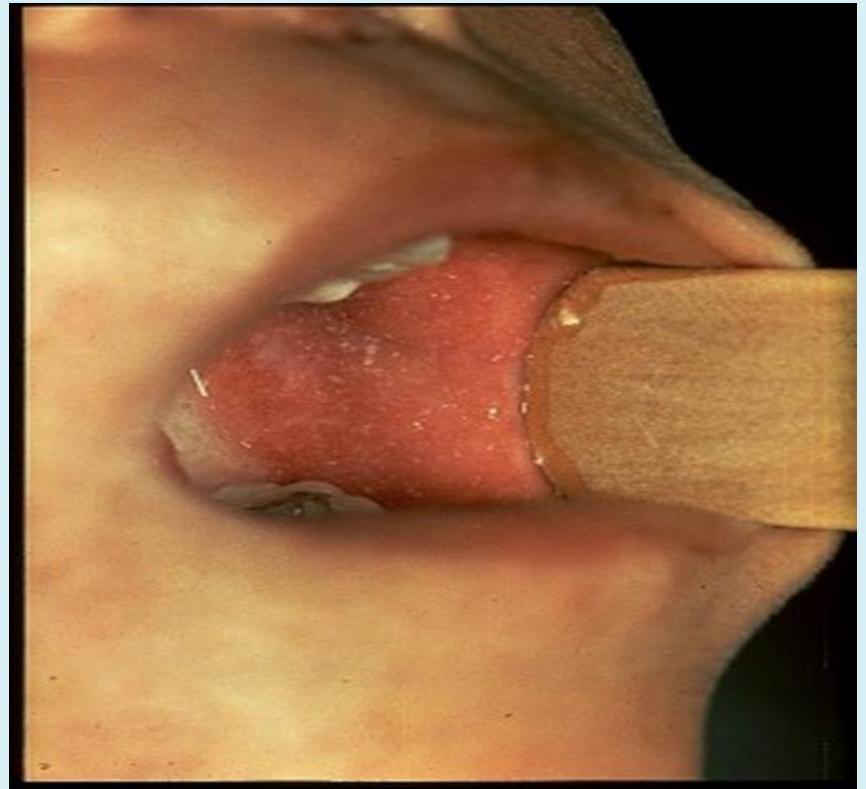
<b>Viral</b>	HHV6 or 7 ( Roseola infantum) – <2 years old Enteroviral rash Parvovirus ('slapped cheek') – usually school-age Measles – uncommon if immunised Rubella – uncommon if immunised
<b>Bacterial</b>	Scarlet fever (group A streptococcus) Erythema marginatum – rheumatic fever <i>Salmonella typhi</i> (typhoid fever) – classically rose spots Lyme disease – erythema migrans
<b>Other</b>	Kawasaki disease Juvenile idiopathic arthritis

## Vesicular, bullous, pustular

<b>Viral</b>	Varicella-zoster virus – chickenpox, shingles Herpes simplex virus Coxsackie – hand, foot and mouth
<b>Bacterial</b>	Impetigo – characteristic crusting Boils – infection of hair follicles/sweat glands Staphylococcal bullous impetigo Staphylococcal scalded skin Toxic epidermal necrolysis
<b>Other</b>	Erythema multiforme; Stevens–Johnson syndrome
<b>Petechial, purpuric</b>	
<b>Bacterial</b>	Meningococcal, other bacterial sepsis Infective endocarditis
<b>Viral</b>	Enterovirus and other viral infections
<b>Other</b>	Henoch–Schönlein purpura (HSP) Thrombocytopenia Vasculitis Malaria

# Classic Childhood Exanthems

- Measles (Rubeola)
- Scarlet Fever
- Rubella (German measles)
- Erythema Infectiosum (fifth disease, Parvovirus B19)
- Roseola Infantum





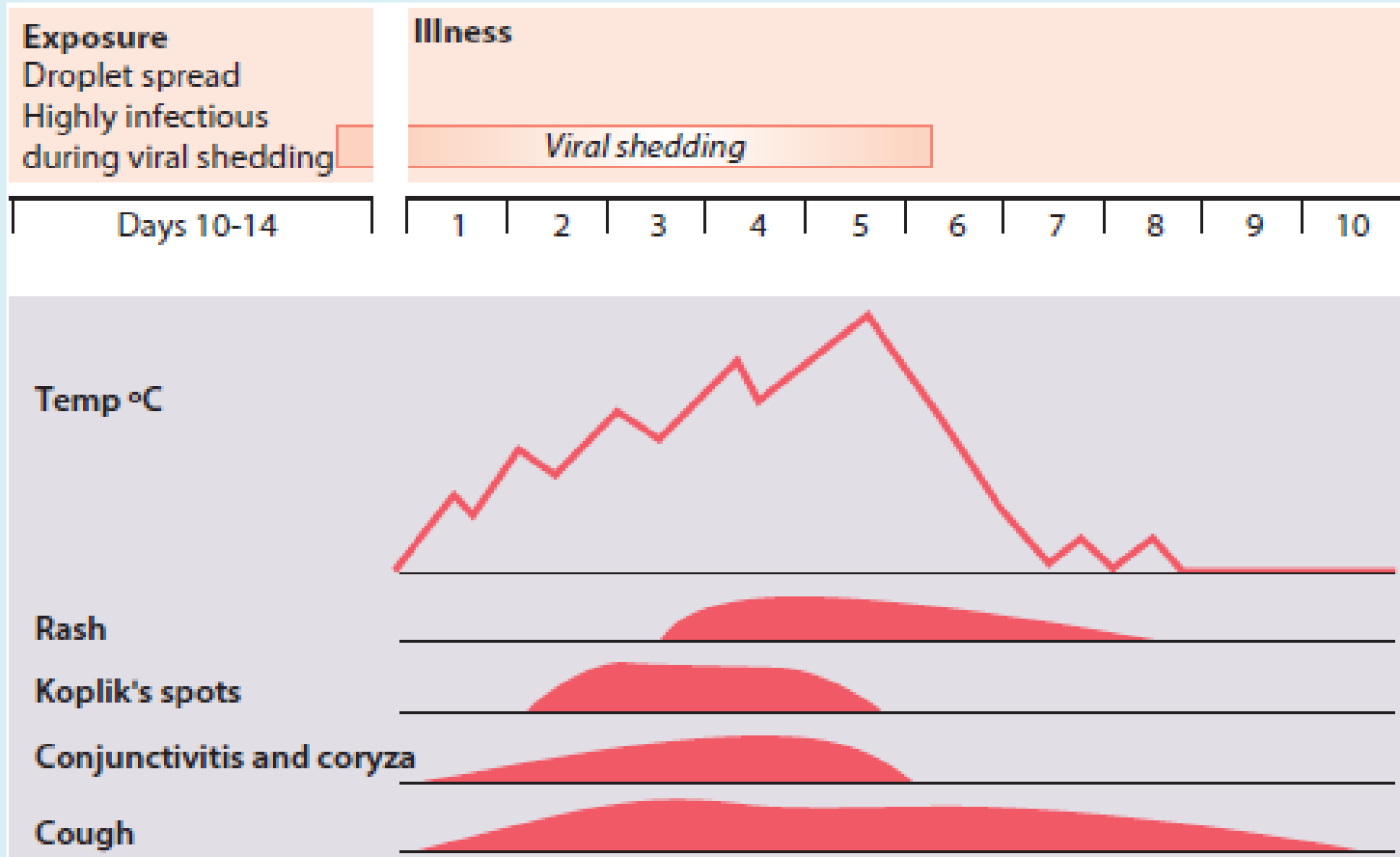


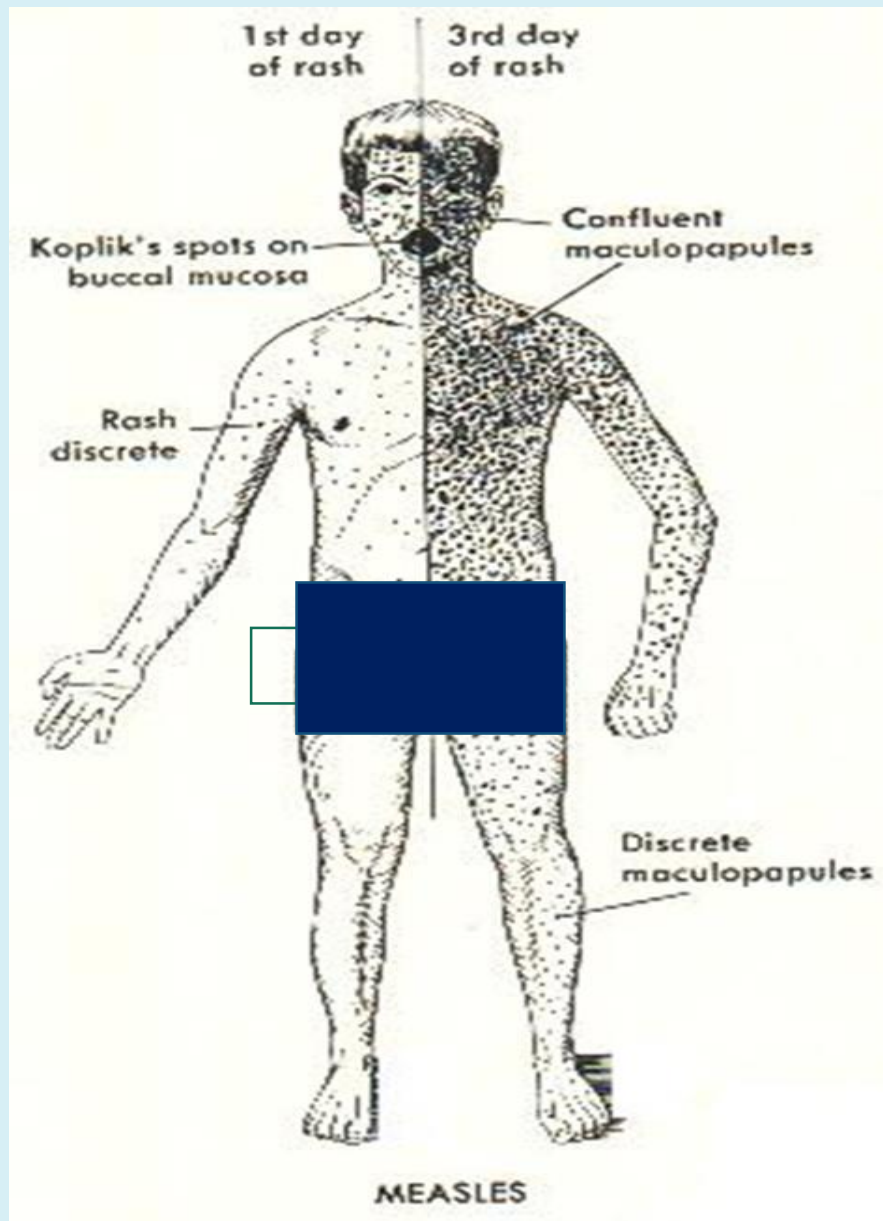
# Measles

- Paramyxovirus
- At risk: children who are not yet vaccinated or who miss vaccination
- Incubation period: 10-14 days
- Infectious period: 1-2d before prodrome to 4 days after onset of rash



# Measles clinical features





# Symptoms

- Prodrome: day 7-11 after exposure
  - Fever, cough, coryza, conjunctivitis
  - Enanthem: Koplik's spots appear 2 days before the rash, last 2 days into the rash
- rash spread downwards from face
- Highly contagious
- Treatment: symptomatic, Vitamin A
- **Prevention** 2 doses of measles vaccine
- Immunize susceptible contacts, Immune globulin

# Measles: complications

- Otitis media
- Bronchopneumonia
- Encephalitis
- Myocarditis
- Pericarditis
- Subacute sclerosing panencephalitis SSPE—late sequelae due to persistent infx of the CNS







# Scarlet Fever

- Due to erythrogenic exotoxin-producing Group A beta-hemolytic streptococci
- Peak age: 4-8 yr
- Incubation period: 2-5 days



# Scarlet Fever

- Abrupt onset fever, headache, vomiting, malaise, sore throat
- Bright red oral mucosa
- Palatal petechiae
- Tongue change

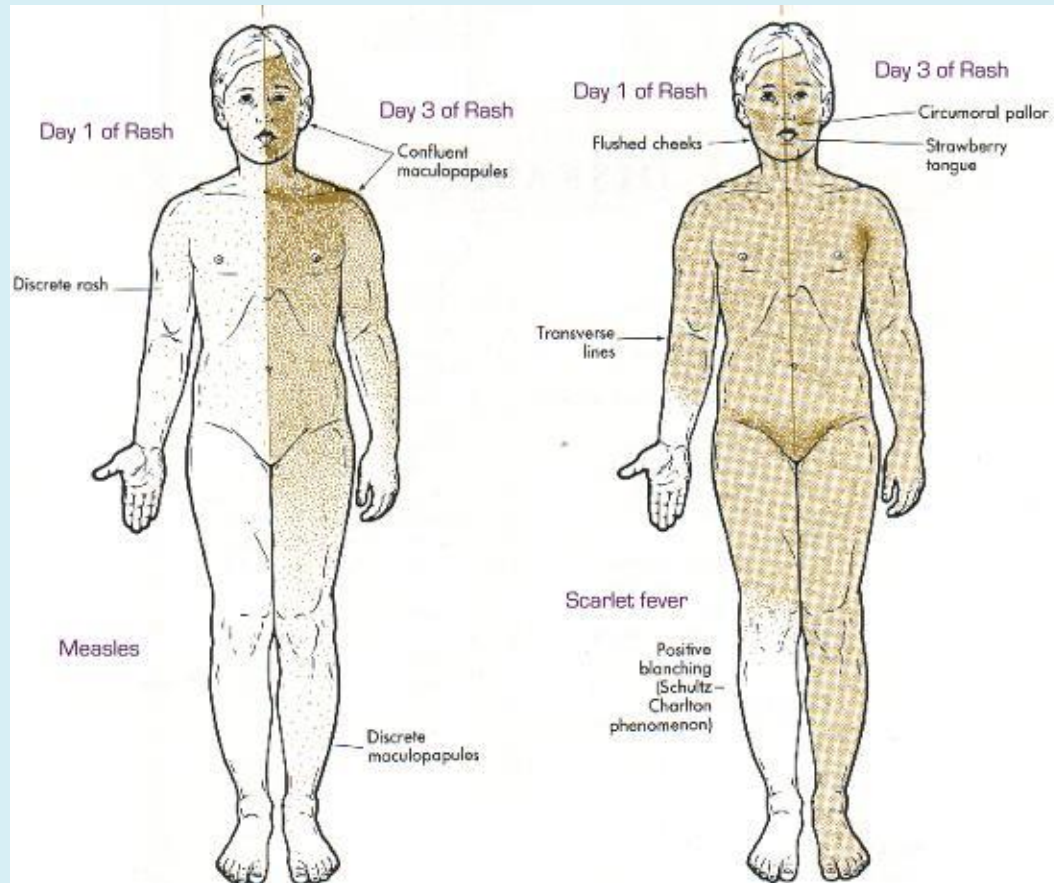
- Rash appears 1-2 days after the onset of illness
- Described as "sandpapery" in quality
- Can last for over a week
- As the rash fades, peeling (desquamation) may occur (finger tips, toes, and groin area)

Treatment: penicillin

or erythromycin if there is penicillin allergy  
for 10 days



# Measles versus Scarlet fever



## Scarlet Fever: complications

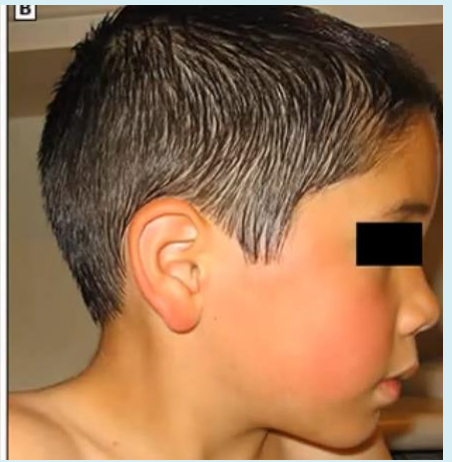
### Purulent complications:

- Otitis media
- Sinusitis
- Peritonsillar/retro-pharyngeal abscesses
- Cervical adenitis

### Nonsuppurative sequelae:

- Rheumatic fever
- Acute glomerulonephritis





# Fifth Disease Erythema Infectiosum (Human Parvovirus)

Raised, red, warm rash, first appearing on cheeks  
(slapped cheek appearance).

After 1 - 4 days, a lace-like rash spreads to the rest  
of the body.

- **Infectiousness** greatest before onset of the rash and not after the rash.
- **Control** In school outbreaks, alert pregnant staff.
- In pts hemolytic anaemia (e.g SCA)
- Treatment: supportive

# Roseola infantum (exanthema subitum)

Human Herpesvirus-6





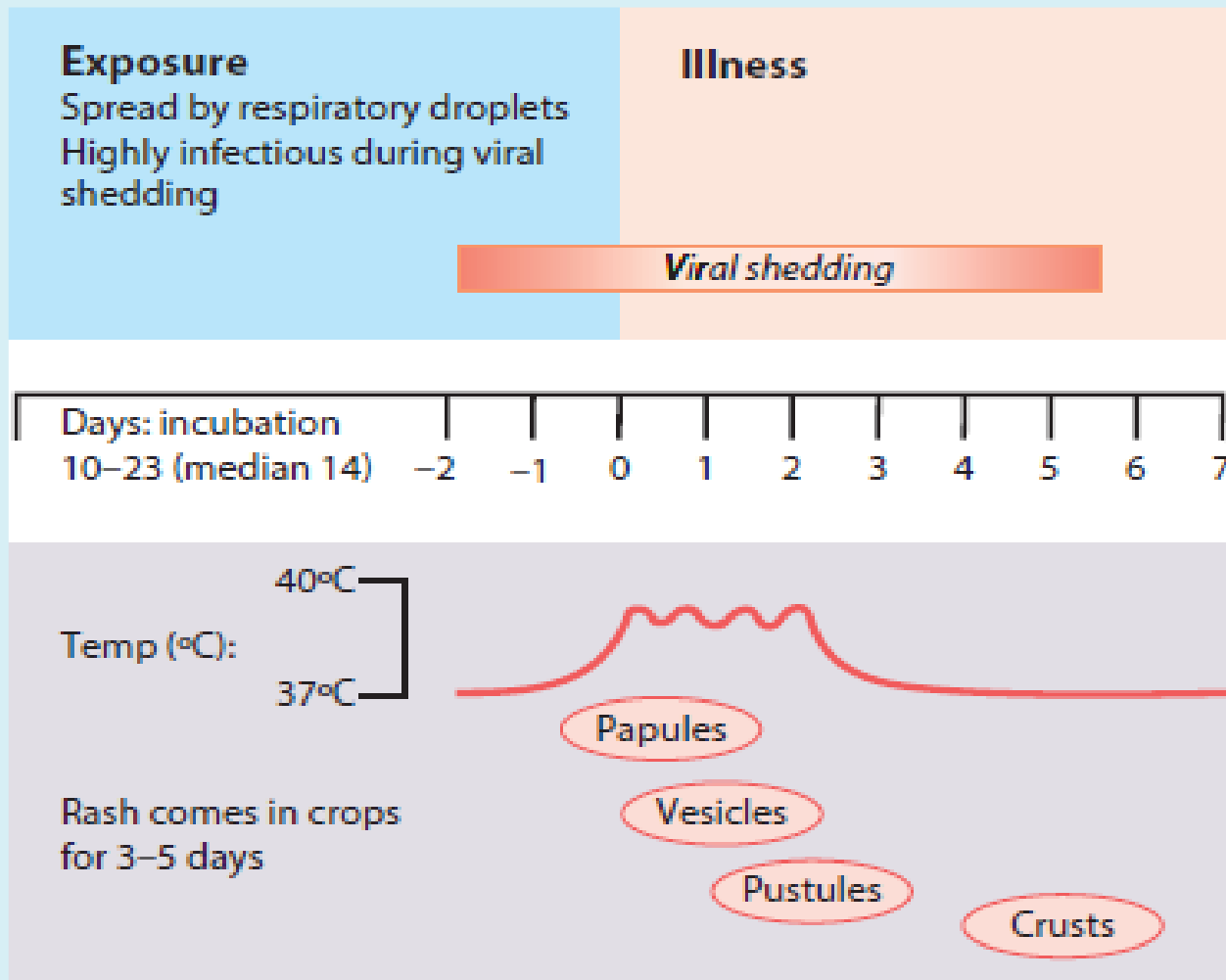




# Chicken Pox (Varicella)

- DNA Virus
- Incubation Period: 10 – 21 days
- Very contagious; can be spread by direct contact, airborne transmission
- Infectivity: 1-2 days before rash till all skin lesions have crusted (~ 6<sup>th</sup> day of rash)
- Vaccine

# Varicella



# Complications

- Secondary infection of the blisters may occur
- pneumonia, myocarditis
- Cerebellar ataxia may appear during the recovery phase or later
- Encephalitis (rare)
- Congenital infection
- Newborns are at risk for severe infection (if mother is not immune)
- Disseminated dis: immunocompromised
- Treatment: Acyclovir



Neonatal varicella with secondary bacterial infection



# Mumps

- RNA Virus
- Incubation Period: 15 – 24 days
- Clinical Features: fever, parotitis, may be subclinical
- Complications: meningitis, encephalitis, orchitis
- Treatment
- Isolation & Infectivity: 7 days after onset of parotid swelling.
- Vaccine



# Rubella

- RNA Virus
- Incubation Period: 15 – 20 days
- Spread by respiratory droplet.
- generally a mild disease in childhood, Lymphadenopathy particularly the occipital and postauricular nodes, is prominent, arthralgia and arthritis.
- Serious in pregnancy: cong. infection
- Treatment
- Isolation & Infectivity: 7 days from onset of rash
  - Congenital Rubella: until 1 year of age
- Vaccine



# Congenital rubella syndrome

- Infection of seronegative mother during pregnancy
- Risk of fetal infection
  - First trimester : 75-90%

# Congenital Rubella

Crosses placenta when **mother has acute infection**.

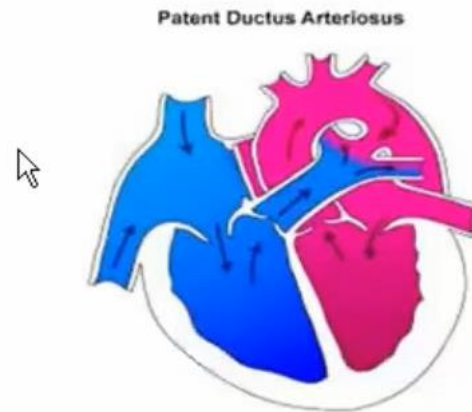
The earlier the fetus is infected -> more serious disease.

May result in serious congenital abnormalities

- **Intrauterine growth retardation**
- **Hepatosplenomegaly**
- **Cataracts**
- **Mental retardation**
- **Sensorineural hearing loss**
- **Heart- Patent ductus arteriosis**
- **Pulmonary stenosis**
- **Thrombocytopenic purpura**



Blueberry Muffin Rash



PDA



Cataracts

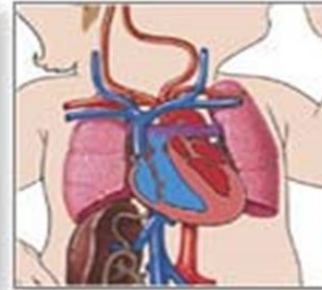
## Classic triad:

- PDA
- Cataracts, and deafness
- +/- "blueberry muffin" rash

## Rubella syndrome



Microcephaly



PDA



Cataracts



# MCQ

14-year-old girl, unvaccinated, presented with sore throat, low-grade fever, and a diffuse maculopapular rash. During the next 24 hours, she develops tender swelling of her wrists. In addition, her physician notes mild tenderness and marked swelling of her posterior cervical and occipital lymph nodes. Four days after the onset of her illness, the rash has vanished. Which of the following is the most likely diagnosis?

- a. Rubella
- b. Rubeola
- c. Roseola
- d. Erythema infectiosum
- e. Erythema multiforme

# Enterovirus infection

Nonpoliovirus)

and Parechovirus Infections

(Group A and B Coxsackieviruses, Echoviruses,

Numbered Enteroviruses, and Human

Parechoviruses)

The most common manifestation of enteroviruses is nonspecific febrile illness

- Other manifestations can include the following:

(1) respiratory: coryza, pharyngitis, herpangina, stomatitis, bronchiolitis, pneumonia.

(2) skin: handfoot-and-mouth disease, and nonspecific exanthems.

(3) neurologic: aseptic meningitis, encephalitis, and motor paralysis

(4) gastrointestinal: vomiting, diarrhea, abdominal pain, hepatitis, pancreatitis.

(5) eye: acute hemorrhagic conjunctivitis and uveitis

(6) heart: myocarditis

(7) muscle: myositis







# Hand-Foot-and-Mouth Disease

- Coxsackievirus infection
- Usually a mild illness
- Generally complete recovery occurs in 5-7 days

## Complications:

- Dehydration may occur
  - mouth lesions cause pain with swallowing

# Herpes simplex virus 1

most common sites are lips and fingers or thumbs  
(herpes whitlow)





# Herpes simplex virus infection

- **Herpes** “cold sores”
- **Symptoms** Superficial clear vesicles (blisters) with red base, usually on face or lips, which crust and heal within days.
- **Method of** Direct contact
- avoid contact with children with eczema or burns and the immunocompromised.

# Herpes simplex virus infection

- Gingivostomatitis – may necessitate, intravenous fluids and aciclovir
- Eczema herpeticum – may result in secondary bacterial infection and septicaemia
- Herpetic whitlows – painful pustules on the fingers
- Eye disease – blepharitis, conjunctivitis, corneal ulceration and scarring
- CNS – aseptic meningitis, encephalitis
- Pneumonia and disseminated infection in the immunocompromised.



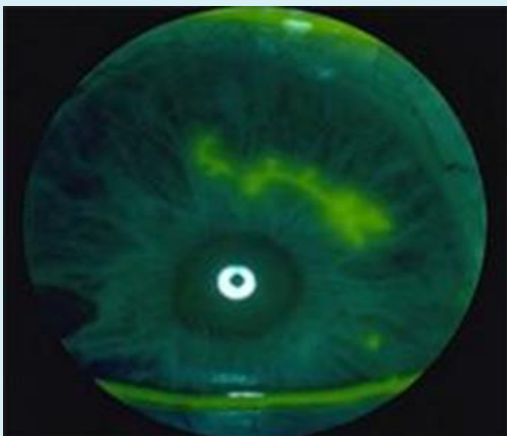




# Eczema herpeticum

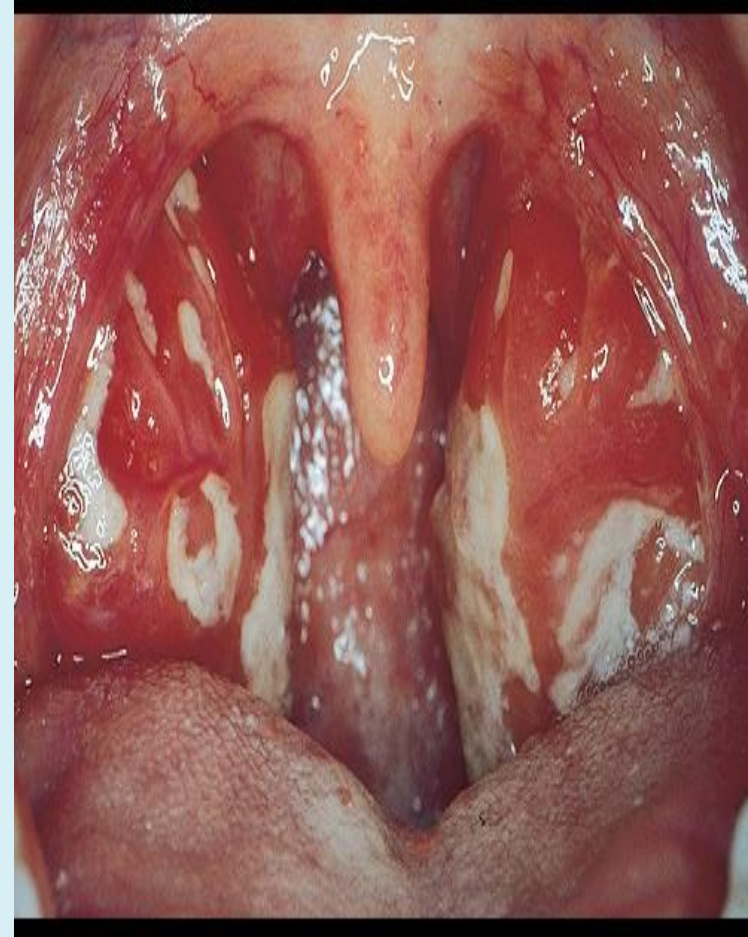
## (kaposi varicelliform eruption)

- serious condition, emergency care
- Widespread vesicular lesions develop on eczematous skin
- This may be complicated by secondary bacterial
- infection, which may result in septicaemia
- high fever, irritability, lesions then rupture and crust over the course of a couple of days
- Lesions can become hemorrhagic
- If area of involvement is large, can be lots of fluid loss and potentially fatal
- Treat promptly with acyclovir



# Infectious Mononucleosis

Cause: Epstein-Barr virus and  
Cytomegalovirus





- Enlarged lymph nodes
- Rash
  - Pink, measles-like rash
    - more common if given amoxicillin for throat infection
- Enlarged spleen & liver
- transmitted by saliva and close contact
- Diagnosis: serology, PCR
- Treatment is usually supportive, unless immunocompromised, where antiviral is indicated.

# ADENOVIRUSES

- Incubation period is 2-14 days.
- Clinical syndromes:
  - Eye Epidemic keratoconjunctivitis, acute follicular conjunctivitis, pharyngoconjunctival fever.
  - Respiratory system Common cold (rhinitis), pharyngitis, tonsillitis, bronchitis, pneumonia.
  - Genitourinary Acute hemorrhagic cystitis, orchitis, nephritis.
  - Gastrointestinal Gastroenteritis, mesenteric adenitis, appendicitis.
- Rare results of adenovirus infections: Meningitis, encephalitis, arthritis, myocarditis, hepatitis.
- Fatal disease may occur in immunocompromised patients, as a result of a new infection or reactivation of latent virus





# MCQ

An 8-year-old sickle-cell patient seen at the emergency room (ER) for fever. Over the previous several days, the child has become progressively tired and pale. The hemoglobin concentration in the ER is 3.1 mg/dL.

Which of the following viruses commonly causes such a clinical picture?

- a. Roseola
- b. Parvovirus B19
- c. Coxsackie A16
- d. Echovirus 11
- e. Cytomegalovirus

# case

- a six month old male, had the acute onset of fever to 39° c and irritability.
- He was seen in your office and examination of the tympanic membranes revealed the physical findings noted.



# Risk factors for OM

- Children cared for in group settings
- Children who live with adults who smoke
- Infants who nurse from a bottle while lying down
- Children who are not breast-fed

- **Strep. Pneumoniae**
- **H. influenzae**
- **M. catarrhalis**
- **Strep. pyogenes**
- **Staph. Aureus**
- **No growth**

# OM treatment

Amoxicillin

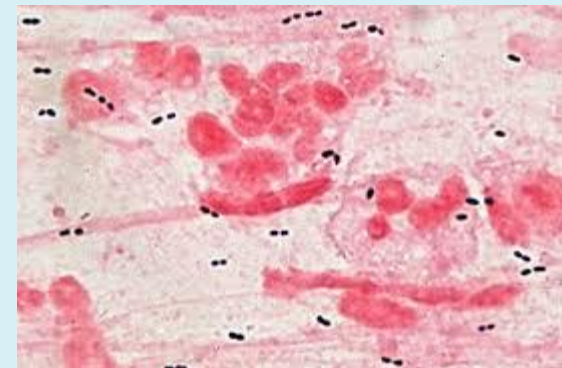
# Complications of OM

- chronic effusion, hearing loss
- Mastoiditis
- intracranial extension (brain abscess, subdural empyema, or venous thrombosis).
- cholesteatoma (mass-like keratinized epithelial growth)



# Pneumococcal infections

- Often carried in nasopharynx of healthy children
- transmission is by respiratory droplets.
- the incidence of invasive disease has declined.
- Susceptibility is increased in hyposplenism (e.g. SCD, nephrotic syndrome, splenectomy)
- May cause pharyngitis, otitis media, conjunctivitis, sinusitis, invasive disease (pneumonia, bacterial sepsis and meningitis).
- Prevention: Vaccine (PCV13, PPV23)
- Prophylaxis for high risk.





# Impetigo

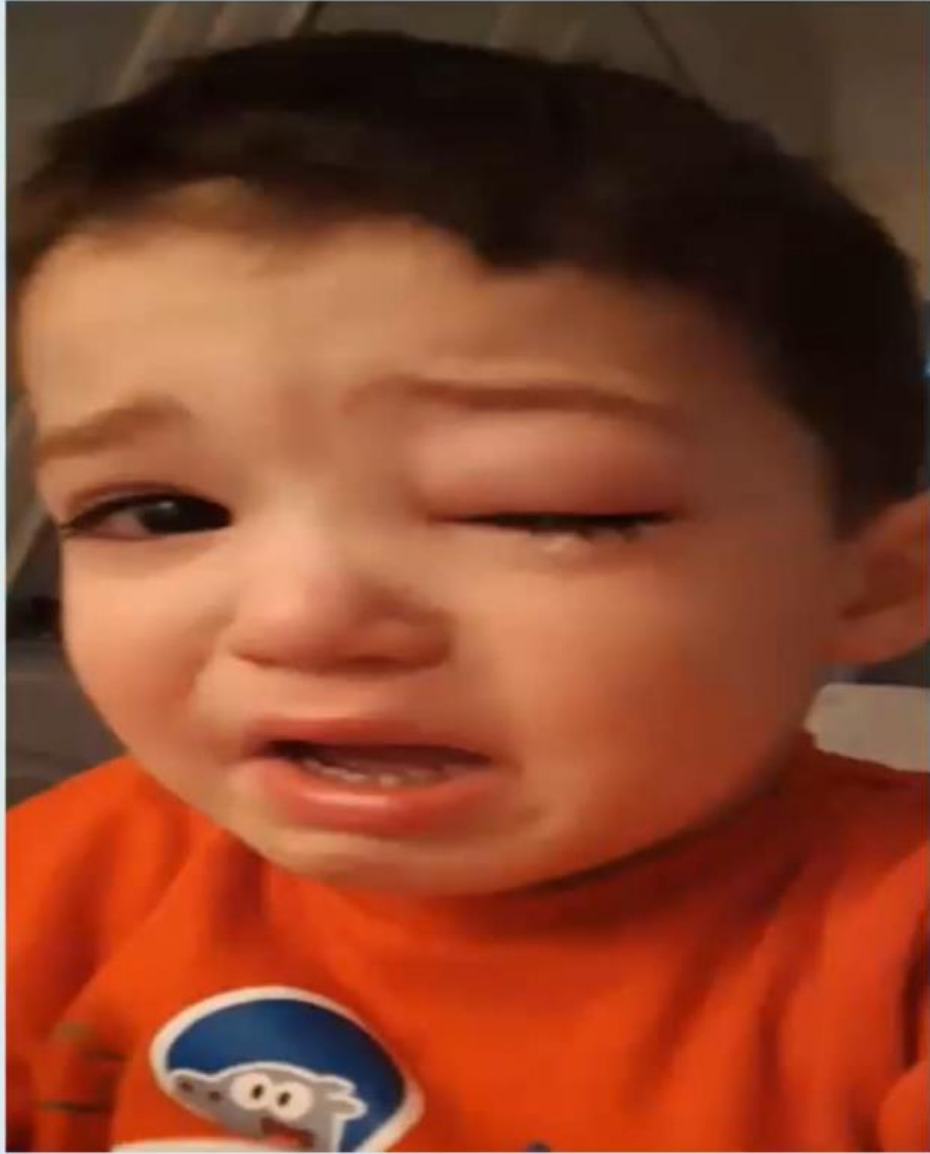
- Impetigo is a bacterial skin infection
- Staphylococcus aureus / streptococcus pyogenes.
- honey-coloured crusted lesions
- Lesions are usually on the face, neck and hands
- most common in infants and young children.
- It is contagious.
- Topical antibiotics (e.g. mupirocin)
- Systemic: cloxa, augmentin, cephalixin.





# Cellulitis

- Inflammation of the subcutaneous connective tissue – may lead to abscess
- Streptococcus pyogenes, Staphylococcus aureus, Haemophilus influenzae (<2 yrs)
- Therapy: clindamycin, cefazolin, cloxacillin



# Periorbital cellulitis

- fever with erythema, tenderness, oedema of the eyelid.
- It is almost always unilateral.
- In young, unimmunised children it may also be caused
- by *Haemophilus influenzae* type b which may also be accompanied by infection at other sites, e.g. meningitis.
- It may follow local trauma to the skin. In older children, it may spread from a paranasal sinus infection or dental abscess
- Treatment : i.v antibiotic





# Pertusis (Whooping Cough)

- Bordetella Pertusis
- Incubation Period: 7 – 14 days
- Coughing adults are major reservoirs
- Clinical Features: The infection usually lasts 6 wks
  - Cold symptoms (~2 weeks)
  - Progressively worse cough (~4 weeks)
  - Complete resolution (may take months)
- Treatment: erythromycin (other macrolids)
- Isolation & Infectivity: up to 6 weeks, but with treatment => 5 days after starting therapy
- Vaccine, doesn't provide lifelong immunity

## Video

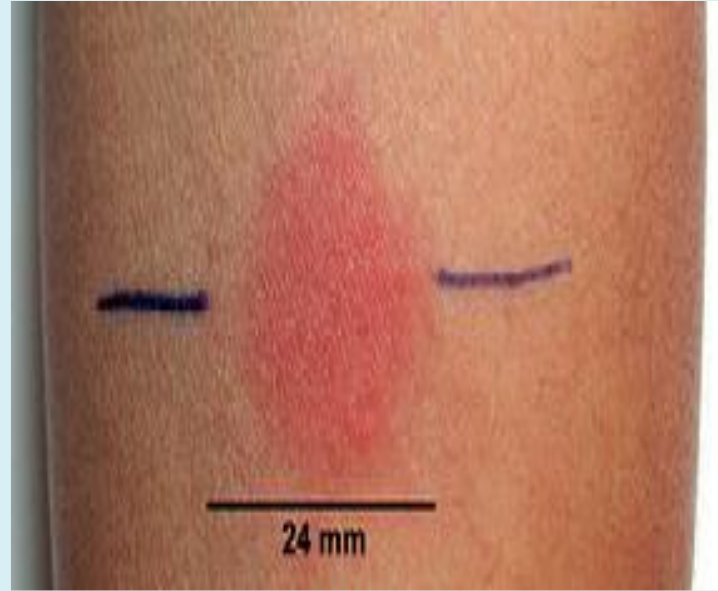
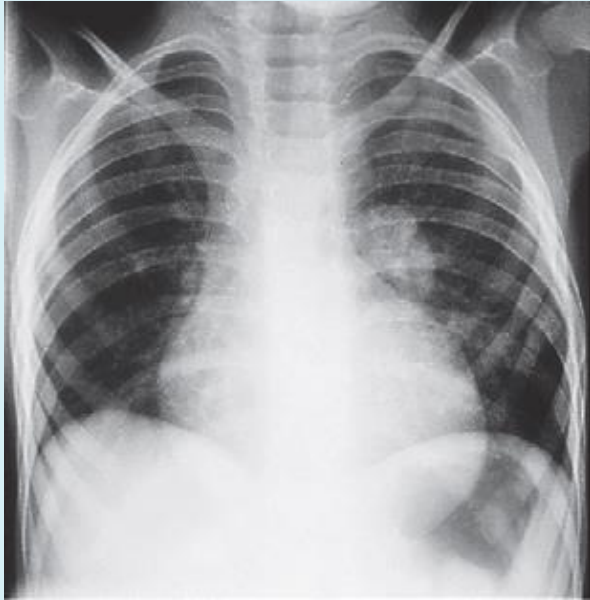
<https://www.youtube.com/watch?v=TIV460AQUWk>

## Complication

- OM
- Pneumonia
- apnea
- Convulsions
- Brain damage from lack of oxygen
- cerebral hemorrhage

# MCQ

- Which of the following is responsible for causing Hand-Foot-and-Mouth Disease?
  - a. Adenovirus
  - b. Coxsackievirus
  - c. Cytomegalovirus
  - d. Echovirus 22
  - e. Epstein-Barr Virus



# Tuberculosis

- TB affects millions of children worldwide; low but increasing incidence in many developed countries.
- Diagnosis of TB in children is even more difficult than in adults. The clinical features of the disease are nonspecific, such as prolonged fever, malaise, anorexia, weight loss or focal signs of infection.
- Clinical features follow a sequence – primary infection, then dormancy, which may be followed by reactivation to post-primary TB.
- TB disease can present as local disease or may be widely disseminated, miliary TB to sites such as bones, joints, kidneys, pericardium and CNS.
- In infants and young children, seeding of the CNS is particularly likely, causing tuberculous meningitis

- Diagnosis is often difficult, so decision to treat is usually based on contact history, Mantoux test, interferon-gamma release assays (Quantiferon), chest X-ray and clinical features.
- Young children swallow their sputum, so early morning gastric aspirate are required (3 samples)
- Contact tracing is important.
- TB is more difficult to diagnose and more likely to disseminate in the immunosuppressed.





**Table 124-3** Recommended Treatment Regimens for Drug-Susceptible Tuberculosis in Infants, Children, and Adolescents

INFECTION OR DISEASE CATEGORY	REGIMEN	COMMENTS
<b>LATENT TUBERCULOSIS INFECTION (POSITIVE TST RESULT, NO DISEASE)</b>		
Isoniazid-susceptible	9 months of isoniazid, once a day	If daily therapy is not possible, DOT twice a week can be used for 9 months.
Isoniazid-resistant	6 months of rifampin, once a day	
Isoniazid-rifampin-resistant	Consult a tuberculosis specialist.	
Pulmonary and extrapulmonary (except meningitis)	2 months of isoniazid, rifampin, and pyrazinamide daily, followed by 4 months of isoniazid and rifampin twice weekly under DOT	If possible drug resistance is a concern, another drug (ethambutol or an aminoglycoside) is added to the initial three-drug therapy until drug susceptibilities are determined. DOT is highly desirable.
		If hilar lymphadenopathy only, a 6-month course of isoniazid and rifampin is sufficient.
Meningitis	2 months of isoniazid, rifampin, pyrazinamide, and an aminoglycoside or ethionamide, once a day, followed by 7–10 months of isoniazid and rifampin, once a day or twice a week (9–12 months total)	Drugs can be given 2 or 3 times per week under DOT in the initial phase if nonadherence is likely.
		A fourth drug, usually an aminoglycoside, is given with initial therapy until drug susceptibility is known.
		For patients who may have acquired tuberculosis in geographic areas where resistance to streptomycin is common, capreomycin, kanamycin, or amikacin may be used instead of streptomycin.