



# SIGNS AND SYMPTOMS IN INFECTIONS

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# **INFECTION**

## **Definition**

- ❑ **The invasion and growth of microorganisms in the body.**

# INFECTION

## Definition

- ❑ **Microorganisms: Small, living organisms not visible to the naked eye.**
  - ❑ **Fungi**
  - ❑ **Bacteria**
  - ❑ **Viruses**
  - ❑ **Protozoans**
  - ❑ **Prions**
- ❑ **Pathogens: Microorganisms that cause disease**
- ❑ **Disease results if the invading pathogen causes impairment in the host.**

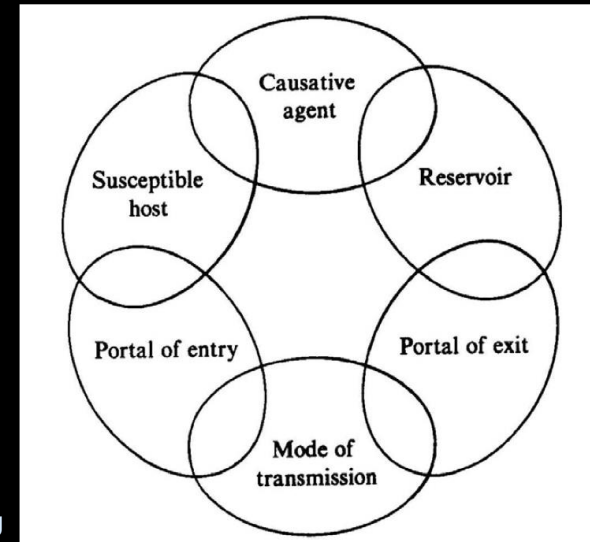


# INFECTION

## Chain of Infection

### □ Conditions that must exist for disease to occur and spread

1. **Causative Agent:** A pathogen such as a bacterium or virus that can cause disease.
2. **Reservoir:** The place where a causative agent can live. Common reservoirs are human body, animals, environment and fomites which is nonliving objects such as doorknobs, cups, utensils, needles.
3. **Portal of Exit:** The way for a causative agent to escape from the reservoir pathogens can leave the body through such as urine, feces, saliva, blood, tears, mucous discharge, sexual secretions, and wounds
4. **Mode of Transmission:** The way that causative agent can be transmitted to a host including direct contact; person-to-person, examples include: sex, saliva/kissing, handshake/touching and indirect contact; contaminated substances examples include: food, air, soil, insects, animals, feces, equipment
5. **Portal of Entry:** A way for the causative agent to enter a new host. Different portals of entry include breaks in the skin, respiratory tract, digestive tract, genitourinary tract, circulatory system
6. **Susceptible Host:** An individual who can contract the disease. Humans become susceptible if large numbers of pathogens invade the body and body defenses are weak



# INFECTION

## The Natural History of a Communicable Disease

- Events that occur in the natural history of a communicable disease are grouped into four stages:
  - Exposure
  - Infection
  - Infectious disease
  - Outcome



# **SIGNS AND SYMPTOMS IN INFECTIONS**

## **Common Signs and Symptoms**

- Fever**
- Chills and sweats**
- Change in cough or a new cough**
- Sore throat or new mouth sore**
- Shortness of breath**
- Nasal congestion**
- Stiff neck**
- Burning or pain with urination**
- Unusual vaginal discharge or irritation**
- Increased urination**
- Redness, soreness, or swelling in any area**
- Diarrhea**
- Vomiting**
- Pain in the abdomen or rectum.**
- New onset of pain**

# SIGNS AND SYMPTOMS IN INFECTIONS

## Gastroenteritis

- ❑ Gastroenteritis is an intestinal infection marked by watery diarrhea.
  - ❑ Diarrhea
  - ❑ Abdominal pain
  - ❑ Nausea
  - ❑ Vomiting
  - ❑ Fever



# **SIGNS AND SYMPTOMS IN INFECTIONS**

## **Gastroenteritis**

- ❑ **Dehydration is the most important cause of death in children with gastroenteritis.**
- ❑ **Assess children with fever for signs of dehydration. Look for:**
  - ❑ **Prolonged capillary refill time**
  - ❑ **Abnormal skin turgor**
  - ❑ **Abnormal respiratory pattern**
  - ❑ **Weak pulse**
  - ❑ **Cool extremities**



# SIGNS AND SYMPTOMS IN INFECTIONS

## Gastroenteritis

- ❑ Skin turgor is the skin's elasticity. It is the ability of skin to change shape and return to normal.
- ❑ To check for skin turgor, grasp the skin between two fingers so that it is tented up. The skin is held for a few seconds then released.
- ❑ Skin with normal turgor snaps rapidly back to its normal position. Skin with poor turgor takes time to return to its normal position.



**Abnormal skin turgor**



**Abnormal skin turgor**

# SIGNS AND SYMPTOMS IN INFECTIONS

## Gastroenteritis

- ❑ This examination could be performed on arm and leg but, commonly abdomen is checked in children.



**Abnormal skin turgor**

# **SIGNS AND SYMPTOMS IN INFECTIONS**

## **Gastroenteritis**

- ❑ **Abnormal skin turgor**
- ❑ **Dry mouth**
- ❑ **Sunken eyes**
- ❑ **Sunken anterior fontanelle**
- ❑ **Irritability**



**Dehydrated infant**



# SIGNS AND SYMPTOMS IN INFECTIONS

## Gastroenteritis

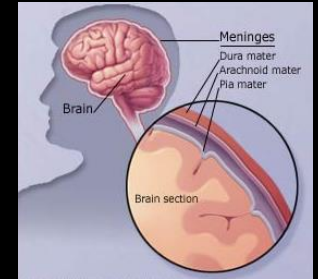
- ❑ Abnormal skin turgor
- ❑ The skin often has a **doughy texture** when the dehydration is associated with **elevation of serum sodium**.



**Doughy skin**

# SIGNS AND SYMPTOMS IN INFECTIONS

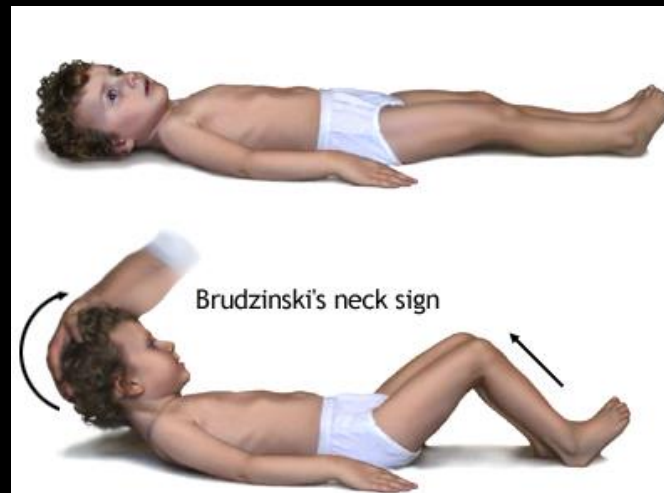
## Meningitis



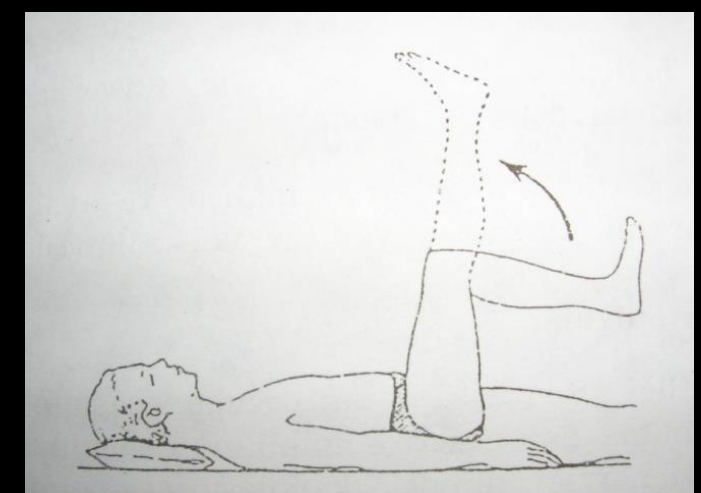
- ❑ Meningitis is an inflammation of the meninges.
- ❑ The meninges are the three membranes that cover the brain and spinal cord.
- ❑ Bulging fontanelle, Decreased level of consciousness, Convulsive status epilepticus.
- ❑ Stiff neck, Kernig's sign positivity and Brudzinski's sign positivity are meninges irritation findings.
- ❑ These should suggest that the patient has meningitis.



**Stiff neck**



**Brudzinski's sign**

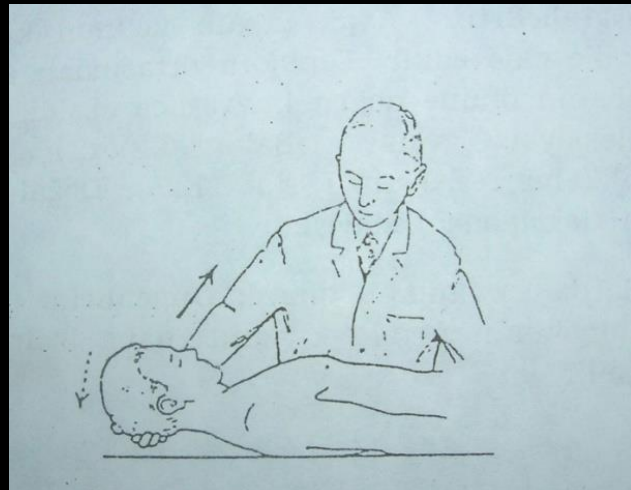


**Kernig's sign**

# SIGNS AND SYMPTOMS IN INFECTIONS

## Meningitis

- ❑ Place the patient in the supine position.
- ❑ Support the patient's chest with one hand, slide your other hand under the patient's occiput, and try to move their chin towards the sternum.
- ❑ In patients with neck stiffness, the reflex contraction of the muscles of the neck prevents the patient's chin from touching their chest, causing resistance and pain.
- ❑ The distance between the chin and the sternum is a measure of the severity of neck stiffness.
- ❑ In extreme cases, tension of the long paraspinal muscles is high enough to cause spontaneous posterior flexion of the neck and anterior arching of the trunk called opisthotonus.



**Stiff neck**

# SIGNS AND SYMPTOMS IN INFECTIONS

## Meningitis

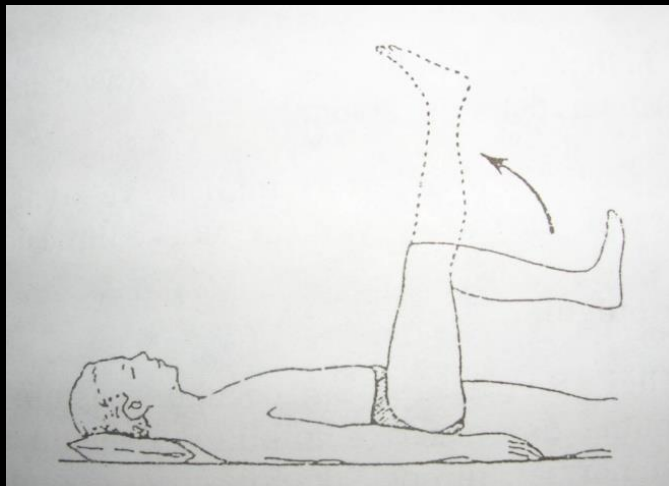
- ❑ While assessing for neck stiffness movement of the chin towards the chest causes reflex flexion of the lower limbs at hips and knee joints.
- ❑ If this occurs Brudzinski's sign is positive.



# SIGNS AND SYMPTOMS IN INFECTIONS

## Meningitis

- ❑ Place the patient in the supine position.
- ❑ Flex the patient's hip to 90 degrees, then attempt to extend a knee.
- ❑ In patients with a positive Kernig sign, reflex muscle contraction prevents extension of the knee, which manifests as resistance and pain.



**Kernig's sign**



# SIGNS AND SYMPTOMS IN INFECTIONS

## Meningitis

- ❑ Meningococcal disease is a life threatening condition
- ❑ Consider meningococcal disease in any child with fever and a non-blanching rash, particularly if any of the following features are present:
  - ❑ An ill-looking child
  - ❑ Lesions larger than 2 mm in diameter (purpura)
  - ❑ A capillary refill time of 3 seconds or longer

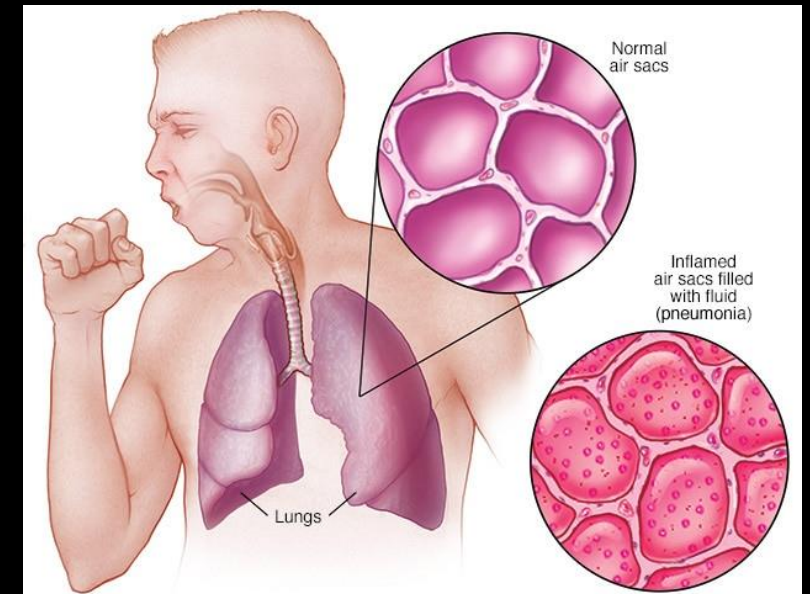


**Meningococcal rash**

# SIGNS AND SYMPTOMS IN INFECTIONS

## Pneumonia

- ❑ Consider pneumonia in children with fever and any of the following signs:
  - ❑ Tachypnea (respiratory rate greater than 60 breaths per minute, age 0–2 months; greater than 50 breaths per minute, age 2–12 months; greater than 40 breaths per minute, age older than 12 months)
  - ❑ Crackles in the chest
  - ❑ Nasal flaring
  - ❑ Chest indrawing
  - ❑ Cyanosis
  - ❑ Oxygen saturation of 95% or less when breathing air.



# **SIGNS AND SYMPTOMS IN INFECTIONS**

## **Urinary Tract Infection**

- ❑ **Fever may be the only signs of urinary tract infection in a child younger than 3 months.**
- ❑ **Consider urinary tract infection in any child younger than 3 months with fever.**
- ❑ **Consider urinary tract infection in a child aged 3 months or older with fever and 1 or more of the following:**
  - ❑ **Vomiting**
  - ❑ **Poor Feeding**
  - ❑ **Lethargy**
  - ❑ **Irritability**
  - ❑ **Abdominal pain or tenderness**
  - ❑ **Urinary frequency or dysuria.**



# SIGNS AND SYMPTOMS IN INFECTIONS

## Septic Arthritis/Osteomyelitis

- ❑ Osteomyelitis is an infection of the bone that can include the periosteum, medullary cavity, and cortical bone.
- ❑ Septic arthritis is an infection of surface of the cartilage that lines the joint and the synovial fluid that lubricates the joint.
- ❑ Consider septic arthritis/osteomyelitis in children with fever and any of the following signs:
  - ❑ Swelling of a limb or joint
  - ❑ Not using an extremity
  - ❑ Non-weight bearing



# SIGNS AND SYMPTOMS IN INFECTIONS

## Common Childhood Exanthems

- ❑ Skin rash or exanthems are common in childhood.
- ❑ Six separate childhood exanthems were defined in the late 19th, early part of the 20th Century. These were named in the order they were discovered and are outlined.
- ❑ The term fourth disease or Filatov-Dukes disease is thought to be a variant of scarlet fever and is no longer used.

<i>Number</i>	<i>Disease</i>
<i>First</i>	Measles (Rubeola)
<i>Second</i>	Scarlet fever
<i>Third</i>	Rubella (German measles)
<i>Forth</i>	Filatov-Dukes disease
<i>Fifth</i>	Erythema infectiosum
<i>Sixth</i>	Roseola infantum, Exanthem subitum



# SIGNS AND SYMPTOMS IN INFECTIONS

## Measles

- ❑ Measles is one of the most important rash diseases.
- ❑ In the prodromal period, fever, conjunctivitis, photophobia and Koplik spots are seen.
- ❑ Koplik spots, present on mucous membranes, are considered to be unique to measles. They occur 1 to 2 days before the measles rash (i.e., during the prodromal period), and appear as punctate blue-white spots on the bright red background of the buccal mucosa.



**Conjunctivitis**



**Photophobia**



**Koplik's spots**



# SIGNS AND SYMPTOMS IN INFECTIONS

## Measles



**First day**

- ❑ The measles rash is a maculopapular eruption that usually lasts 5 to 6 days.
- ❑ It begins at the hairline, then involves the face and upper neck.
- ❑ During the next 3 days, the rash gradually proceeds downward and outward, reaching the hands and feet.
- ❑ The maculopapular lesions are generally individually distinct but may run together, particularly on the upper body. Initially, lesions blanch (become white or pale) with fingertip pressure.
- ❑ By 3 to 4 days, most do not blanch with pressure.
- ❑ The rash fades in the same order that it appears, from head to extremities.
- ❑ The lesions peel off in scales in more severely involved areas.



# SIGNS AND SYMPTOMS IN INFECTIONS

## Measles



**Second day**

- ❑ The measles rash is a maculopapular eruption that usually lasts 5 to 6 days.
- ❑ It begins at the hairline, then involves the face and upper neck.
- ❑ During the next 3 days, the rash gradually proceeds downward and outward, reaching the hands and feet.
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# SIGNS AND SYMPTOMS IN INFECTIONS

## Measles

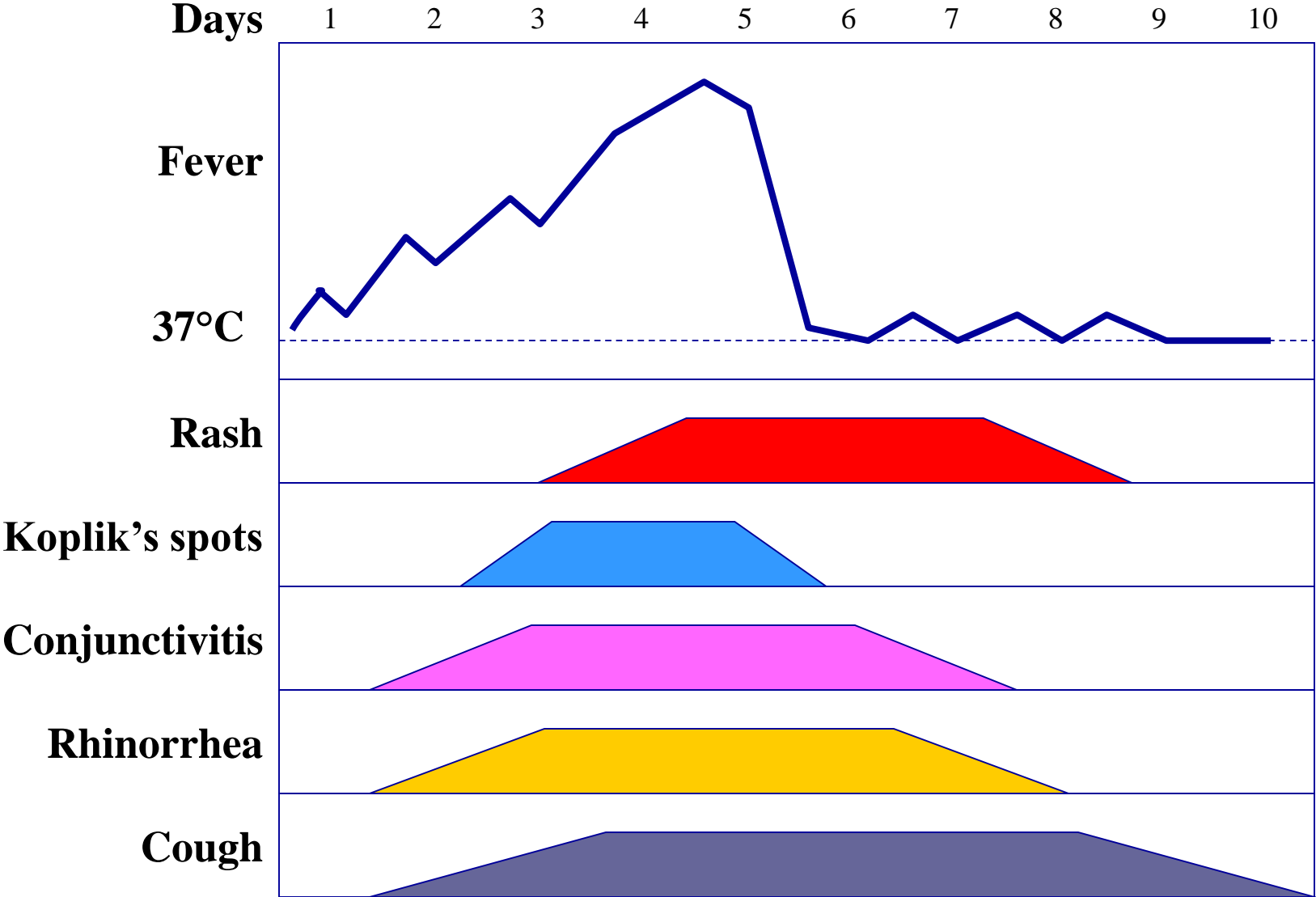


**Third day**

- ❑ The measles rash is a maculopapular eruption that usually lasts 5 to 6 days.
- ❑ It begins at the hairline, then involves the face and upper neck.
- ❑ During the next 3 days, the rash gradually proceeds downward and outward, reaching the hands and feet.
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# SIGNS AND SYMPTOMS IN INFECTIONS

## Measles



# SIGNS AND SYMPTOMS IN INFECTIONS

## Pharyngitis and Tonsillitis

- ❑ Pharyngitis and tonsillitis are infections in the throat that cause inflammation.
- ❑ Pharyngitis and tonsillitis due to Group A  $\beta$ -hemolytic streptococcus should be treated with antibiotics.
- ❑ Sudden onset of symptoms such as fever, sore throat and inflamed pharynx are seen.
- ❑ Pharyngeal and tonsillar erythema, edema, tonsillar exudates and palatal petechiae are main clinical findings.
- ❑ Cervical lymphadenitis are common.



**Pharyngitis, exudative tonsillitis, palatal petechiae**



# **SIGNS AND SYMPTOMS IN INFECTIONS**

## **Pharyngitis and Tonsillitis**

- ❑ **Most people with streptococcal pharyngitis or scarlet fever have a white strawberry tongue at first.**
- ❑ **In a few days, their tongue may turn red.**
- ❑ **Several diseases can lead to a strawberry tongue such as Kawasaki disease.**
- ❑ **A yellowish white coating with red papillae may initially cover the tongue.**
- ❑ **The eventual disappearance of the coating can result in a “strawberry tongue.”**



**White strawberry  
tongue**



**Red strawberry  
tongue**

# SIGNS AND SYMPTOMS IN INFECTIONS

## Pharyngitis and Tonsillitis

### Scarlet fever



### Circumoral pallor

- ❑ Scarlet fever is characterized by a scarlatiniform rash that blanches on pressure, it has sandpaper quality, accentuate in flexor creases termed "Pastia's lines".
- ❑ The rash begins on the trunk, then quickly spreads outward, usually sparing the palms, soles, and face. So, circumoral pallor are seen.
- ❑ The rash usually persists for about one week and desquamation may follow.

# SIGNS AND SYMPTOMS IN INFECTIONS

## Pharyngitis and Tonsillitis

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- ❑ The rash begins on the trunk, then quickly spreads outward, usually sparing the palms, soles, and face. So, circumoral pallor are seen.
- ❑ The rash usually persists for about one week and desquamation may follow.



**Sandpaper-like rash**  
**Sunburn with goose pimples**



**Pastia's lines**





# SIGNS AND SYMPTOMS IN INFECTIONS

## Rubella



**Rubella rash**

- ❑ The rubella rash is maculopapular and usually occurs initially on the face and then progresses from head to foot.
- ❑ It lasts about 3 days and is occasionally pruritic.
- ❑ The rash is fainter than a measles rash, does not coalesce.
- ❑ Postauricular, posterior cervical, and suboccipital nodes may be involved.
- ❑ Small, red (Forscheimer) spots may be noted on the soft palate but are not diagnostic for rubella.



# SIGNS AND SYMPTOMS IN INFECTIONS

## Rubella

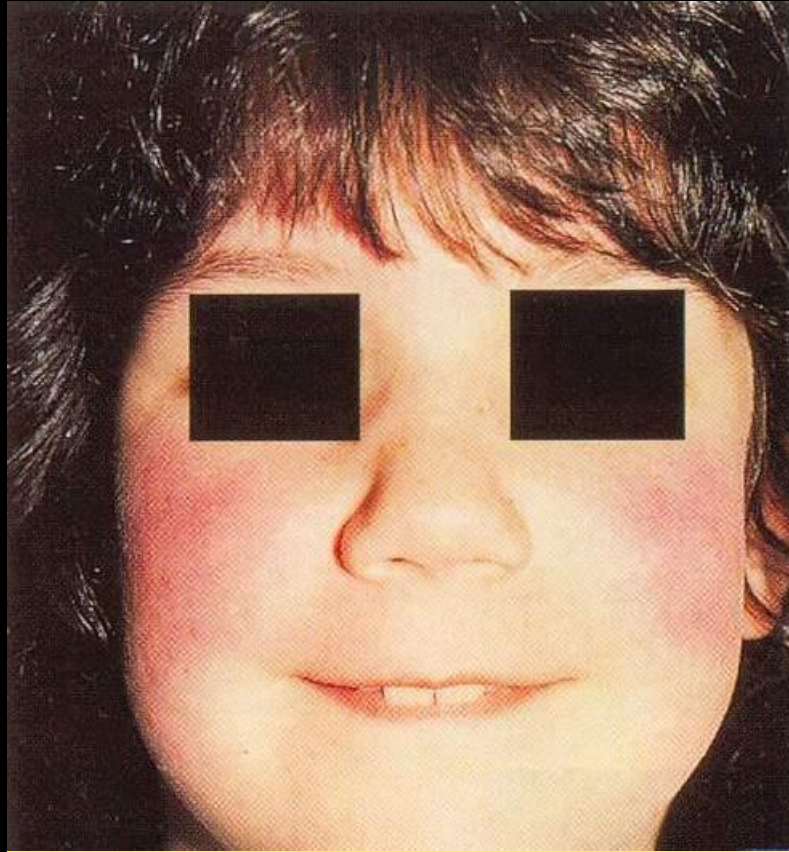
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- ❑ Small, red (**Forschheimer**) spots may be noted on the soft palate but are not diagnostic for rubella.



**Forschheimer's spots**

# SIGNS AND SYMPTOMS IN INFECTIONS

## Fifth Disease (Erythema Infectiosum)



**"Slapped cheek" rash**

- A red rash on face called "slapped cheek" rash is the most recognized feature of fifth disease.

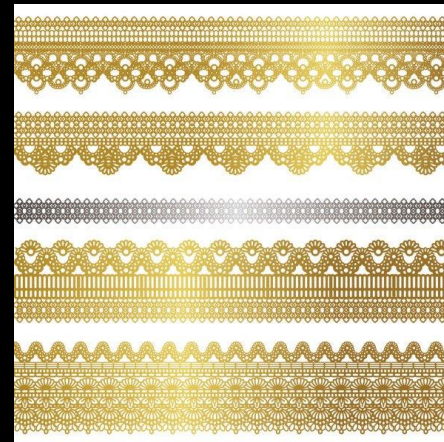
# SIGNS AND SYMPTOMS IN INFECTIONS

## Fifth Disease (Erythema Infectiosum)



**Fifth disease rash**

- ❑ Some people may get a second rash a few days later on their chest, back, buttocks, or arms and legs.
- ❑ The rash may be itchy, especially on the soles of the feet.
- ❑ It can vary in intensity and usually goes away in seven to 10 days, but it can come and go for several weeks.
- ❑ As it starts to fade away, it may look **lacy**.





# SIGNS AND SYMPTOMS IN INFECTIONS

## Sixth Disease (Roseola Infantum)



**Sixth disease rash**

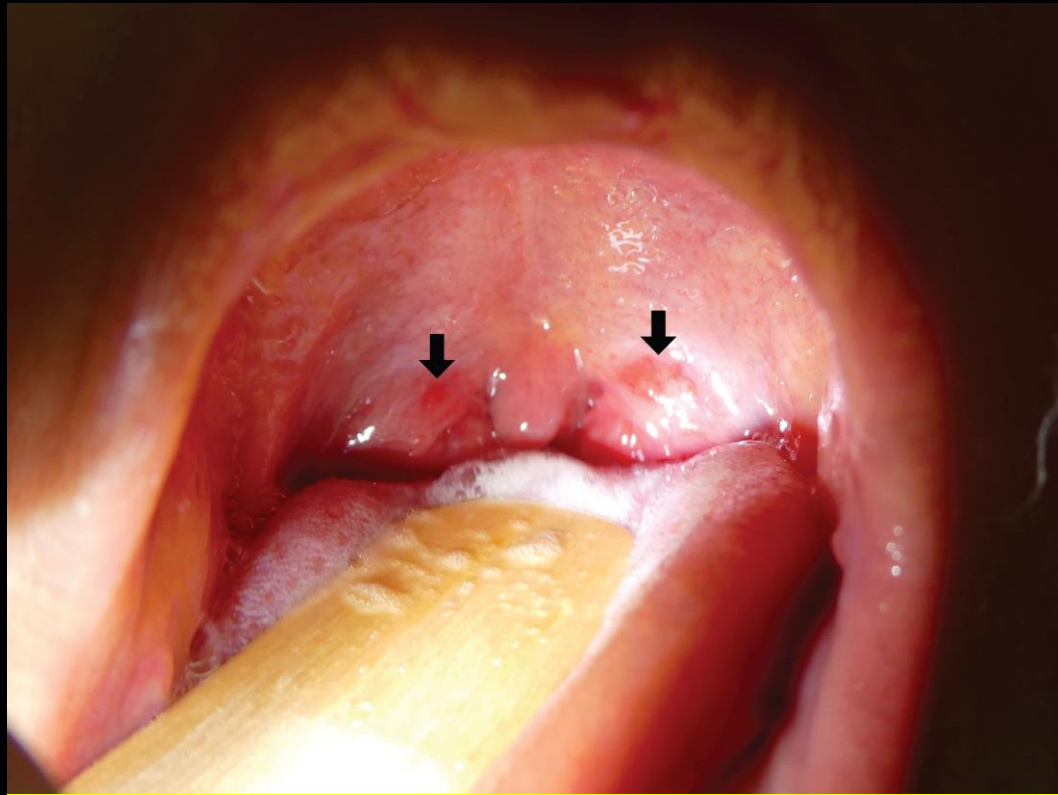


**Sixth disease rash**

- ❑ The first symptom of roseola is typically a high fever (up to 40°C).
- ❑ The fever lasts for between three and five days.
- ❑ Often this is the only noticeable symptom.
- ❑ After about five days, the fever starts to subside and a rash appears on the body.
- ❑ The rash lasts about 2–3 days, and then fades.

# SIGNS AND SYMPTOMS IN INFECTIONS

## Sixth Disease (Roseola Infantum)

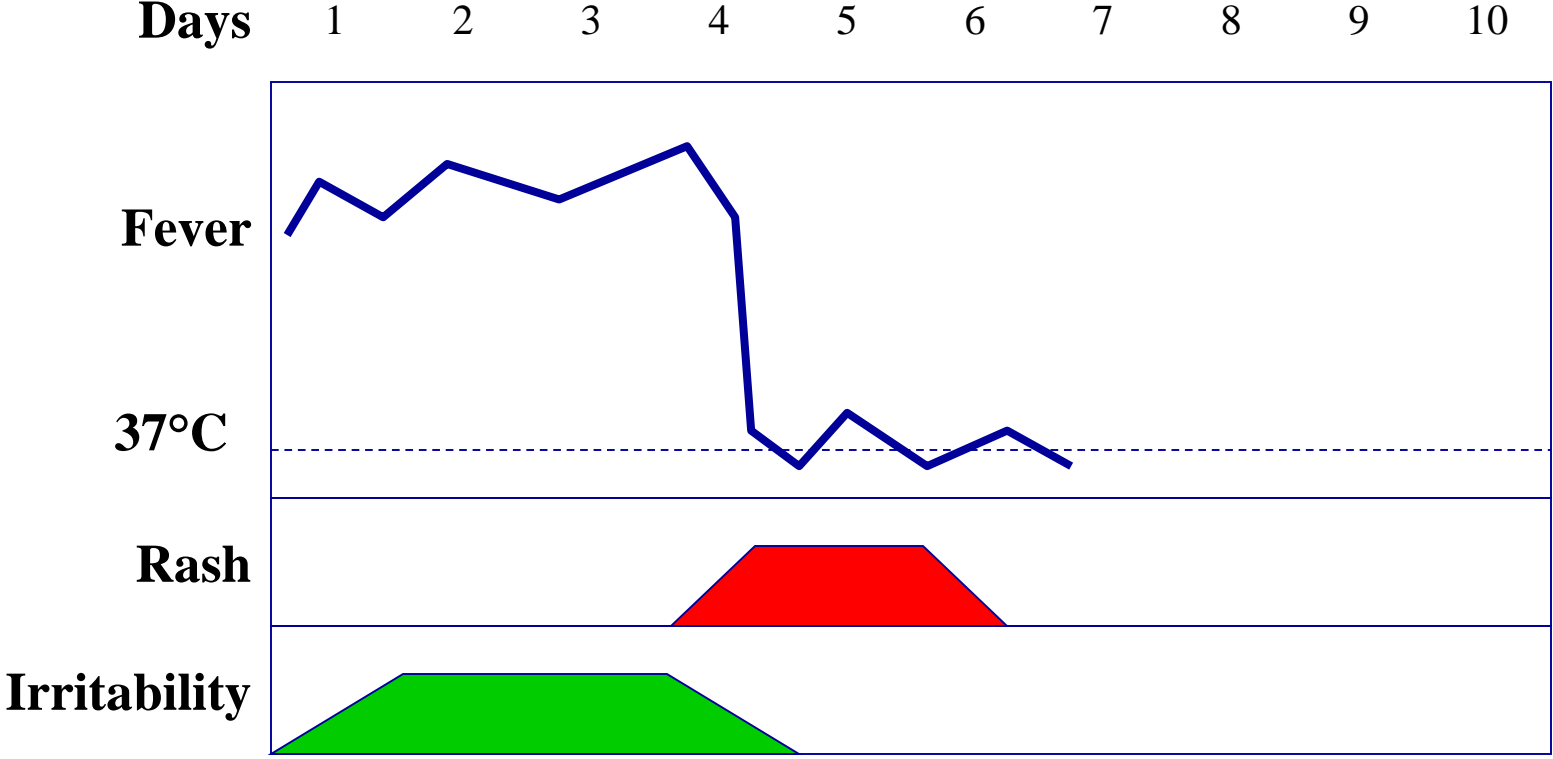


**Nagayama spots**

- ❑ Uvulopalatoglossal spots also referred to as **Nagayama spots**, are erythematous papules/ulcers found on the soft palate and uvula that are seen in two-thirds of patients.
- ❑ They are more common in Asian countries.

# SIGNS AND SYMPTOMS IN INFECTIONS

## Sixth Disease (Roseola Infantum)



# SIGNS AND SYMPTOMS IN INFECTIONS

## Chickenpox



**Polimorph rash**

- ❑ The Chickenpox rash is generalized and pruritic and progresses rapidly from macules to papules to vesicular lesions before crusting.
- ❑ The rash usually appears first on the scalp, face or trunk, and then spreads to the extremities; the highest concentration of lesions is on the trunk.
- ❑ Lesions also can occur on mucous membranes of the oropharynx, respiratory tract, vagina, conjunctiva, and the cornea.
- ❑ Lesions are usually 1 to 4 mm in diameter.
- ❑ The vesicles are superficial and delicate and contain clear fluid on an erythematous base.
- ❑ Vesicles may rupture or become purulent before they dry and crust.
- ❑ Successive crops appear over several days, with lesions present in all stages of development at the same time.
- ❑ For example, macular lesions may be observed in the same area of skin as mature vesicles. Healthy children usually have 250 to 500 lesions in 2 to 4 successive crops.



# SIGNS AND SYMPTOMS IN INFECTIONS

## Chickenpox



**Oral chickenpox lesions**

- ❑ The Chickenpox rash is generalized and pruritic and progresses rapidly from macules to papules to vesicular lesions before crusting.
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# **SIGNS AND SYMPTOMS IN INFECTIONS**

## **Chickenpox**



**Severe chickenpox rash**

- The Chickenpox rash is generalized and pruritic and progresses rapidly from macules to papules to vesicular lesions before crusting.
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# SIGNS AND SYMPTOMS IN INFECTIONS

## Herpes Zoster After Chickenpox



**Herpes zoster**



**Herpes zoster**

- ❑ Herpes zoster is the result of reactivation of latent VZV infection.
- ❑ During the primary chickenpox infection virus travels to the sensory ganglia where it resides permanently.
- ❑ A vesicular eruption of zoster generally occurs unilaterally in the distribution of a sensory nerve or dermatome and does not cross the mid-line.
- ❑ Zoster can occur in any dermatome but occurs most often in the trunk or face.
- ❑ Two to four days prior to the eruption, there may be pain and paresthesia in the involved area.
- ❑ Zoster rash are initially red macules and papules but progresses to form clusters of vesicular lesions before crusting over.
- ❑ The rash lasts for 7-10 days with healing in 2-4 weeks.
- ❑ In healthy persons there are few systemic symptoms.

# SIGNS AND SYMPTOMS IN INFECTIONS

## Movie Recommendation

### The Andromeda Strain (1971)


When in Southern California visit Universal Studios

Rated **G**  
but may be too intense  
for younger  
children.

The picture  
runs 130 minutes!...

The story  
covers 96 of the most critical hours in man's history!...

The suspense  
will last through your lifetime!



A ROBERT WISE PRODUCTION  
From the Best Seller by MICHAEL CRICHTON  
**THE ANDROMEDA STRAIN**  
STARRING  
ARTHUR HILL · DAVID WAYNE · JAMES OLSON · KATE REID  
Production Designed by BORIS LEVEN · NELSON GIDDING · Screenplay by MICHAEL CRICHTON · Directed by ROBERT WISE · Music by GIL MELLÉ  
Soundtrack Album exclusively on Kapp Records  
A UNIVERSAL PICTURE  
TECHNICOLOR® PANAVISION®  
NOTE: NO ONE WILL BE SEATED EXCLUSIVELY DURING THE LAST 10 MINUTES.