

# Common Pediatric Infectious Disease

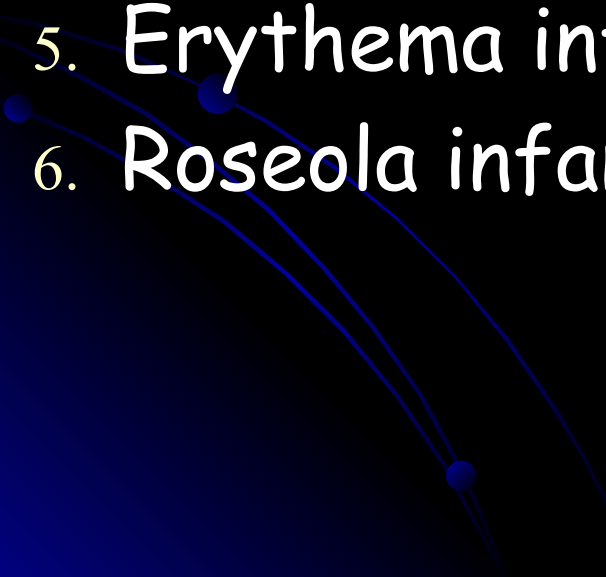
*Dr. Owis khater*



# *Exanthems*

Is a widespread rash is a widespread rash, usually viral is a widespread rash, usually viral, and usually occurring in children

It represents either a reaction to a toxin It represents either a reaction to a toxin produced by the organism damage to the skin It represents either a reaction to a toxin produced by the organism damage to the skin by the organism an immune response. or due to a drug, most commonly antibiotics

1. Measles.
  2. Rubella.
  3. Scarlet fever
  4. Chicken pox.
  5. Erythema infectiosum.
  6. Roseola infantum.
- 

- Historically, exanthems in children have been numbered in the order they were identified:
- First disease - Rubeola First disease - Rubeola, Measles First disease - Rubeola, Measles (caused by Morbillivirus)
- Second disease - rubella, German measles (caused by rubella virus)
- Third disease - scarlet fever, scarlatina, caused by Group A strep- the only bacterial exanthem.
- Fourth disease- varicella –chicken pox- herpes zoster
- Fifth disease Erythema infectiosum caused by parvo virus B19
- Sixth disease Roseola infantum. Caused by human herpes virus simplex 6



# *Measles*

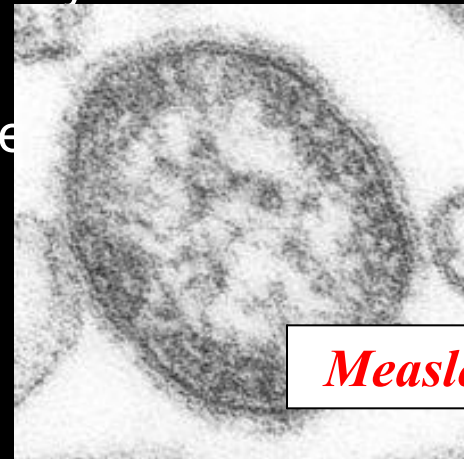
# Measles

**Measles**, also known as **rubeola**, is a disease, is a disease caused by a virus, is a disease caused by a virus, specifically a paramyxovirus of the .genus Morbillivirus

Measles is spread through respiration (contact with fluidsMeasles is spread through respiration (contact with fluids from an infectedMeasles is spread through respiration (contact with fluids from an infected person's nose and mouth, either directly or through aerosol transmission), and is .highly contagious

The incubation period The incubation period usually lasts for 10-12 days .(during which there are no symptoms)

Infected people remain contagious from the appearance of .symptoms until 3-5 days after the rash appears



*Measles virus*

# Symptoms

- fever for at least three days, 40° Celsius.
- Three Cs—coughs—cough, coryzas—cough, coryza (runny nose) conjunctivitis (red eyes)
- Koplik's spots seen inside the mouth are pathognomonic transient and may disappear within a day of arising.
- Maculopapular, erythematous, erythematous rash that begins several days after the fever starts. It starts on the head before spreading to cover most of the body. The measles rash also classically "stains" by changing colour from red to dark brown before disappearing later. The rash can be itchy.

# DIAGNOSIS

- A detailed history. vaccination history, contact history, and travel history.
- Clinical diagnosis of measles requires a history of fever of at least three days together with at least one of the three Cs.
- Observation of Koplik's spots is also diagnostic of measles.
- Laboratory diagnosis of measles can be done with confirmation of positive measles IgM antibodies or isolation of measles virus RNA from respiratory specimens.
- Positive contact with other patients known to have measles adds strong epidemiological evidence to the diagnosis.





Koplik spots.

# *Measles*



# TREATMENT

- No specific therapy for measles .
- Adequate hydration and antipyretics.
- Avoid strong light :photophobia.
- IV ribavirin in severe cases.
- High dose vit A supplementation for 6M to 2 years old need hospitalization ,HIV-infected infants,and infant in endemic areas in developing countries.

# *Complications*

- **Otitis media.the most common**
- **Interstitial pneumonia.**
- **giant cell pneumonia.**
- **Activate latent T.B.**
- **Myocarditis ,and mesentric lymphadenopathy.**
- **Encephalomyelitis.**
- **Subacute sclerosing panencephlitis.**



- Death due to bronchopneumonia or encephalitis, and subacute sclerosing panencephalitis.
- Mortality rate is 15% with 20% to 30% of survivor having serious neurological sequelae.
- Prevented by vaccine.

# Prevention & vaccination

- **MMR vaccine**
  - first dose 12 to 15 months of age.**
  - second dose at school entry**
- **People who have measles should limit their contact with others.**
- **Exposure**
  - within 3 days ----- vaccine**
  - within 6 days ----- immunoglobulin**



*Rubella*

*German measles*

*Three days measles*

# Rubella

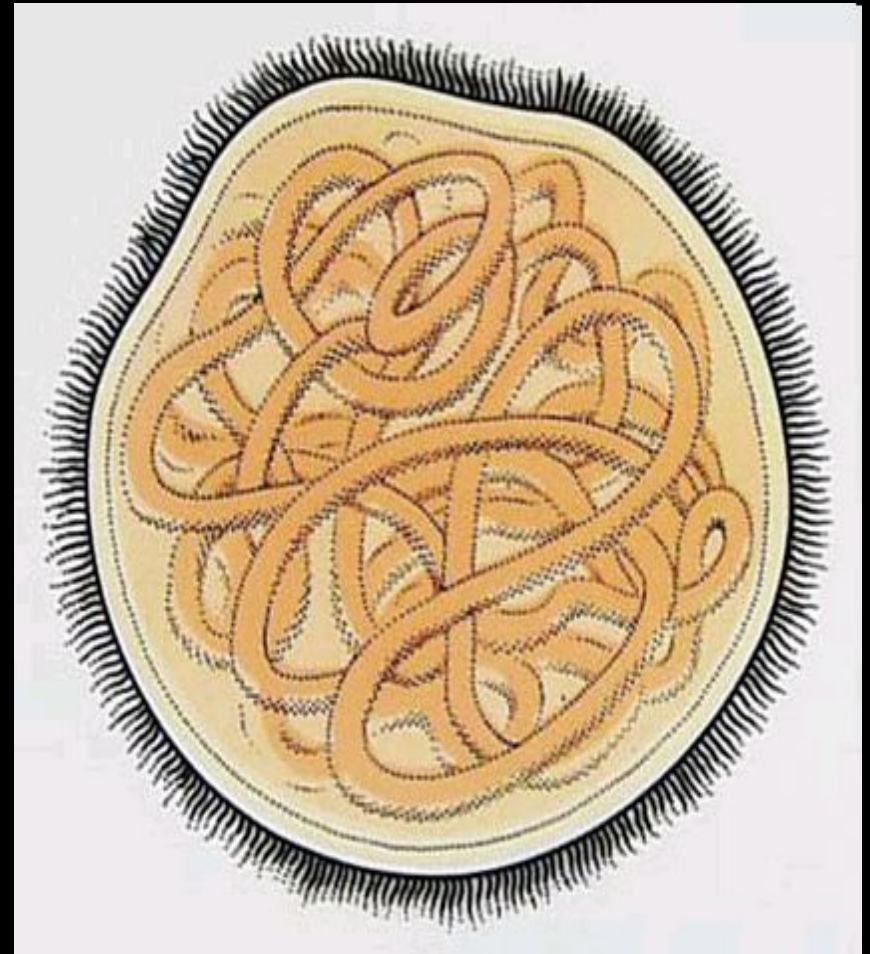
## ( German Measles )

Rubella is also called as  
3 day Measles or  
.German Measles

Family – **Togaviridae**

Genus - **Rubivirus**

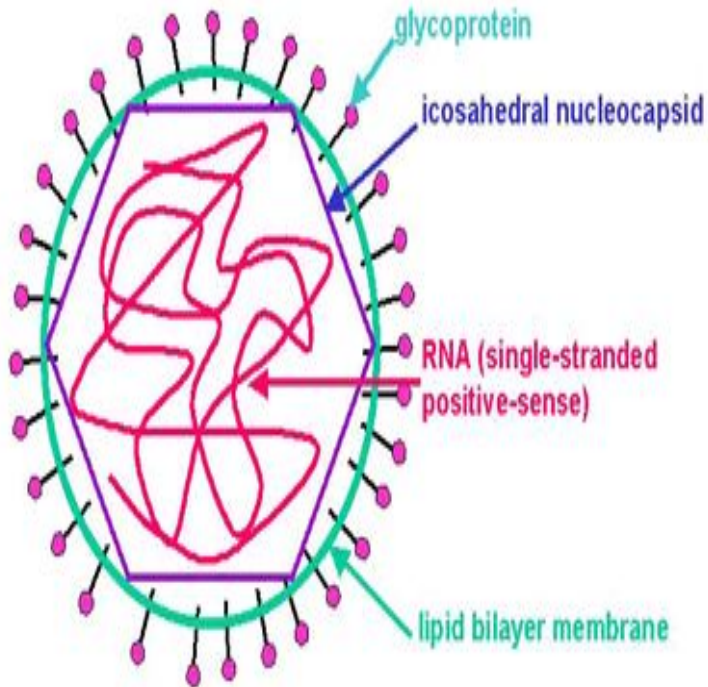
In general belong to  
Togavirus group





# Rubella Virus

## RUBELLA VIRUS



Rubella virus are

ss – RNA virus

Diameter 50 – 70 nm

Enveloped Spherical

Virus carry hemagglutinin

Virus multiply in the  
cytoplasm of infected  
.cell

# Clinical findings

Malaise

Low grade fever

Morbilliform rash

Rash starts on Face

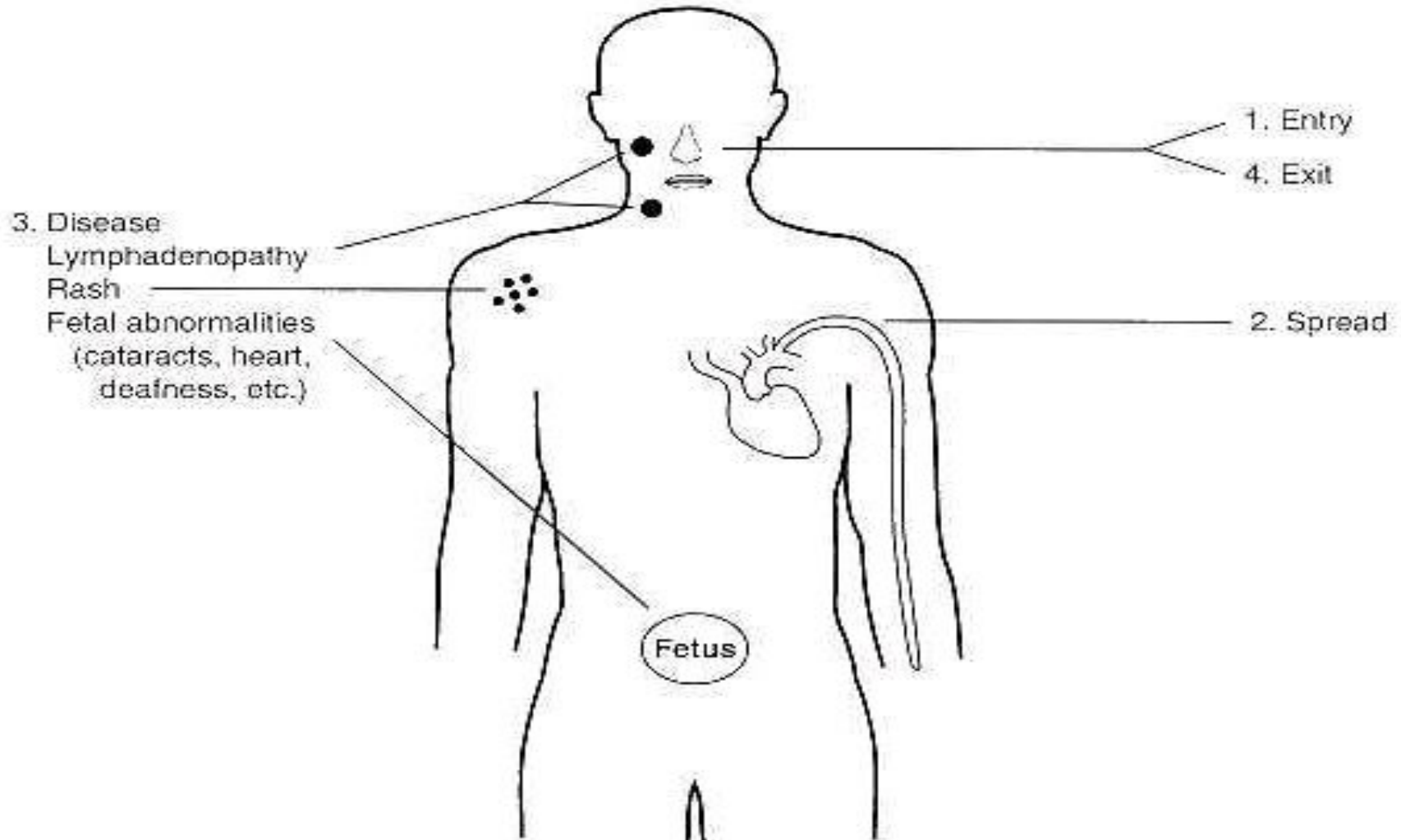
Extremities

Rarely lasts more than 5 days

No features of the rash give clues to definitive diagnosis of Rubella



# Systemic events of Rubella Infection



# :Adults and

- swollen glands or lymph nodes (may persist for up to a week)
- fever (rarely rises above 38 degrees Celsius)
- rash (Appears on the face and then spreads to the trunk and limbs. It appears as pink dots under the skin. It appears on the first or third day of the illness but it disappears after a few days with no staining or peeling of the skin)
- Forchheimer's sign Forchheimer's sign occurs in 20% of cases, and is characterized by small, red papules Forchheimer's sign occurs in 20% of cases, and is characterized by small, red papules on the area of the soft palate
- conjunctivitis

# Other manifestations and complications

May produce transient Arthritis, in women in particular

Serious complications are

**Thrombocytopenia**

**Purpura**

**Encephalitis**



# Classical Triad of Rubella

## Classical Triad

Cataract

Cardiac abnormalities

Deafness

### Other manifestations

Growth retardation

Rash

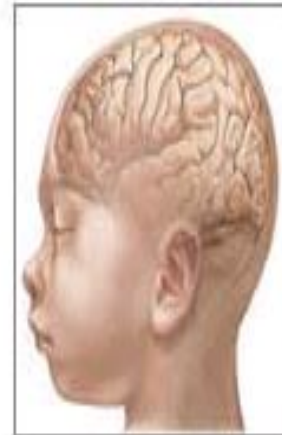
Hepatosplenomegaly

Jaundice

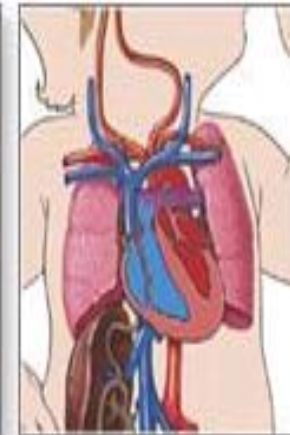
Meingoencephalitis

CNS defects lead to moderate to profound mental retardation

## Rubella syndrome



Microcephaly



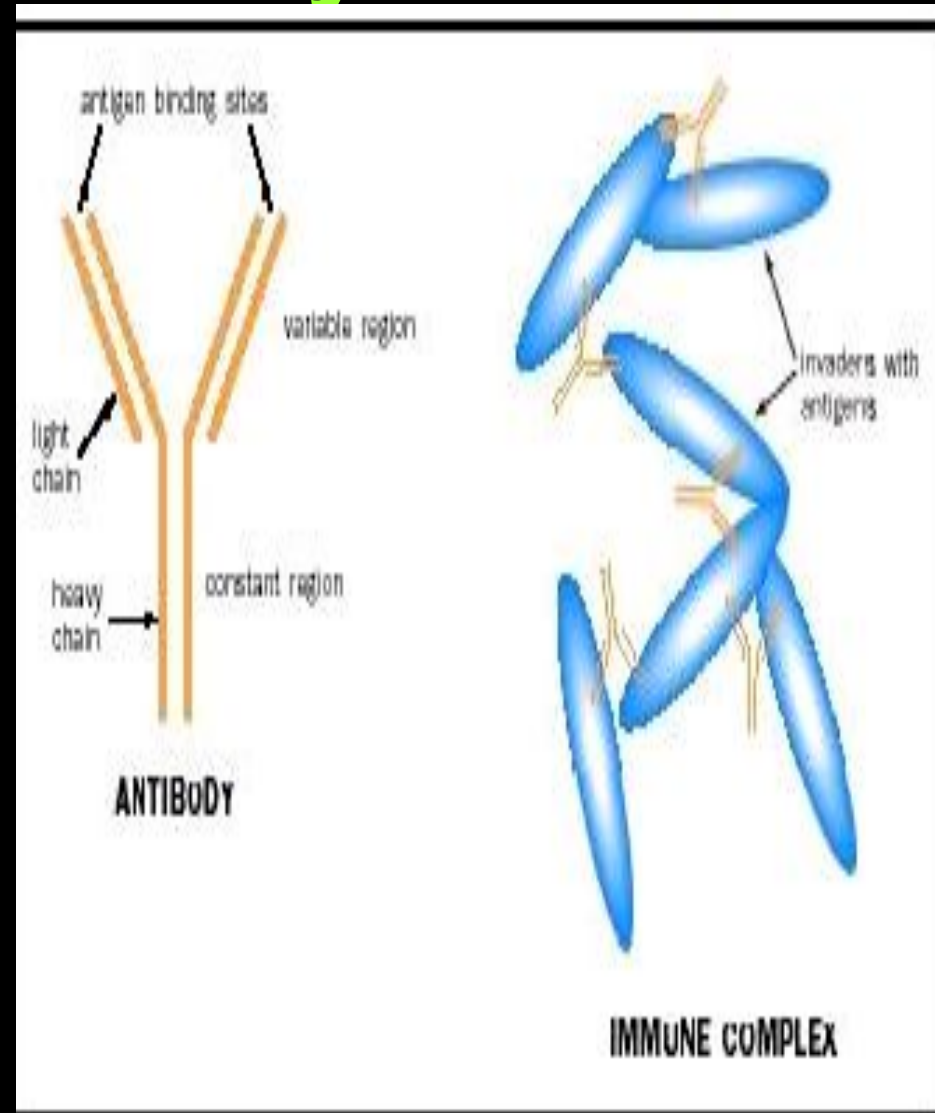
PDA



Cataracts

# Diagnosis of Congenital Rubella Syndrome

Demonstration of Rubella antibodies of IgM in a new born is diagnostic value. As IgM group do not cross the placenta and they are produced in the infected fetus



# Immunity - Rubella



Rubella  
(German measles)

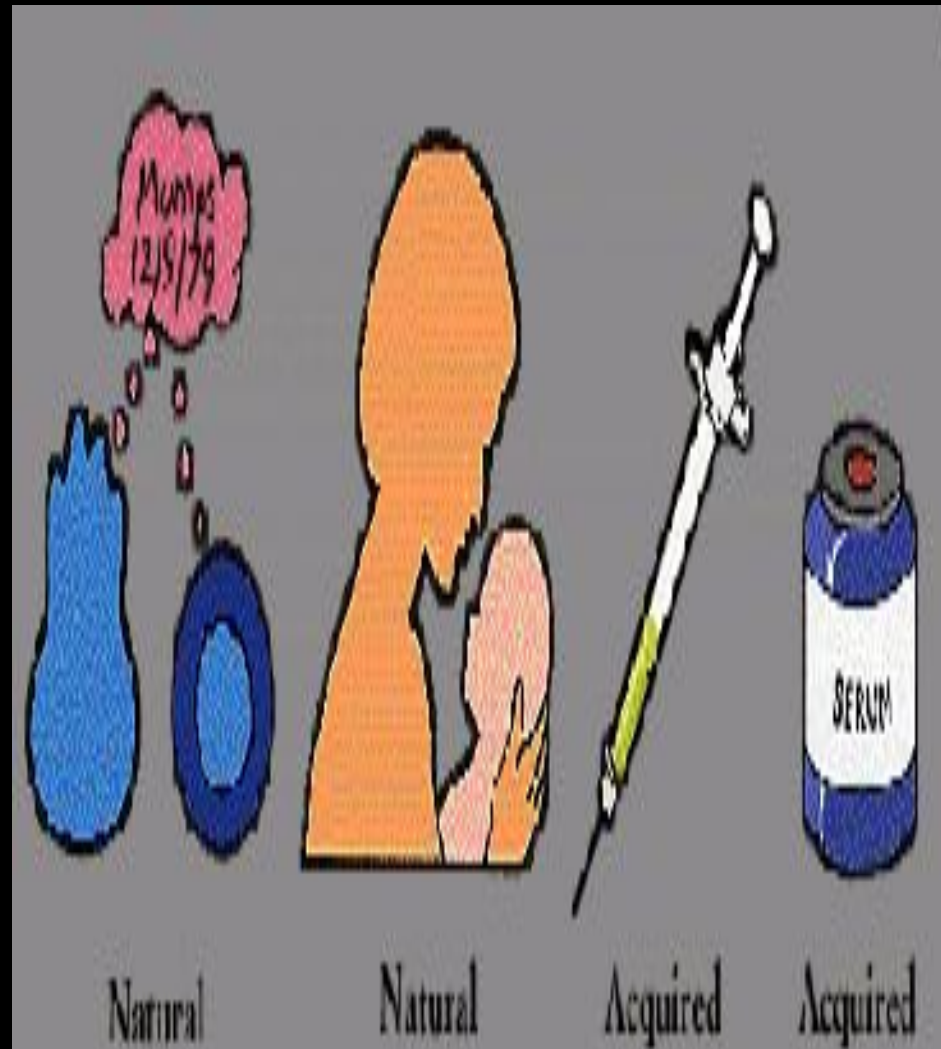
Antibodies appear in serum  
as rash fades and  
antibody titers raise  
Rapid raise in 1 – 3 weeks  
Rash in association with  
detection of IgM indicates  
.recent infection  
IgG antibodies persist for life



# Immunity - Protects

One attack of Rubella infection, protects for life

Immune mothers transfer antibodies to off springs who are in turn are protected for .4 – 6 months



# Treatment, Prevention, Control

No specific treatment is available

*CRS can be prevented by effective immunization of the young children and teenage girls, remain the best option to prevent*

*Congenital Rubella Syndrome*

*The component of Rubella in MMR vaccine protects the vaccinated*

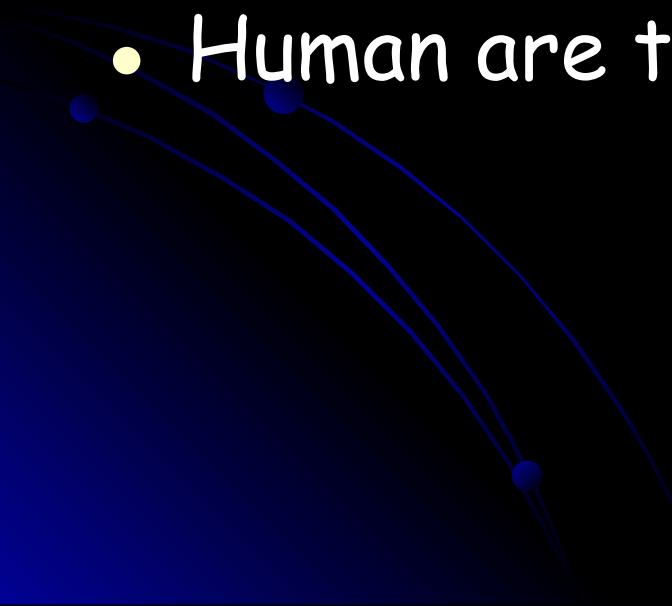


# MMR V

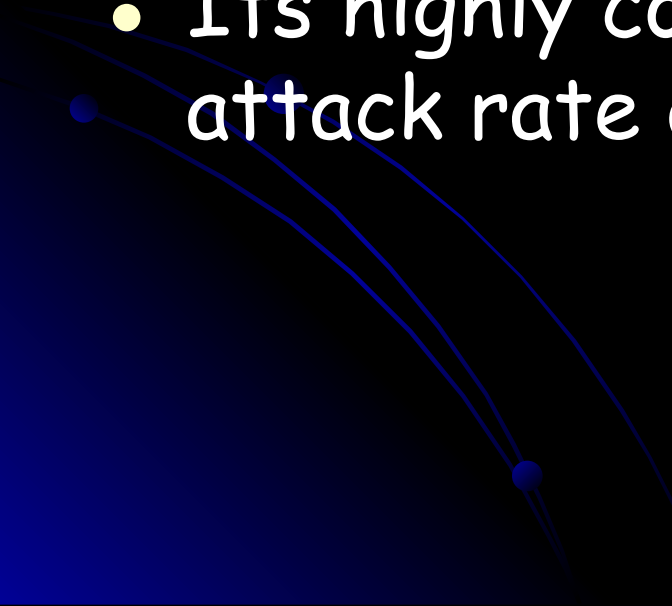
The **MMR vaccine** is a mixture of three live attenuated viruses is a mixture of three live attenuated viruses, administered via injection for immunization is a mixture of three live attenuated viruses, administered via injection for immunization against measles is a mixture of three live attenuated viruses, administered via injection for immunization against measles, mumps is a mixture of three live attenuated viruses, administered via injection for immunization against measles, mumps and rubella is a mixture of three live attenuated viruses, administered via injection for immunization against measles, mumps and rubella. It is generally administered to children around the age of one year, with a second dose before starting school (i.e. age 4/5). The second dose is not a booster; it is a dose to produce immunity in the small number of persons (2-5%) who fail to develop measles

# Chickenpox-varic



- Chickenpox and zoster are caused by varicella -zoster virus .
  - (VZV) ,an enveloped ,double stranded DNA virus that is a member of the herpes virus family.
  - Human are the only natural host.
- 

## ...Etiology

- After resolution of chickenpox, the virus persists in latent phase in the dorsal root ganglia cell.
  - Its highly communicable with secondary attack rate of more than 90%.
- 

# The Stages of Chickenpox



Incubation Period  
Usually (14-17 days)



Prodrome (1 – 3 days)



Vesicles



Pustules



Scabs



Recovery typically 7 days after  
rash appears (ranges 5 - 35 days)

# Clinical Features



Mild prodrome (fever, malaise) for 1-2 days

Successive crops (2-4 days) of pruritic vesicles

Generally appear first on head; most concentrated on trunk

Can spread over the entire body causing between 250 to 500 itchy blisters

Generally mild in healthy children









**Chicken Pox**

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**Chicken Pox**

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# NEONATAL CHICKENPOX.

- Birth within 1 wk before or after the onset of maternal varicella frequently results in the newborn developing varicella, which may be severe.
- The initial infection is intrauterine, although the newborn often develops clinical chickenpox postpartum.
- The risk to the newborn is dependent on the amount of maternal anti-VZV antibody that the fetus acquired transplacentally before birth.

# Stigmata of Varicella-Zo :Fetopathy

1. Damage to Sensory Nerves. Cicatricial skin lesions
2. Hypopigmentation. Damage to Optic Stalk and Lens Vesicle. Microphthalmia. Cataracts. Chorioretinitis. optic atrophy. Damage to Brain/Encephalitis, Microcephaly. Hydrocephaly
3. Calcifications. Aplasia of brain
4. Damage to Cervical or Lumbosacral Cord
5. Hypoplasia of an extremity. Motor and sensory deficits
6. Absent deep tendon reflexes. Anisocoria. Horner syndrome, Anal/urinary sphincter dysfunction



# Herpes Zoster (Shingles)



Reactivation of Varicella  
Zoster Virus

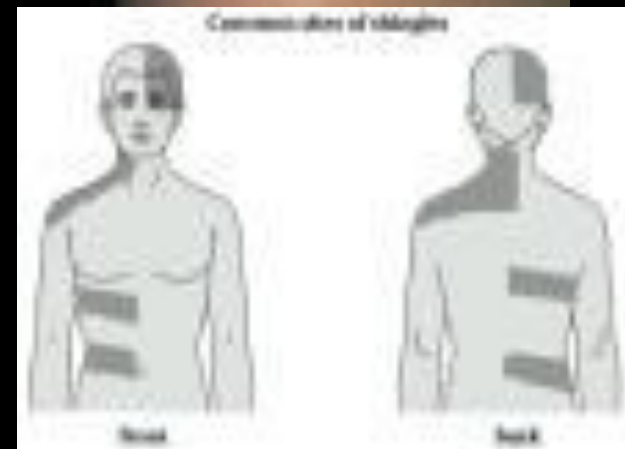
:Associated with

Aging

- Immunosuppression

- Intrauterine exposure

- Varicella at <18 month of age





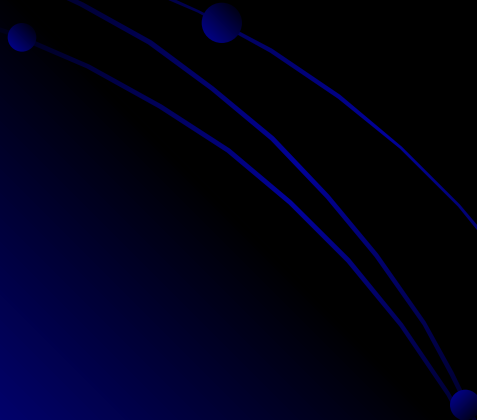
# Groups at Increased Risk for Complications



Normal Adults

Immunocompromised persons

Newborns with maternal rash onset within 5 days before to 48 hours after delivery





# Can you get chickenpox more than once



Yes

.But it is uncommon to do so

For most people, one infection is thought to  
.confer lifelong immunity





# What Complications ?Result From Varicella

The most common  
:complications are  
Bacterial infections of  
the skin and soft  
tissues in children

Septicemia

Toxic Shock  
Syndrome

Necrotizing Fasciitis

Osteomyelitis

Bacterial pneumonia

.Septic arthritis





# What home treatments are available for chickenpox?

Fingernails trimmed short

Calamine lotion and Aveeno (oatmeal) baths may help relieve some of the itching

Aspirin or aspirin-containing products to relieve your child's fever are not recommended

The use of aspirin has been associated with development of Reye syndrome (a severe disease affecting all organs - most seriously affecting the liver and brain, that may cause death)

The use of non aspirin medications such as acetaminophen is recommended

# Varicella Va Recommenc



Routine vaccination at 12 to 18 months of age

Recommended for all susceptible children by the 13<sup>th</sup> birthday

Persons  $\geq 13$  years of age without history of Varicella

Two doses separated by 4 – 8 weeks

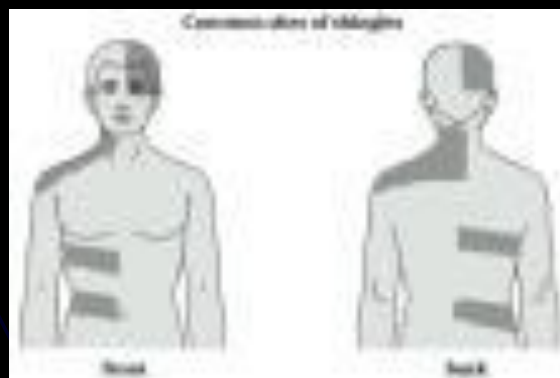


# Zoster Following Vaccination

Most cases in children

Risk from wild virus 4 to 5 times higher than  
from vaccine virus

Mild illness without complications



# Varicella Zoster Immune Globulin (VZIG)



May modify or prevent disease if given <96 hours after exposure

:Indications

Immunocompromised persons

Newborn of mothers with onset 5 days before to 2 days after birth

- Premature infants with postnatal exposure
- Susceptible adults and pregnant women

# Erythema infectiosum fifth disease



# Erythema infectiosum :disease

**.Caused by human parvovirus B19**

**In children between three and 12 years of age, although it can present as a rheumatic  
.syndrome in adults**

**The prodrome : fever, anorexia, sore throat  
.and abdominal pain**

**Once the fever resolves, the classic bright-red  
.facial rash ("slapped cheek") appears**

**Exanthem progresses to a diffuse, lacy,  
reticular rash that may wax and wane for six  
. to eight weeks**




# Erythema infectiosum




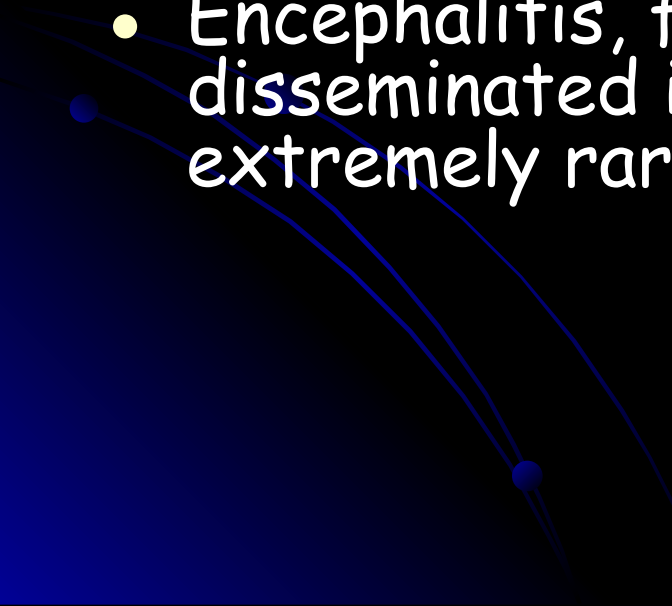
- The incubation period is usually 7-10 days but can be 4-21 days.
- The mechanism producing the dermatologic and rheumatologic features is unknown but thought to represent antigen-antibody (Ag-Ab) complexes in the skin and joints.
- Arthropathy is observed most commonly in adult women and occurs in fewer than 10% of children. It is a symmetric polyarthrititis, usually involving finger joints. The onset of joint symptoms occurs 2-3 weeks after exposure

# Roseola info



- Roseola infantum is the sixth of the traditional exanthems of childhood.
  - The condition is an acute benign disease of childhood characterized by a history of a prodromal febrile illness lasting approximately 3 days, followed by the appearance of a faint pink maculopapular rash.
- 

- HHV-6 was identified as the etiologic agent in 1988.
    - This large, double-stranded (DNA) virus is a member of the Herpesviridae family.
    - The incubation period
    - is approximately 9 days (range, 5-15 d).
- 

- **Mortality/Morbidity:**
  - Roseola is usually a self-limited illness with no sequelae.
  - The major morbidity associated with roseola is seizures (6-15%) during the febrile phase of the illness.
  - Encephalitis, fulminant hepatitis, and disseminated infection with HHV-6 are extremely rare manifestations.
- 

- **History:**
- Most cases present within the first 2 years of life, with peak occurrence in infants aged 9m-2y
- Roseola is typically characterized by a history of high fever followed by characteristic rash.
- Fever (often up to 40°C)
- Rash (fades within a few hours to 2 d)
  - Maculopapular or erythematous
  - Typically beginning on the trunk and may spread to involve the neck and extremities
  - Nonpruritic
  - Blanches on pressure

- **Medication :**

To date, no controlled antiviral trials exist against HHV-6..

- **Prevention :**

Because of the ubiquity of the virus, isolation of patients with HHV-6 infection is probably unnecessary





# Scarlet Fever



# Scarlet fever

- Is an exotoxin an exotoxin-mediated disease caused by Group A streptococcal infection an exotoxin-mediated disease caused by Group A streptococcal infection that occurs most often in association with a sore throat and rarely with impetigo or other streptococcal infections.
- Scarlet fever is *not* rheumatic fever rheumatic fever. Rheumatic fever is the autoimmune disease that occurs after infection with Group A strep that causes damage to the heart valves.
- The disease was once greatly feared and killed many thousands of people. Today, however, it is fairly easy to treat with modern antibiotics.

# Clinical manifestat

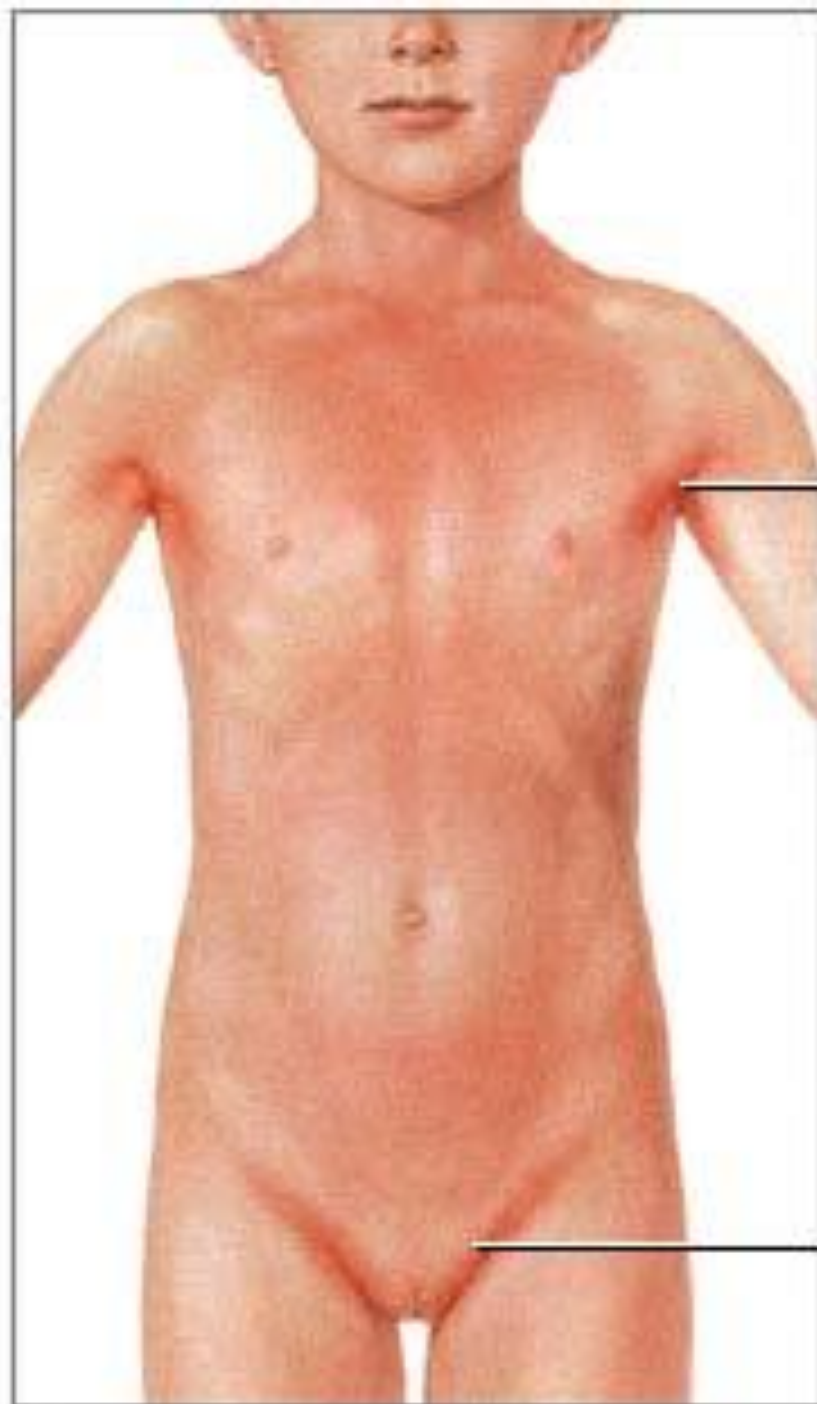
- Scarlet fever generally has a 1- to 4-days incubation period.
- Emergence of the illness tends to be abrupt, usually manifested by sudden onset of fever associated with sore throat, headache, nausea, vomiting, abdominal pain, myalgias, and malaise.
- The characteristic rash appears 12-48 hours after onset of fever.
- In the untreated patient, fever peaks by the second day (as high as 103-104°F) and gradually returns to normal in 5-7 days.
- Fever abates within 12-24 hours after initiation of antibiotic therapy.

# Skin rash      scarlat

- generally starts on the chest, axilla , and behind the ears
- worse in the skin folds
- Pastia lines Pastia lines (small linear petechiae) appear and persist after the rash is gone
- Scarlet fever also produces a bright red tongue with a "strawberry" appearance.
- The area around the mouth is usually pale (circumoral pallor)
- After about a week, the skin often desquamates or peels, usually in the groin, axilla, and on tips of fingers and toes



## Scarlet fever rash



— Pastia's lines





# Compli

- arise from suppurative complications such as;
- \*peritonsillar abscess,  
\*sinusitis,  
\*bronchopneumonia,  
\*and meningitis,
- or problems associated with immune system  
as rheumatic fever or  
glomerulonephritis

- Desquamation, one of the most distinctive features of scarlet fever, begins 7-10 days after resolution of the rash and may continue up to 6 weeks.





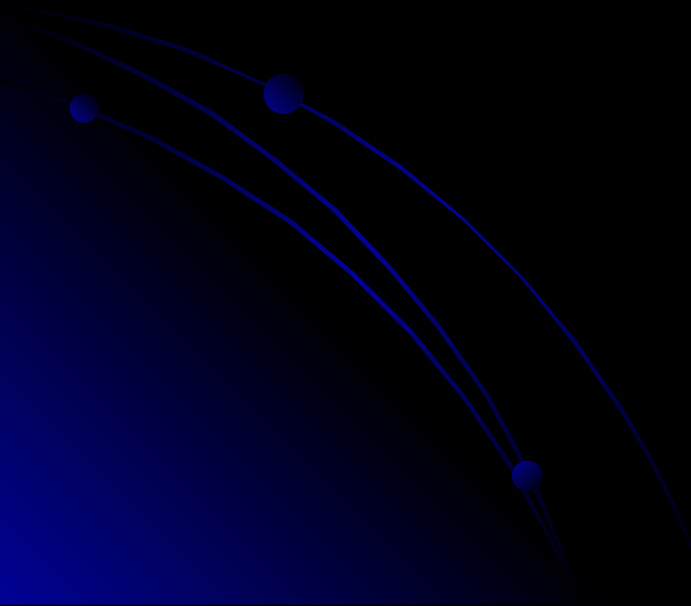
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- **Lab Studies:**

1. Throat culture remains the "gold standard" for confirmation of group A streptococcal upper respiratory infection.

- **ASOT**

antistreptolysine o titere



- penicillin
- Pediatric Dose
- <12 year: 25-50 mg/kg/d PO divided tid/qid;  
not to exceed 3 g/d
- >12 year: Administer as in adults
- Adult Dose 250 mg PO tid/qid for 10 d
- Contraindications Documented  
hypersensitivity

# **TOXIC SHOCK SYNDROME AND SCALDED SKIN SYNDROME**

***Staphylococcus aureus* exotoxins  
responsible for classic toxic shock  
.syndrome and scalded skin syndrome**

**Presentation : hypotension, erythema, fever  
.and multisystem dysfunction**

**The rash : diffuse and can present as  
bullous impetigo, scarlatiniform lesions  
.or diffuse erythema**

**The mucous membranes :spared**



A

B

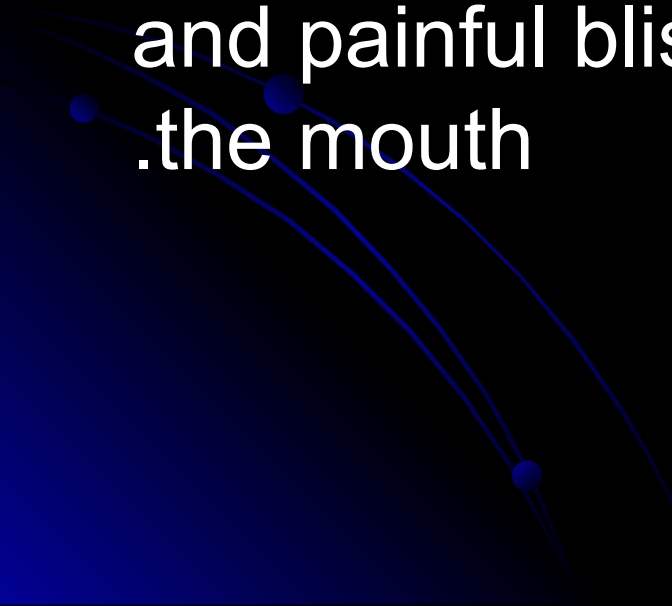




# Coxsackie viruses and enteroviruses

Hand-foot-and-mouth disease: the children develop fever and rash. The rash includes blisters to the mouth and tongue, to the hands and the feet

Herpangina causes a fever, sore throat, and painful blisters or ulcers to the back of the mouth



# Hand-Foot-Mouth Disease

Enteroviruses

coxsackieviruses A and B

echoviruses

Vesicular lesions, may be petechial

Associated with aseptic meningitis,

myocarditis





# Infectious Mononucleosis

Acute, self limited illness

Epstein-Barr virus

Oral transmission – incubation 30-50 days

Fever, fatigue, pharyngitis, LA, splenomegaly, atypical lymphocytosis

- Exanthem is seen in 10-15%

Erythematous, maculopapular, morbilliform, scarlatiniform, urticarial, hemorrhagic, or even nodular

# Impetigo

Superficial infection of the dermis

:Two types

Impetigo contagiosa

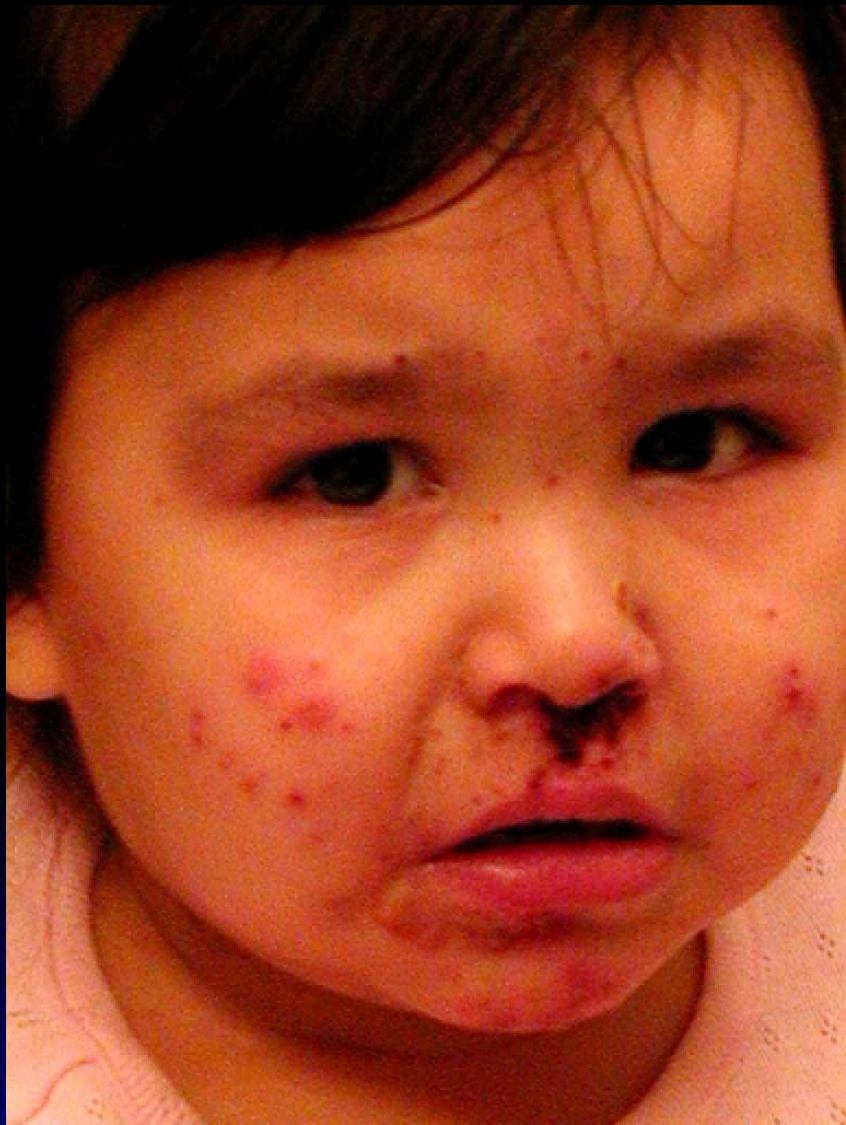
Bullous impetigo

Etiology

Group A  $\beta$  hemolytic streptococcus

*Coagulase positive S. aureus*

Treatment : Keflex, erythromycin, Bactroban



# Rocky Mountain Spotted Fever

Most common rickettsial infection in US

Abrupt fever, headache, and myalgia

Rash from extremities towards trunk

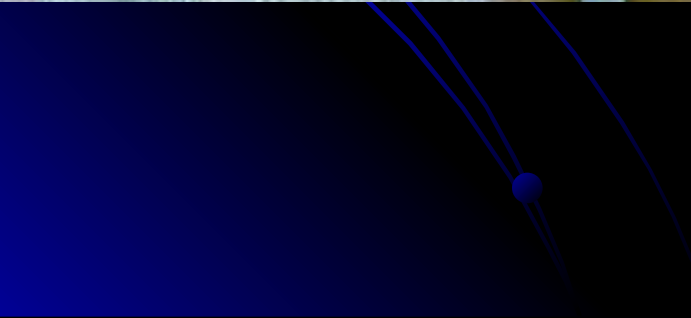
Macules → petechiae

Treatment

- Tetracycline

Doxycycline

Chloramphenicol





# Periorbital- Orbital Cellulitis

*S. aureus*, *S. pneumoniae*, and *HIB*

CBC, blood culture, CT

?LP

IV antibiotics

Admit





# Kawasaki Syndrome

Unknown etiology

Peak incidence 18-24 months

:Clinical findings

Fever for at least five days

Conjunctivitis

Polymorphous rash

Oral cavity changes

Cervical adenopathy



# Erythema Toxicum Neonatorum

Impressive title - harmless skin condition

Erythematous macule with a central tiny papule,  
.seen anywhere - except the palms and soles

The lesions are packed with eosinophils, and there  
may be accompanying eosinophilia in the blood

.count

The cause is unknown, and no treatment is  
.required as the rash disappears after 1-2 weeks



# Miliaria

Prickly heat, sweat rash

Many red macules with central papules,  
.vesicles or pustules are present

These may be on the trunk, diaper area,  
.head or neck







# Infantile Atopic Dermatitis

Cause is unknown

Red, itchy papules and plaques that ooze and crust

Sites of Predilection

Face in the young

Extensor surfaces of the arms and legs 8-10  
.mo

Antecubital and popliteal fossa , neck, face in  
older



# Eczema- Treatment

Avoidance or elimination of predisposing factors

Hydration and lubrication of dry skin

Anti-pruritic agents

Topical steroids



# Seborrheic Dermatitis

Common, generally self-limiting

Its cause remains ill-understood

There is a genetic predisposition

Most frequent between the ages of 1 to 6

.mo

Greasy, salmon-colored scaling eruption

Hair-bearing and intertriginous areas

The rash causes no discomfort or itching

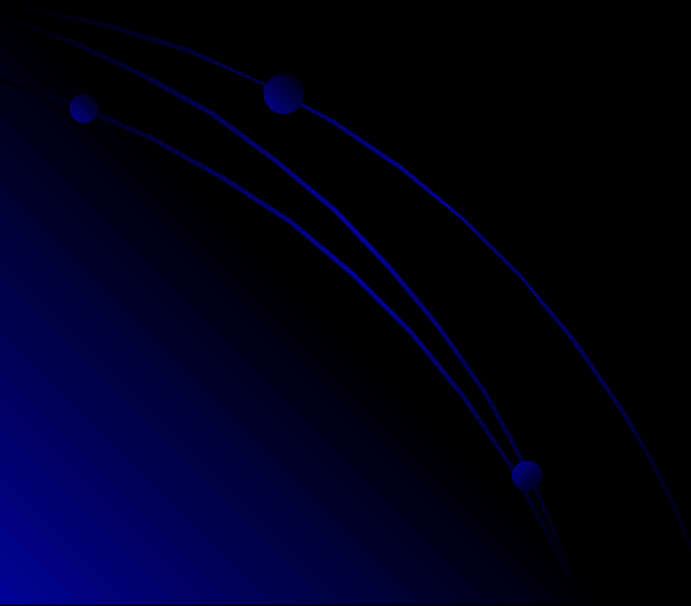




# Seborrheic Dermatitis-Treatment

Anti-seborrheic shampoo

Topical steroids



# Cytomegalovirus (CMV)

*Most common congenital viral infection*

.infants per year in the U.S 40,000~

Mild, self limiting illness

or Transmission can occur with primary infection  
reactivation of virus

risk of transmission in primary infxn 40%

Studies suggest increased risk of transmission  
later in pregnancy

However, more severe sequelae associated with  
earlier acquisition



# Clinical Manifestations

!are asymptomatic at birth 90%

Up to 15% develop symptoms later, notably sensorineural hearing loss

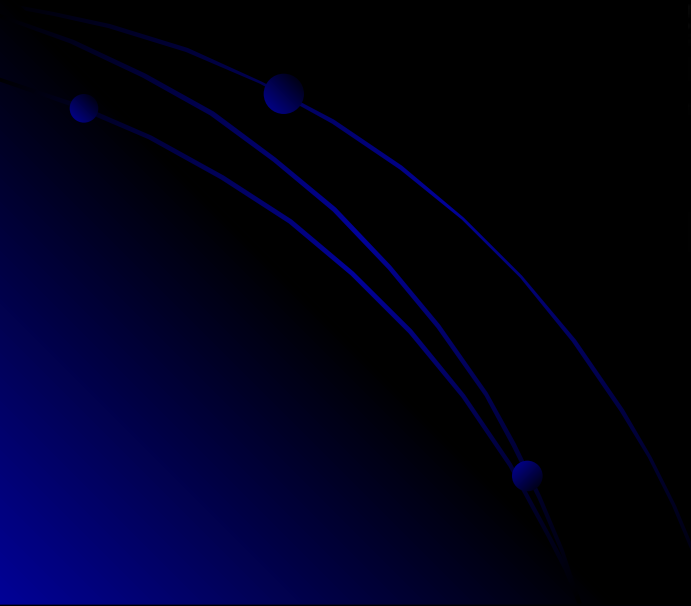
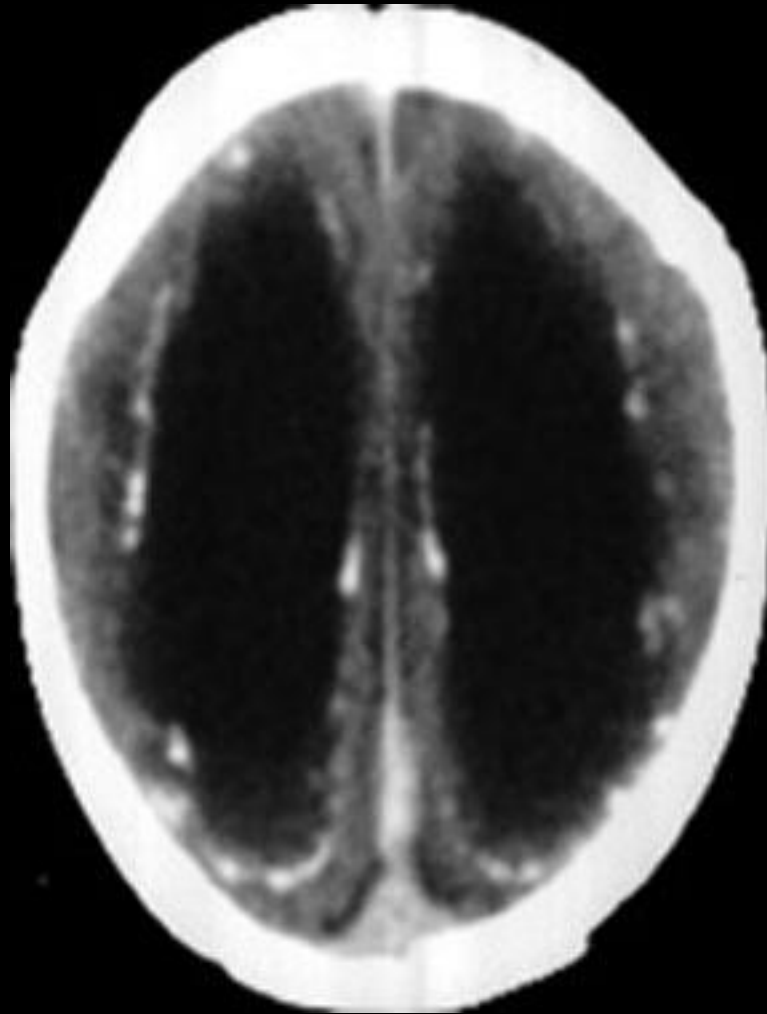
Symptomatic infection

SGA, HSM, petechiae, jaundice, chorioretinitis, *periventricular calcifications*, neurological deficits

develop long term complications 80%<

Hearing loss, vision impairment, developmental delay

Ventriculomegaly and  
calcifications of  
congenital CMV



Maternal IgG shows only past infection

Infection common – this is useless

Viral isolation from urine or saliva in 1<sup>st</sup> 3weeks of life

Afterwards may represent post-natal infection

Viral load and DNA copies can be assessed by PCR

Less useful for diagnosis, but helps in following viral activity in patient

Serologies not helpful given high antibody in population

## Ganciclovir x6wks in symptomatic infants

Studies show improvement or no progression of hearing loss at 6mos

No other outcomes evaluated (development, etc.)

Neutropenia often leads to cessation of therapy

Treatment currently not recommended in asymptomatic infants due to side effects

Area of active research to include use of .valgancyclovir, treating asx patients, etc