

RASH FEVER

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MEASLES



RUBELLA
GERMAN MEASLES



SCARLET FEVER



VARICELLA
CHICKEN POX

SCARLET fever

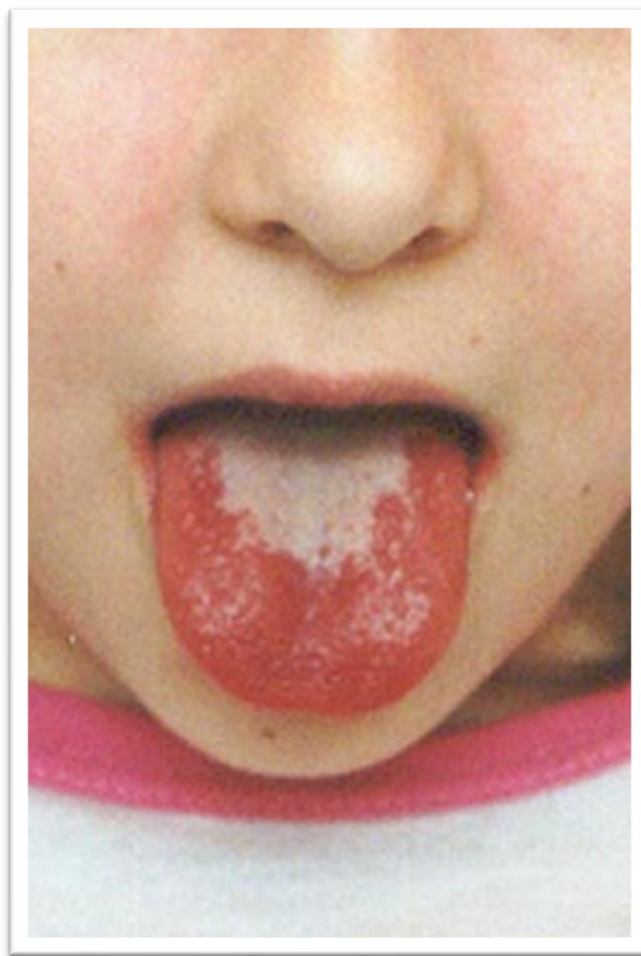


Definition

- Scarlet fever is an acute infectious disease from the rash fever group caused by the bacterium *S. pyogenes*, which secretes pyrogenic toxins (erytrogenic toxins).

Clinical picture

- Incubation is 3 to 5 days
- Initial stage fever, headache, vomiting, sore throat,
- Rash stage small-grained measles (diffuse erythema), predilection sites: axillae, sides of the chest, lower part of the abdomen and flexor sides of the extremities,
- findings in the pharynx: angina, petechial enanthema, "raspberry tongue"
- Flaking stage the parts of the skin where the measles first appeared are peeled first, and then other parts of the skin (palms, soles of the feet)





Complications

- Local: sinusitis, otitis
- Purulent lymphadenitis, peritonsillar and retropharyngeal abscess
- Remote: meningitis and brain abscess, arthritis, osteomyelitis, endocarditis, etc.
- Toxic: toxic arthritis, myocarditis, hepatitis, streptococcal toxic shock syndrome,
- Immunoallergic: rheumatic fever, acute glomerulonephritis, reactive arthritis, erythema nodosum.

Worldwide, GAS (Group A streptococcal infections) and their postinfectious sequelae (primarily ARF and rheumatic heart disease) account for an estimated 500,000 deaths per year. Although data are incomplete, the incidence of all forms of GAS infection and that of rheumatic heart disease are thought to be tenfold higher in resource-limited countries than in developed countries

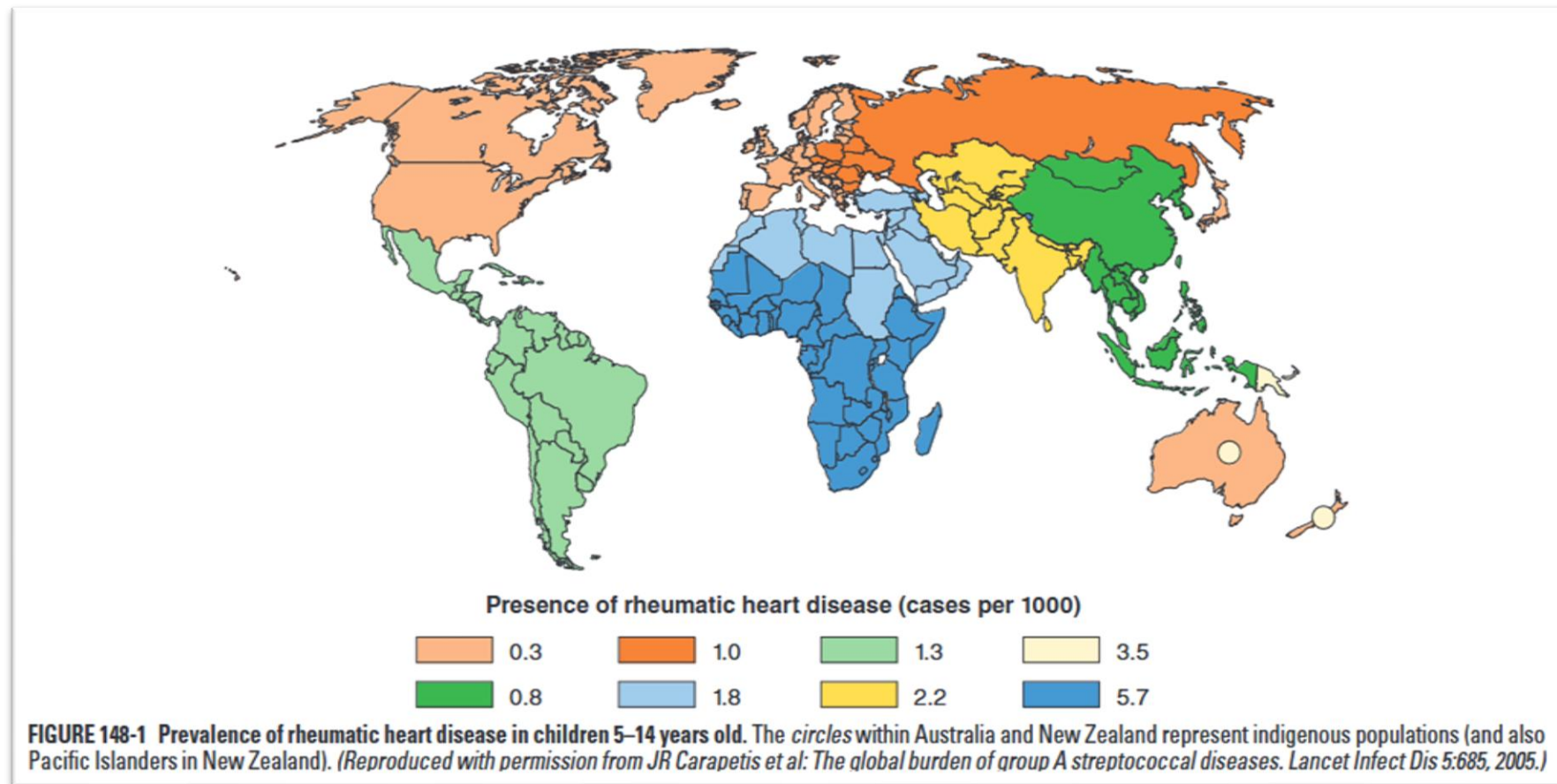
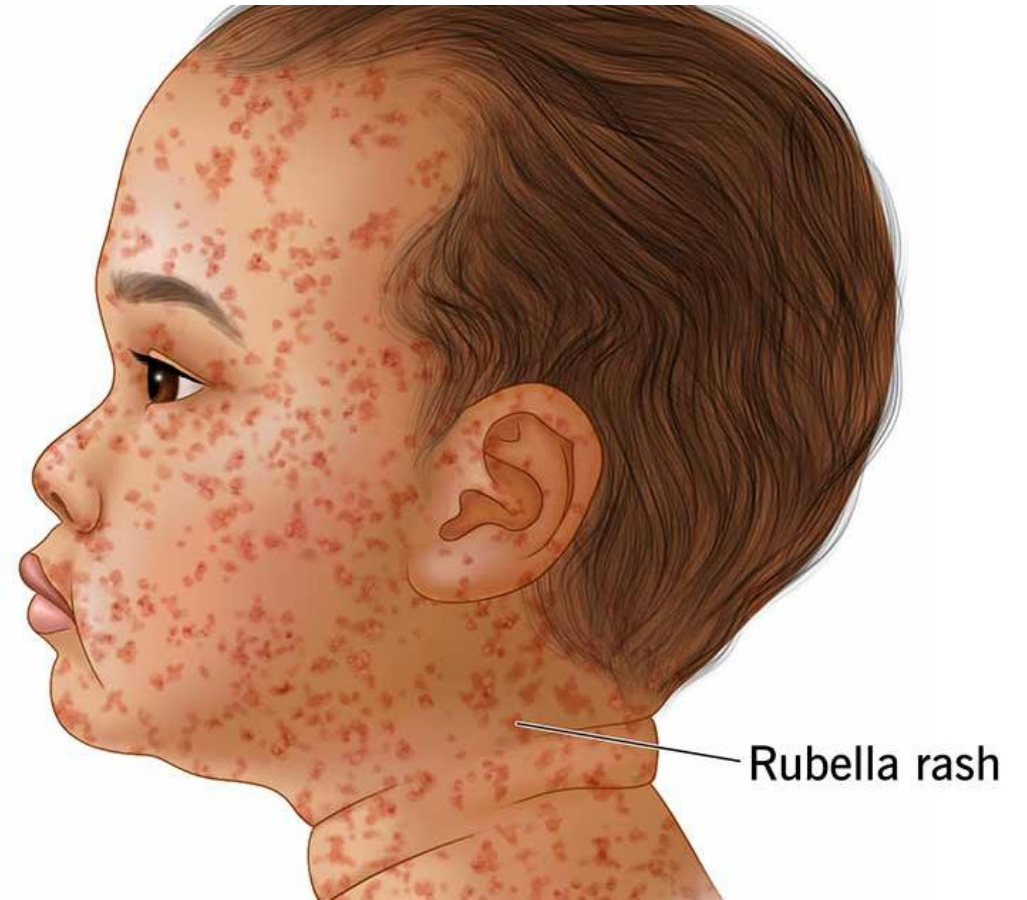


Table 2. Antibiotic Regimens Recommended for Group A Streptococcal Pharyngitis

Drug, Route	Dose or Dosage	Duration or Quantity
For individuals without penicillin allergy		
Penicillin V, oral	Children: 250 mg twice daily or 3 times daily; adolescents and adults: 250 mg 4 times daily or 500 mg twice daily	10 d
Amoxicillin, oral	50 mg/kg once daily (max = 1000 mg); alternate: 25 mg/kg (max = 500 mg) twice daily	10 d
Benzathine penicillin G, intramuscular	<27 kg: 600 000 U; ≥27 kg: 1 200 000 U	1 dose
For individuals with penicillin allergy		
Cephalexin, ^b oral	20 mg/kg/dose twice daily (max = 500 mg/dose)	10 d
Cefadroxil, ^b oral	30 mg/kg once daily (max = 1 g)	10 d
Clindamycin, oral	7 mg/kg/dose 3 times daily (max = 300 mg/dose)	10 d
Azithromycin, ^c oral	12 mg/kg once daily (max = 500 mg)	5 d
Clarithromycin, ^c oral	7.5 mg/kg/dose twice daily (max = 250 mg/dose)	10 d

Rubella (German measles)

Rubella a leading cause of vaccine-preventable birth defects is an acute viral infection that can affect people of all ages



Rubella(German Measles)

- Etiopathogenesis
- Rubella virus is a member of the Togaviridae family and the only member of the genus Rubivirus
- nasopharynx — blood → RES — blood → target organs, - the disease leads to anergy (decrease in resistance)
- Epidemiology
- the source of infection is the patient (infected 7 days before and 14 days after the rash outbreak),
- Maximal viral shedding occurs 1 do 5 days after rash onset
- route of spread of infection:
- occurs sporadically or in epidemics, most often in winter and spring, - preschool and school children are the most affected.

Countries using rubella vaccine in national childhood immunization schedules, 2018

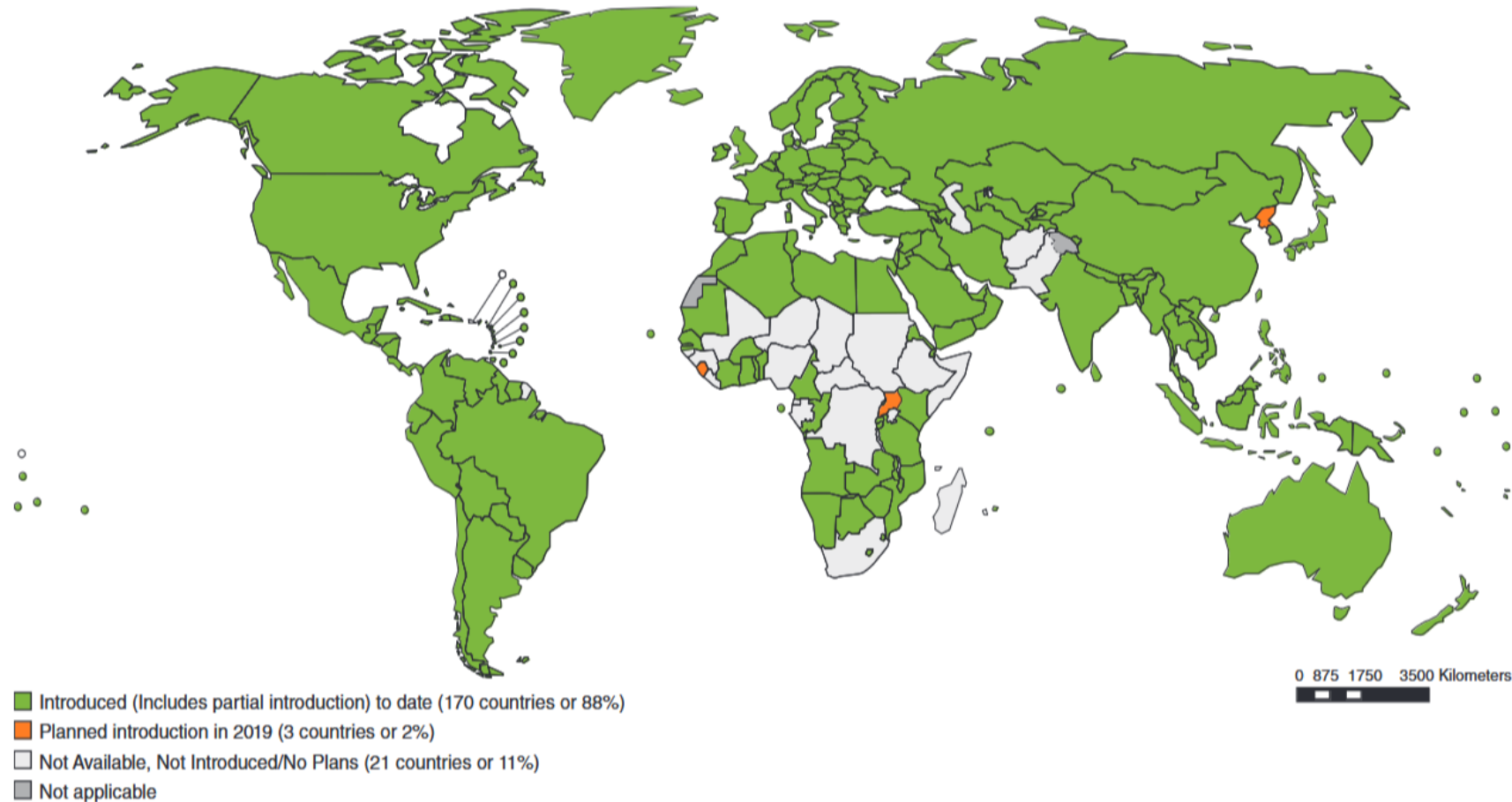


FIGURE 206-2 Countries using rubella vaccine in national childhood immunization schedules, 2018. Disclaimer—The boundaries and names shown and the designations used on this map do not imply the expression or any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city, or area nor of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted or dashed lines on maps represent approximate border lines for which there may not be full agreement. (From the World Health Organization, WHO, 2019. All rights reserved.)

CLINICAL FEATURES

- ✓ Acquired Rubella commonly presents with a generalized maculopapular rash that usually lasts for up to 3 days although as many as 50% of cases may be subclinical or without rash

- ✓ Congenital Rubella Syndrome

The most serious consequence of rubella virus infection can develop when a woman becomes infected during pregnancy, particularly during the first trimester

CLINICAL FEATURES

- **Clinical picture**
- **Incubation: 11-23 days**

The disease progresses through three stages:

catarrhal, rash and convalescent

A - Catarrhal stage - weakly expressed, lasts 1-2 days

B - Rash stage

morphology: maculo-papular measles, less often erythematous, - first on the face, then it descends on the trunk and extremities (it is localized all over the body), - lasts 1-3 days, enlargement of the occipital lymph glands is characteristic (lasts for 2-3 weeks)

C - Convalescent stage



Complications

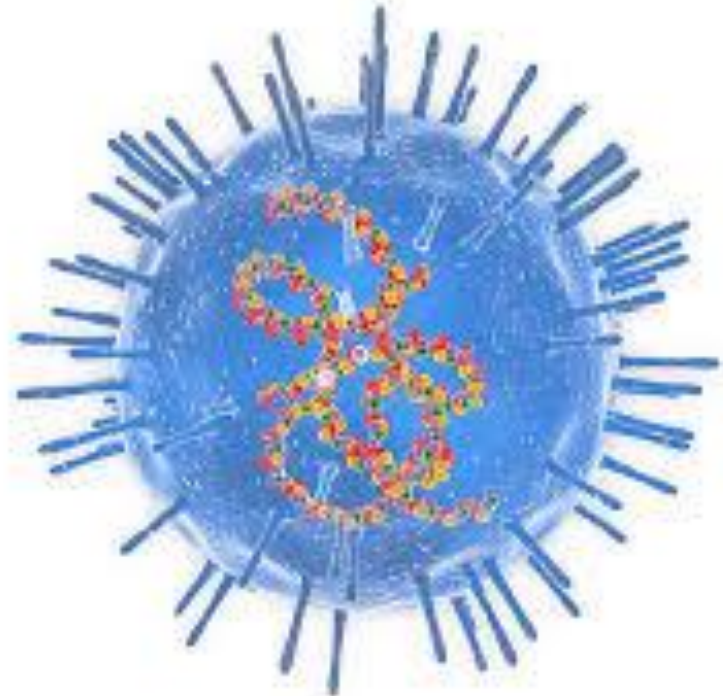
- ✓ arthritis
- ✓ thrombocytopenic purpura
- ✓ encephalitis
- ✓ congenital malformations during pregnancy



“blueberry muffin” rash

Other diagnosis considerations include:

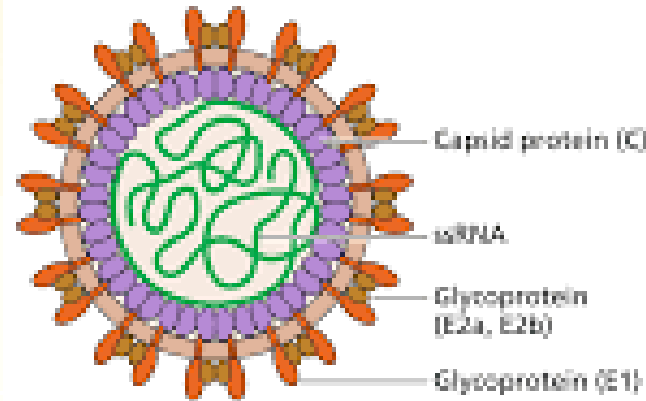
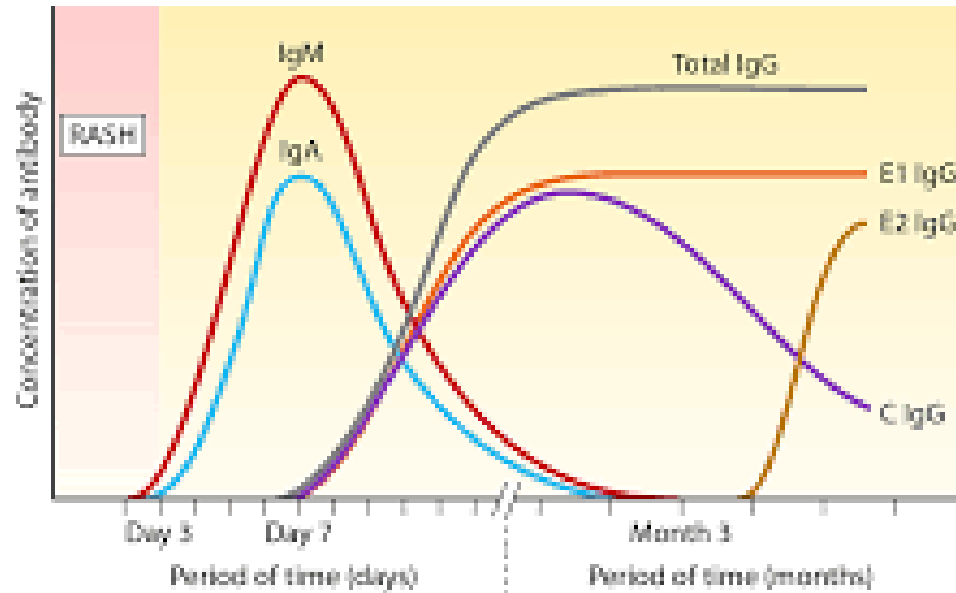
- Scarlet fever
- Roseola
- Parvovirus B 19 infection
- Infectious mononucleosis
- Toxoplasmosis
- Enteroviral infections
- Kawasaki disease
- Rheumatological disorders
- Allergic reactions



Diagnosis

- clinical picture
- epidemiological data
- laboratory analyses (leukopenia, plasmacytosis, virus isolation, serological reactions)
- enzyme-linked immunosorbent assay (ELISA) techniques, which detect either rubella immunoglobulin G (IgG) or IgM antibodies
- molecular methods such as reverse transcription–polymerase chain reaction (RT-PCR)
- Immunity - solid, lifelong, - described reinfections (without viremia)
- Therapy and care - symptomatic

Serological diagnosis of Rubella



- **IgG** antibodies against rubella typically indicate past infection or vaccination. The presence of IgG antibodies suggests immunity to rubella, either from a past infection or from vaccination. In cases of suspected rubella infection, a significant rise in IgG levels over time may indicate recent infection
- **IgM** antibodies against rubella are typically produced early in the course of infection and are often used to detect acute or recent infections. The presence of IgM antibodies suggests recent rubella infection, as these antibodies are typically not present in significant levels in individuals with past infections or vaccination

Prevention

- Due to large-scale vaccination efforts, the United States was able to eliminate rubella in 2004
- The goal of vaccination primarily is to prevent congenital rubella infection
- Live-attenuated vaccine in different form:
 - ✓ Monovalent
 - ✓ MMR form (measles, mumps, rubella)
 - ✓ MMRV form (measles, mumps, rubella, varicella)
- First dose of rubella vaccine can be administered between 12 and 15 months
- The WHO recommends a minimum of 80% vaccination coverage of a population



Children need 2 doses of MMR or MMRV vaccines:

12–15 months old	1st dose
4–6 years old	2nd dose

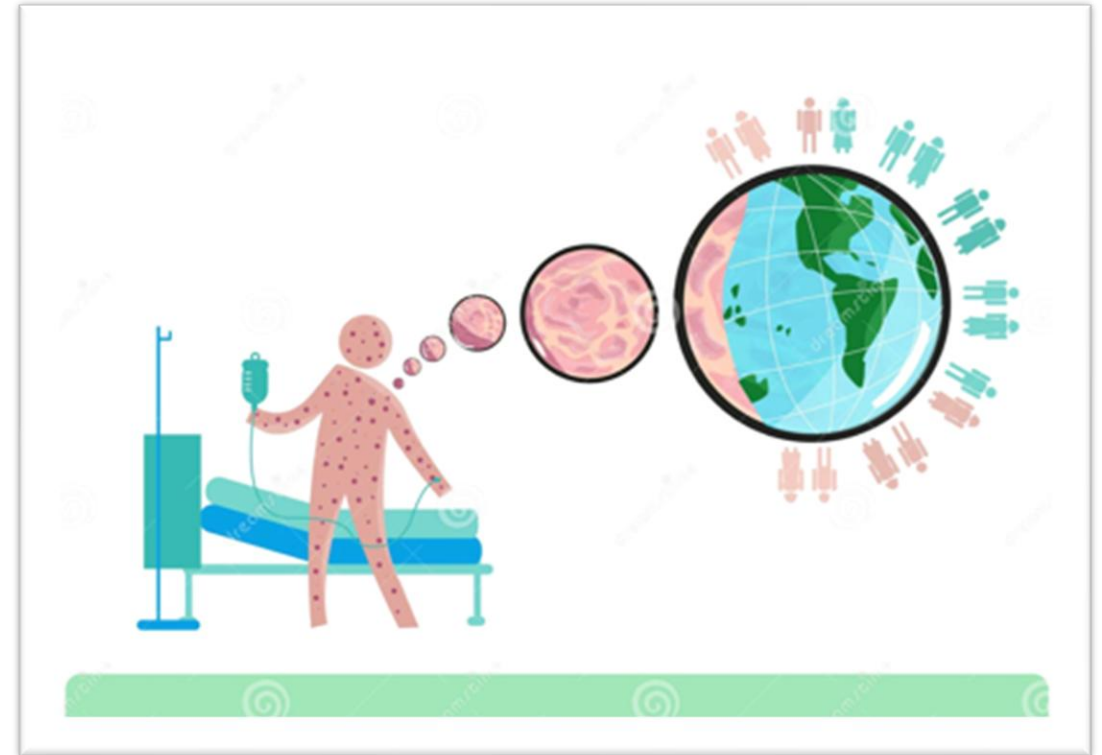
The MMR or MMRV vaccines are safe and effective

One dose of MMR vaccine is:	<ul style="list-style-type: none">• 93% effective against measles• 72% effective against mumps• 97% effective against rubella
Two doses of MMR vaccine are:	<ul style="list-style-type: none">• 97% effective against measles• 86% effective against mumps

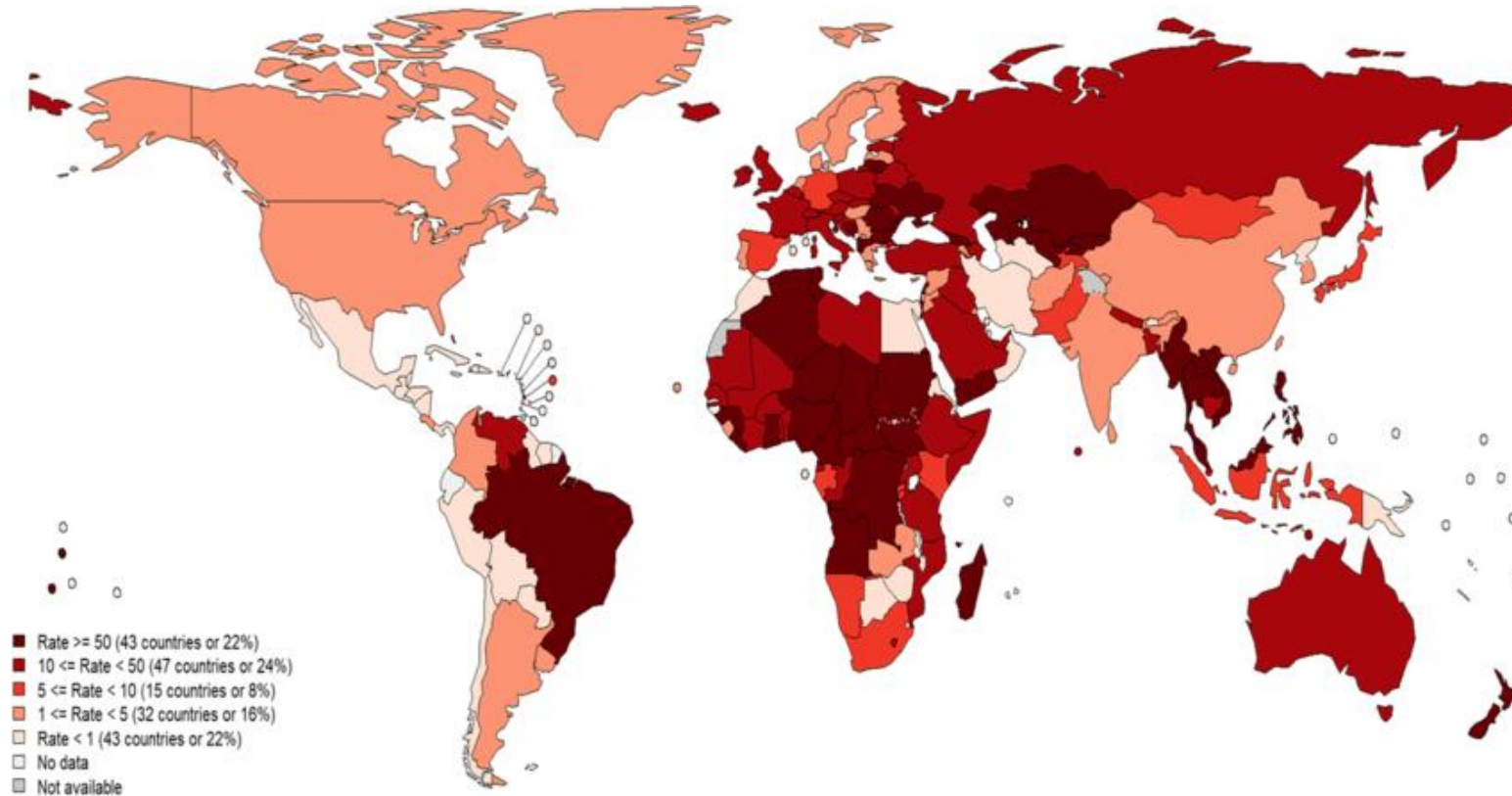
<https://www.cdc.gov/rubella/vaccines/index.html>

Measles is a highly contagious, acute febrile illness caused by rubeola virus, most commonly seen in young children

MEASLES



GEOGRAPHIC DISTRIBUTION AND DISEASE BURDEN



- In countries without vaccine programs, epidemics of measles occur every 2 to 5 years
- Globally, measles causes 20 to 30 million infections with at least 1 million deaths annually
- Countries in which vaccine is widely used have experienced a marked decrease in measles.

Prevalence of measles globally in 2020.

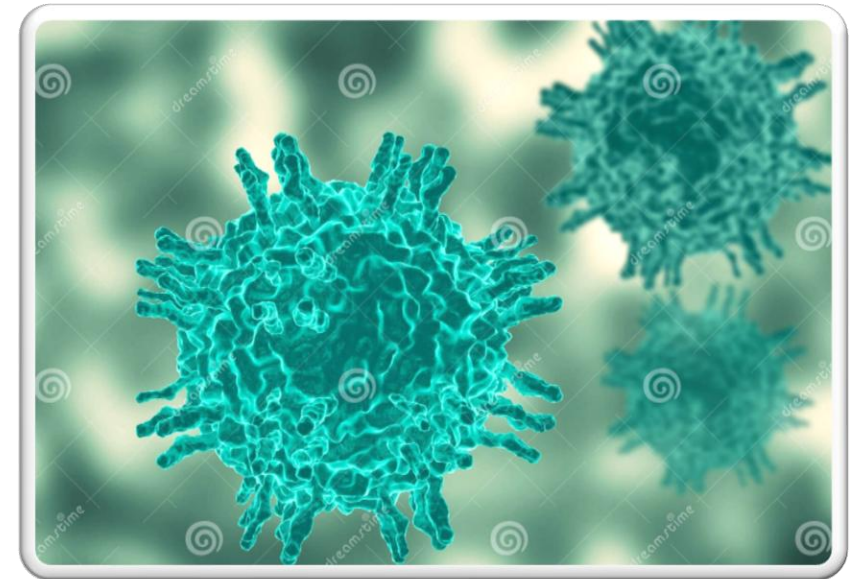
Measles

Etiopathogenesis

- Rubeola virus is a single-stranded ribonucleic acid (RNA) virus belonging to the family Paramyxoviridae
- nasopharynx — blood → RES — blood → target organs, - the disease leads to anergy (decrease in resistance)

Epidemiology

- Infection is transmitted by direct contact with infected respiratory droplets and less commonly by airborne spread
- It is one of the most communicable infectious diseases, with an attack rate well over 90% for susceptible persons
- Infected individuals are most contagious during the late prodromal phase, when cough and coryza are maximal but the specific diagnosis has not yet been made
- the source of infection is the patient (infected 5 days before and 5 days after the smallpox outbreak)



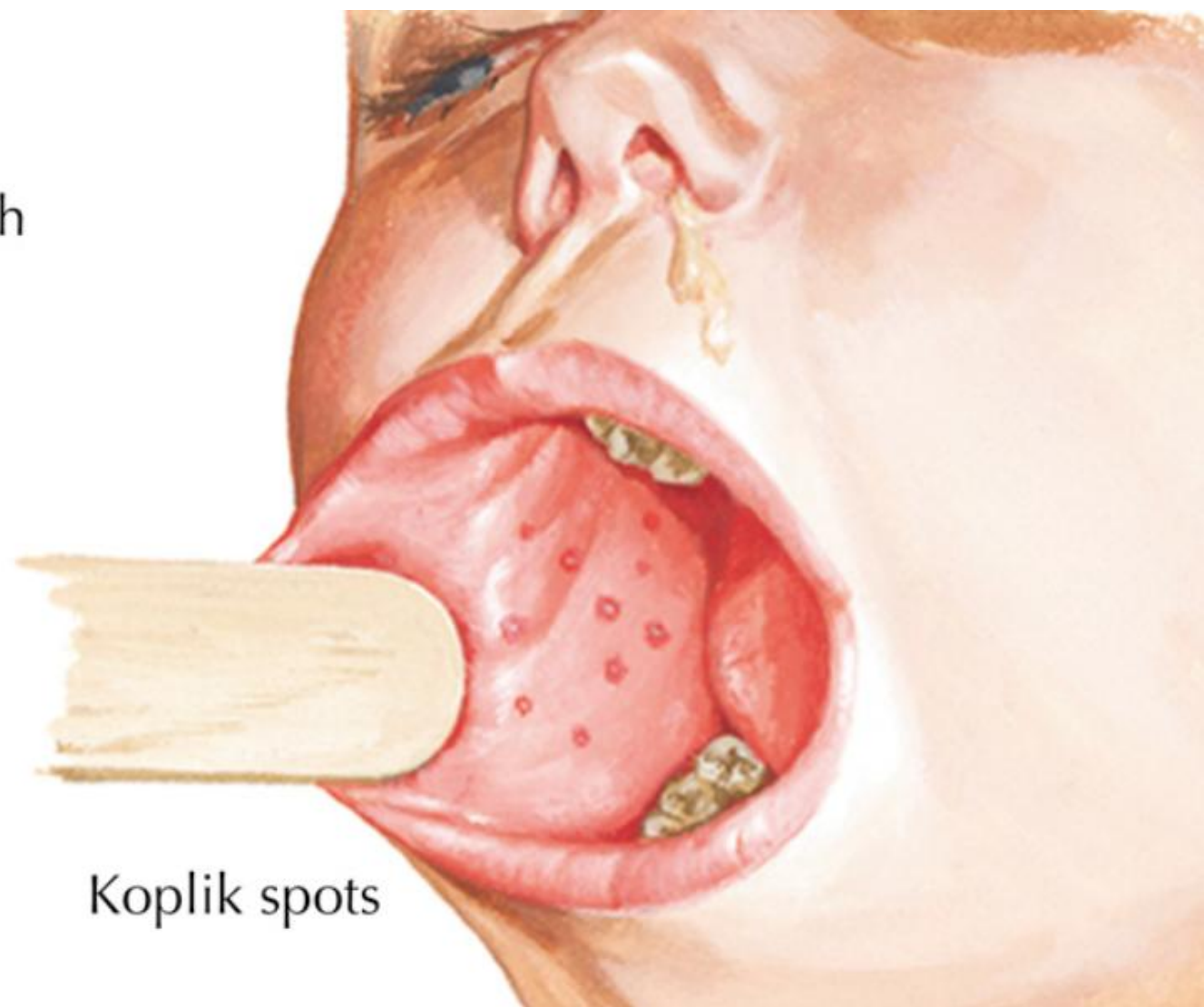
CLINICAL PICTURE

- The incubation period ranges from 7 to 21 days from the time of exposure to the onset of symptoms (Mostly 10/12 days)
- The disease progresses through three stages: catarrhal, rash and convalescent
- A. Catarrhal stage
 - strongly manifested with fever and catarrhal symptoms,
 - near the end of this stage,
 - Koplik's enanthema occurs,
 - this stage lasts 3-5 days



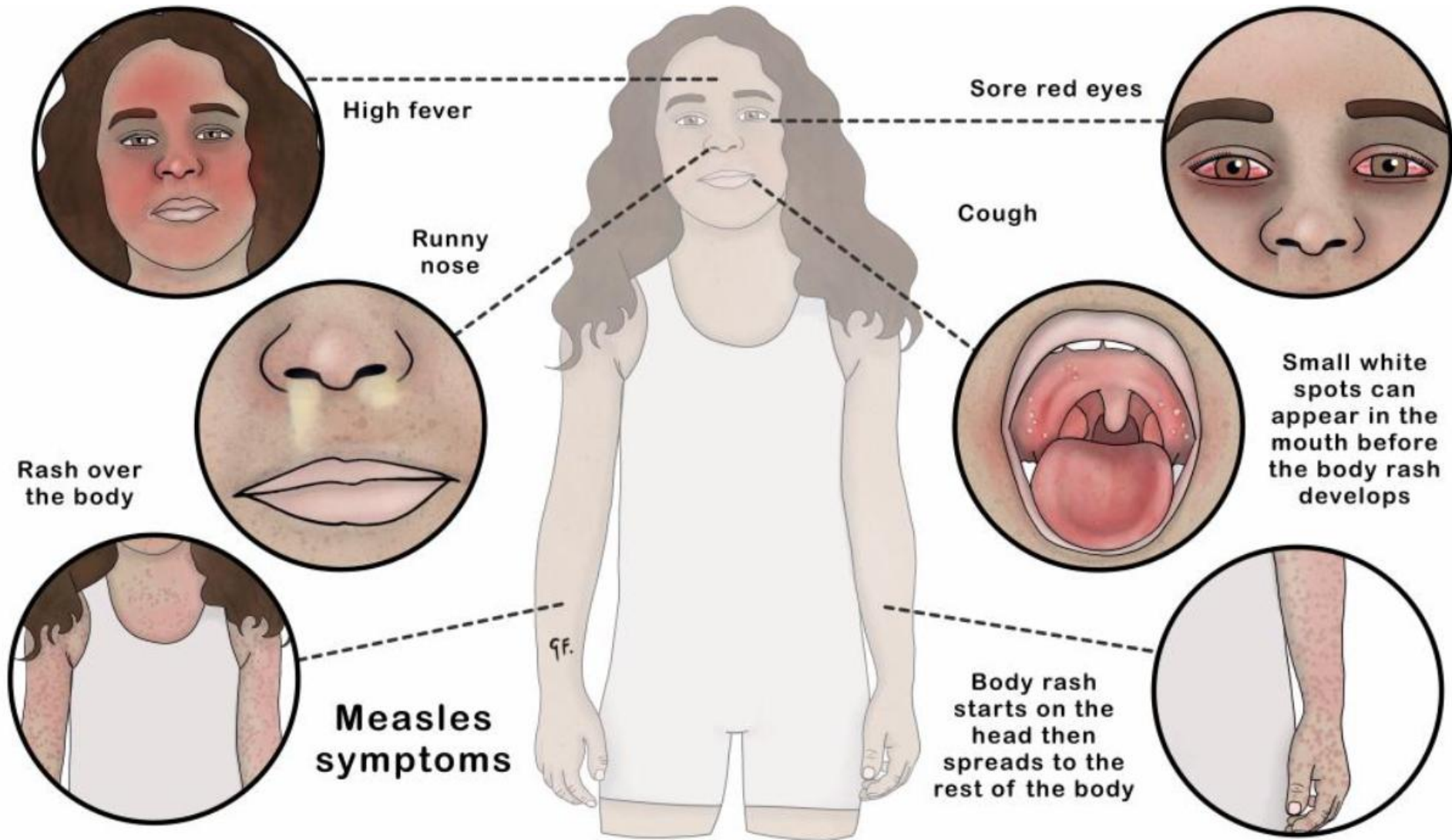


Measles rash



Koplik spots

Signs and symptoms of measles



Facies morbillosa



CLINICAL PICTURE

- B. Rash stage
 - morphology of smallpox:
 - maculo-papular, first behind the ears, then on the face, then it descends on the neck, trunk and extremities (it is localized all over the body),
 - the face takes on the appearance of a "crying mask" (facies morbillosa),
 - and the skin is red, warm, moist, velvety, - this stage lasts about 5 days, then the smallpox fades, and hyperpigmentation remains on the skin.
 - C. Convalescent stage - recovery of the patient.



- Maculo-papular measles



Atypical Presentations of measles

- a) Modified Measles
- b) Black Measles
- c) Measles in Immunocompromised Hosts
- d) Measles in Malnourished Hosts
- e) Measles in Pregnancy and Congenital Infection

Complications

- Otorhinolaryngological: angina, otitis media, sinusitis, laryngitis
 - Respiratory (pneumopathy): bronchiolitis, bronchitis
bronchopneumonia, pneumonia, ARDS
 - Neurological: encephalitis, febrile convulsions, SSPE, multiple sclerosis
 - Other complications: hepatitis, myocarditis, appendicitis, etc.
-
- Mortality increases in populations with malnutrition and vitamin A deficiency



MEASLES PNEUMOPATHY



Figure 3 – Radiological progression of the interstitial pulmonary infiltrate (A) First day after admission, (B) and (C) day 3 after admission

- Measles ARDS

Diagnosis

Clinical Diagnosis

- The diagnosis of measles can be difficult, as many childhood and adult diseases display similar “morbilliform” rashes and systemic findings
- It is very important to isolating the infected patient, but also for identifying and evaluating all recent contacts for consideration of postexposure prevention measures for outbreak control

Laboratory Diagnosis

- Simple blood counts often reveal leukopenia and lymphopenia
- Molecular diagnostic methods (e.g., real-time polymerase chain reaction [RT-PCR]) with samples from sites of shedding—including the nasopharynx, oropharynx, conjunctiva, and even urine—can make diagnosis possible within hours but require access to a modern laboratory with this capability
- Naive infected individuals usually develop an elevated IgM antibody as soon as the onset of rash

Therapy

- Supportive therapy includes reducing fever, maintaining hydration and nutrition, and treatment of any of the individual complications previously discussed
- No specific antiviral agents have proven to be effective in treating individuals with measles
- Immediate vitamin A supplementation is used to reduce the risk of xerophthalmia, corneal scarring, and blindness as well as the debilitating prolonged diarrhea that may exacerbate malnutrition and increase mortality postinfection



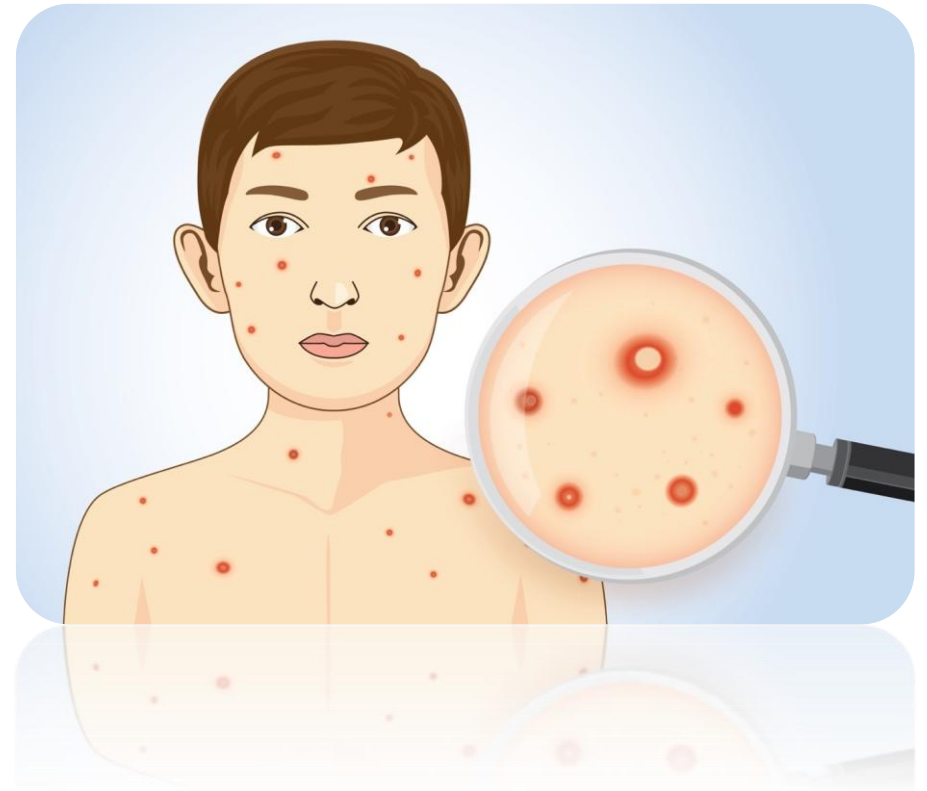
Prevention

- The introduction of an effective live-attenuated vaccine during the late 1960s has led to a dramatic global reduction in the disease burden and resultant mortality
- The vaccine is often combined with rubella and mumps virus (measles, mumps, and rubella, or MMR) and varicella (MMRV)



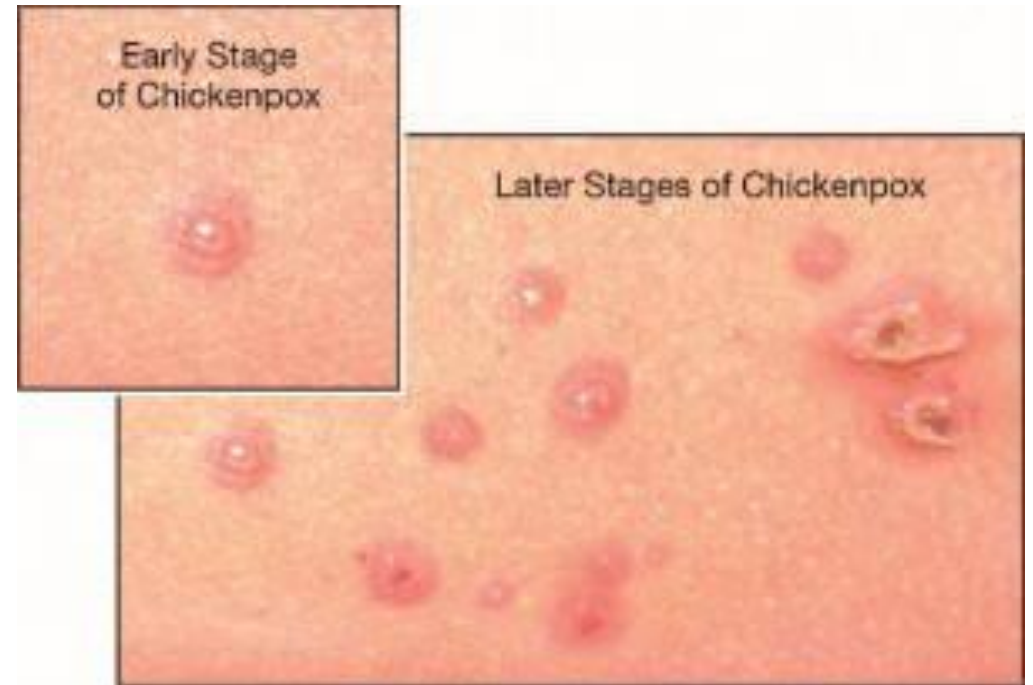
Chickenpox

- Varicella-zoster virus (VZV) causes primary varicella, a common childhood illness called chickenpox. This virus establishes latency and may reactivate later in life, causing herpes zoster, which is commonly called shingles or simply zoster.



GEOGRAPHIC DISTRIBUTION AND DISEASE BURDEN

- Varicella is present worldwide and is common in areas without routine vaccination
- In temperate regions without high vaccine coverage, seasonal epidemics with peaks in late winter and spring occur
- Most individuals were infected by adolescence, and the peak age of onset was 4 to 5 years of age
- Attack rates are lower and less seasonal in tropical areas, where a greater proportion of adolescents and adults are susceptible



- Etiopathogenesis

- - the causative agent of varicella - zoster virus (Herpetoviridae),
- - nasopharynx — blood → RES — blood → target organs.

- Epidemiology

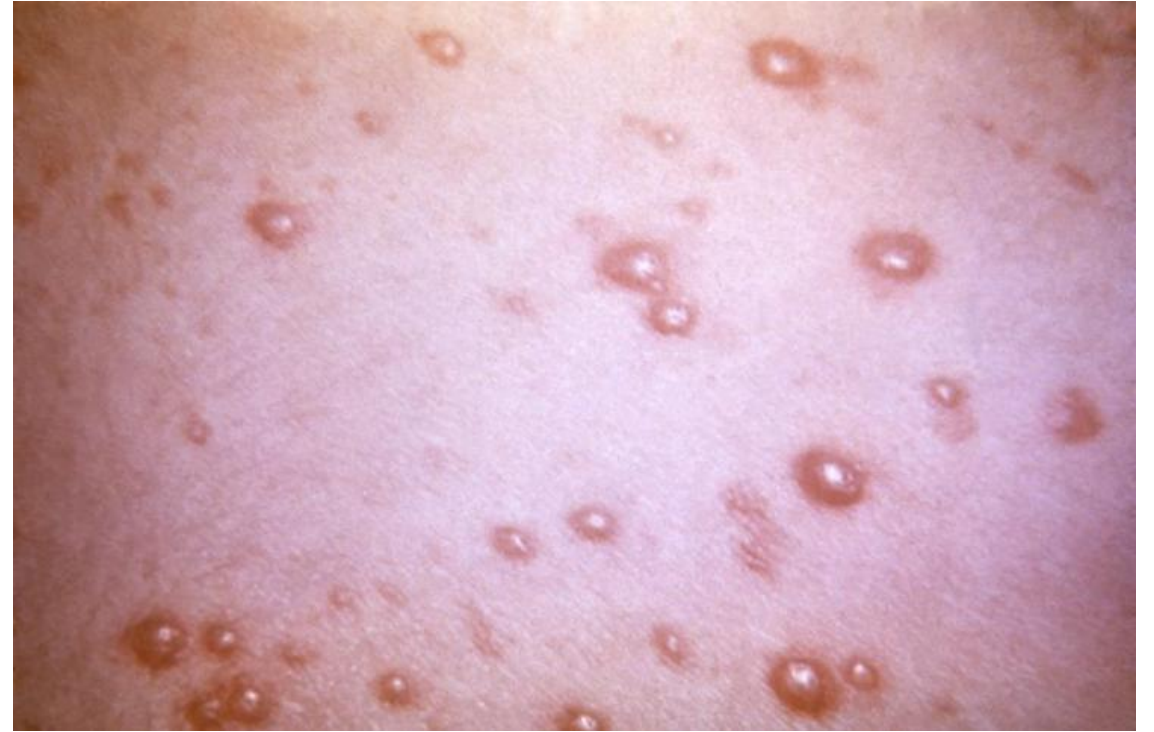
- - source of infection: a patient with varicella or herpes zoster (infected from the end of incubation until there are vesicles on the skin),
- - way of spread of infection: droplet, less often by direct contact,
- - occurs sporadically or epidemically, most often in winter and spring,
- - children up to 10 years of age are most often affected,
- - the contagion index is about 70%.

- Clinical picture
- Incubation: 7-21 days
- The disease progresses through three stages: prodromal, rash and convalescent.
- A. Prodromal stage
 - - weakly expressed (temperature, headache, pain in muscles and joints),
 - - lasts 1-2 days.
- B. Rash stage
 - - morphology of measles: measles goes through the stage of macula, papule, vesicle, crust ("polymorphic measles"),
 - - smallpox breaks out in bursts,
 - - it is localized all over the body, but is more pronounced on the trunk (centripetal distribution),
 - - lasts 10-15 days.
- C. Convalescent stage
 - - lasts 10-15 days.

Rash evolution in chickenpox



Vesicular measles



Polymorphic varicella measles

Formation of crusts



The crust

Complications during chickenpox

- In immunocompromised – haemorrhagic lesions
- Secondary bacterial infection of cutaneous lesions

Visceral involvement

- cerebellar ataxia
- encephalitis
- pneumonitis

Haemorrhagic form of varicella




Bacterial superinfection in varicella

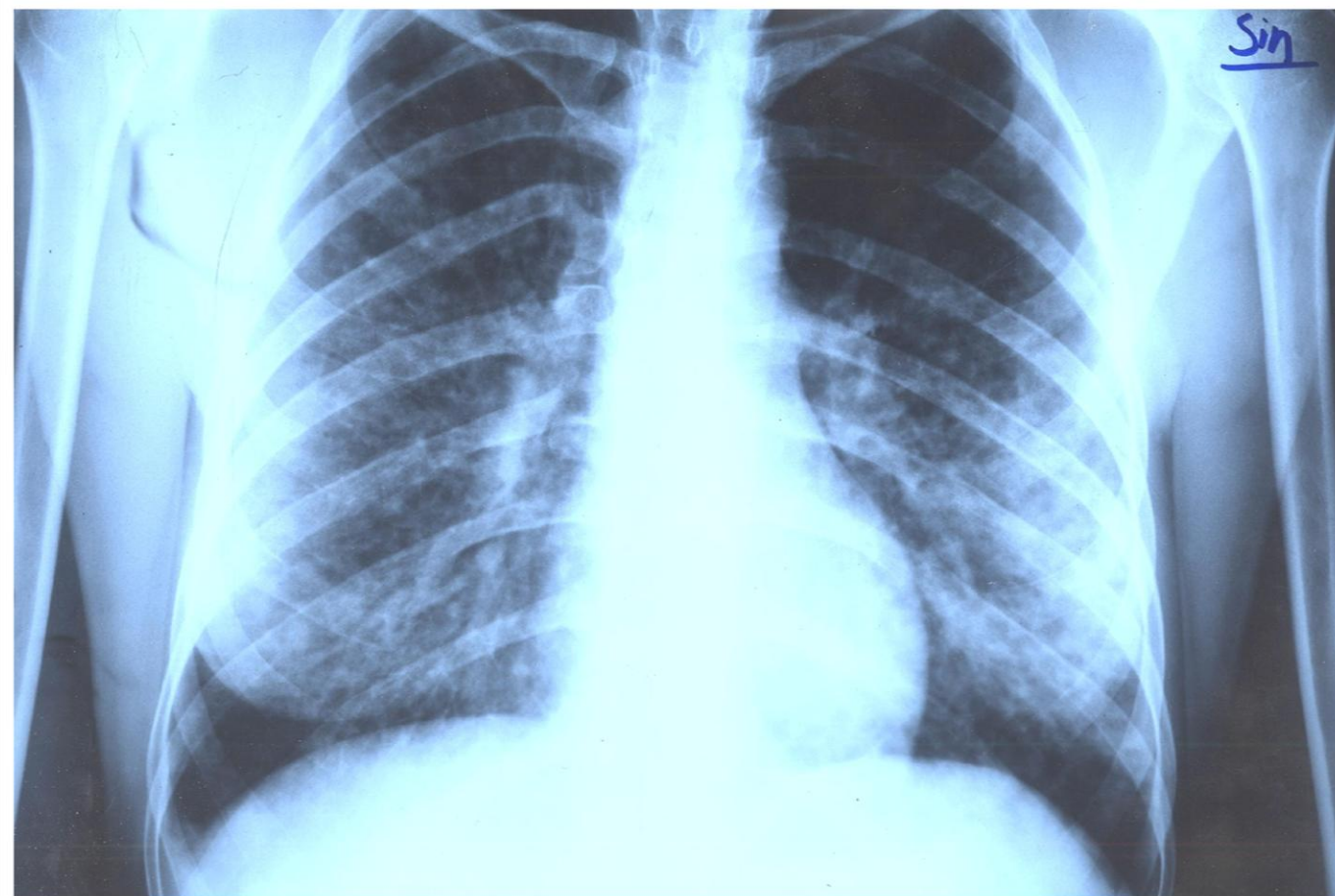
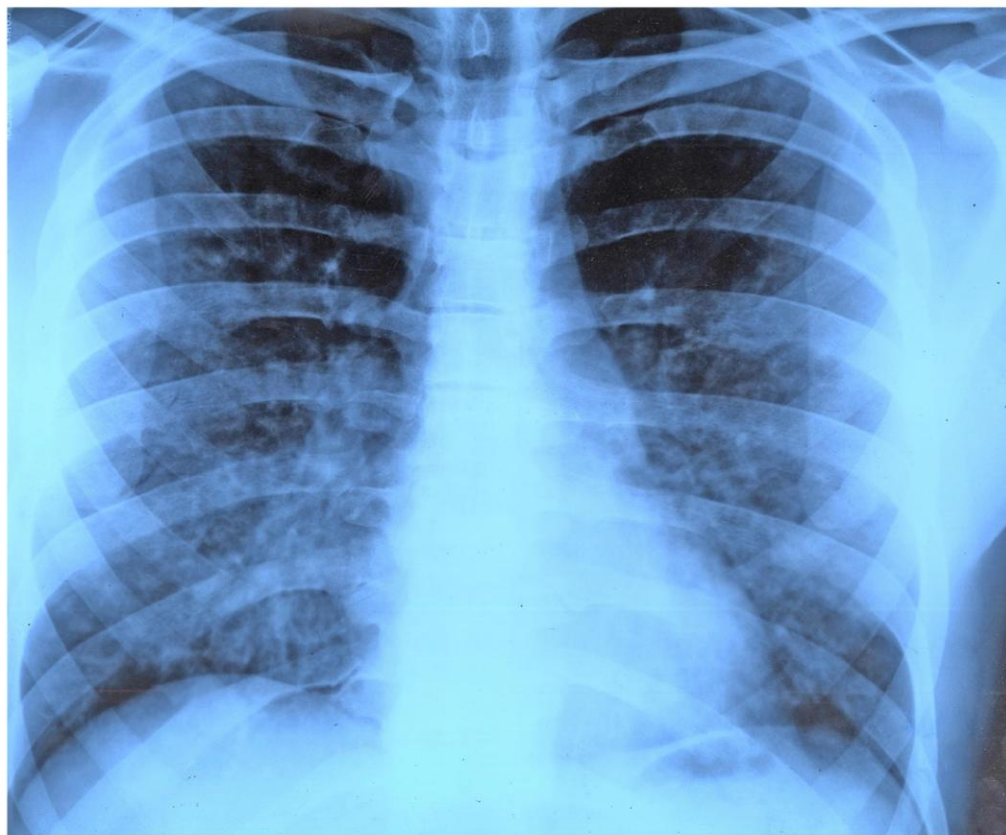


Visceral complications

- **Cerebellitis (1 in 4000)**
 - usually within the first week of the rash
 - clin. manif: ataxia, vomiting, vertigo, tremor
 - LP – CSF lymphocytosis and proteinorachia
- **Encephalitis (0,1%)**
 - Altered consciousness, headache, vomiting, fever, seizures
 - Mortality 5-20%, neurologic sequelae 15%
- **Pneumonitis (1 in 400)**
 - more frequent in adults over 30, smokers, males, immunodeficient
 - 3.-5. day tachypnea, cough, fever
 - chest radiograph – nodular or interstitial pneumonia
 - Increased mortality rate



Acute cerebellar
ataxia



•Diagnosis

- clinical picture,
 - epidemiological survey,
 - laboratory analyzes (leukopenia, finding of giant multinucleated cells in the smear of vesicle contents, virus isolation, serological reactions).
 - Serological reactions (VZV IgM +, or VZV Wblot IgG (low titer)
 - PCR
-
- Immunity
 - - solid, lifelong.

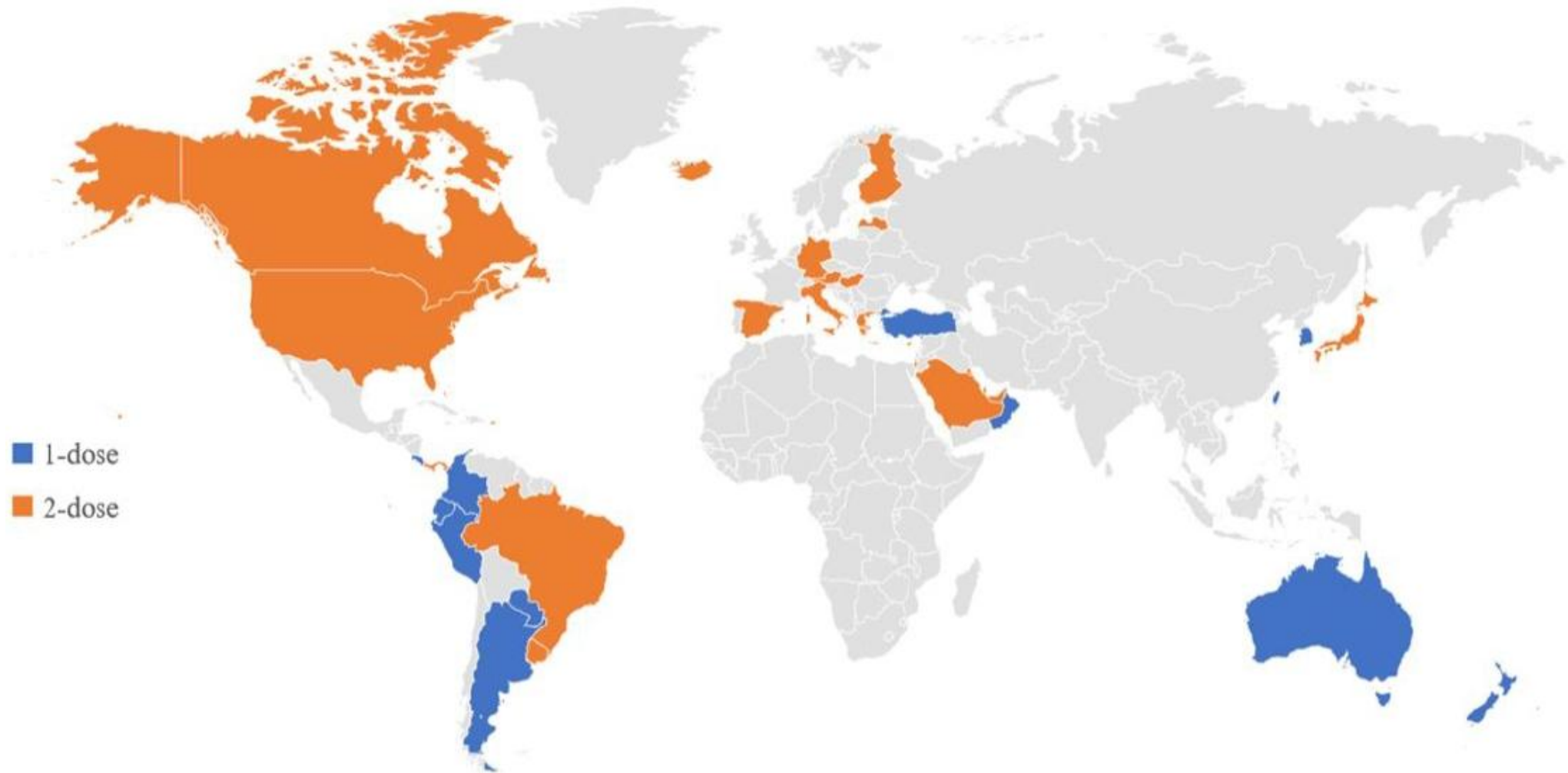
Therapy and care

- Skin hygiene!
- Prevention of secondary bacterial infections
- Antipyretics – never Aspirin!
- Paracetamol, acetaminophen
- Antivirals - acyclovir
- High risk population
- Immunocompromised children and adults
- Adult males, smokers
- Pneumonitis (high dose CS + supportive care)

Recommendation and Doses of Acyclovir or Valacyclovir for Varicella

Indication	Dosage	Timing
<p>Heathy persons with increased risk of moderate to severe varicella:</p> <p>Unvaccinated persons >12 years of age</p> <p>Persons with chronic cutaneous or pulmonary disorders</p> <p>Persons on long-term salicylate therapy</p> <p>Persons receiving short or intermittent courses of corticosteroids</p> <p>Secondary cases of household contacts</p>	<p>Valacyclovir: 20 mg/kg per dose, max 1000 mg given PO three times a day orally for 5 days (2 to younger than 18 years old)</p> <p>Acyclovir PO: ≤40 kg: 80 mg/kg per day in four divided doses for 5 days; max daily dose 3200 mg/d; >40 kg: 3200 mg, in four divided doses for 5 days</p> <p>Acyclovir IV (if hospitalized):</p> <p><2 years old: 30 mg/kg per day in three divided doses for 7–10 days; ≥2 years old: 1500 mg/m² per day in three divided doses for 7–10 days</p>	<p>Ideally initiate within 24 hours after initial lesions appear for maximum benefit</p>
<p>Immunocompromised hosts (including persons on high-dose corticosteroids >14 days)</p>	<p>IV Acyclovir: <2 years old: 30 mg/kg per day in three divided doses for 7–10 days; ≥2 years old: 1500 mg/m² per day in three divided doses for 7–10 days</p>	<p>Initiate as soon as possible after initial lesions appear</p>

Prevalence of VZV vaccination in the world



INFECTIOUS ERYTHEMA - ERYTHEMA INFECTIONIOSUM

Definition

- Erythema infectiosum is an acute, mild, viral disease of childhood from the rash fever group



Fifth Disease

- Etiopathogenesis

- - the causative agent of the disease is parvovirus B19 (Parvoviridae),
- - nasopharynx→blood (viremia lasts 4-7 days)
- - target cells: cells of the erythrocyte lineage, megacryocytes, endothelial cells and fetal muscle cells (possess P-antigen),
- - immune complexes play an important role.

- Epidemiology

- - source of infection: a patient who excretes the virus with respiratory secretions,
- - occurs sporadically or in epidemics, most often in spring and early autumn,
- - children aged 5-14 are mostly affected.

- Clinical picture
- Incubation: 7-10 days.
- A fully developed clinical picture has a biphasic course.
- A. Prodromal stage
 - - weakly expressed (subfebrile, headache, nasal discharge, diarrhea),
 - - lasts 1-4 days.
- B. Afebrile period
 - - lasts 2-3, maximum 7 days.
- C. Rash stage
 - Phase I: erythema on the face ("slapped cheeks"),
 - Phase II: confluent maculo-papular rash on the proximal parts of the extremities and spreads distally to the hands and feet (reticulated appearance),
 - Phase III: measles changes its intensity (it fades and reappears on different stimuli).

Facial erythema ("slapped cheeks")



Erythematous measles on the trunk and extremities



- Other clinical manifestations of parvovirus B19 infection

- - polyarthrititis (in adults),
- - aplastic crisis (in persons with chronic anemia),
- - neurological manifestations (meningitis, encephalitis, cerebellar ataxia),
- - damage to the fetus during pregnancy.

- Diagnosis

- - clinical picture,
- - etiological diagnosis (serological analysis, dot-blot hybridization and PCR).

- Therapy

- - symptomatic.

Exanthema subitum(three-day fever, roseola infantum)

- Benign, viral illness with macular measles, after three days of fever



- Etiology
 - Human herpes virus 6 (HHV 6), of the herpesviridae family
 - Thymidine kinase is not synthesized during replication (resistant to acyclovir).
- Epidemiology
 - It is transmitted by respiratory route,
 - The most common cause of rash (about 90%) in children aged 3-5 years age.



- Clinical picture (incubation 5-15 days),
- High fever for three days and then measles, first on the abdomen and back, can spread to the whole body,
- Maculopapular measles, lasting several hours,
- Acute HHV 6 infection manifests more often as: otitis media, gastroenteritis, cervical lymphadenitis, than as erythema subitum.

- Complications

- Febrile convulsions
- Meningitis
- Encephalitis

- Diagnosis

- Clinical picture
- ELISA IgM, IgG
- Fourfold increase in At titer in the IgG class
- Leukopenia

- Therapy

- Symptomatic
- Antiviral (ganciclovir)

