CLASSIFYING DISEASES (cont'd.)

- ***Communicable (Infectious) Diseases***
  - **Diseases for which biological agents or their products are the cause and which are transmissible from one individual to another**
  - **The disease process begins when the causative agent is able to lodge and grow or reproduce within the body**
  - **The process of lodgment and growth of a microorganism or virus in the host is termed *infection***
- ***Non-communicable (Noninfectious) Diseases/Illnessses***
  - **Those diseases or illnesses that cannot be transmitted from an infected person to a susceptible, healthy one**
  - **Several, or even many, factors may contribute to the development of a given non-communicable health condition**
  - **The contributing factors may be genetic, environmental, or behavioral in nature**

Classification of Diseases

Types of Diseases	Examples
Acute Diseases	
• **Communicable**	**Common cold, pneumonia, mumps, measles, pertussis, typhoid fever, flu**
• **Non-communicable (e.g., (incl. trauma)**	**Appendicitis, poisoning, trauma due to automobile accidents, burns)**
Chronic Diseases	
• **Communicable**	**Tuberculosis, AIDS, syphilis, rheumatic fever following streptococcal infections, herpes**
• **Non-communicable**	**Diabetes, coronary heart disease, osteoarthritis, cirrhosis of the liver due to alcoholism, hypertension**

Communicable disease

- **An illness caused by an infectious agent or toxic product and is transmitted by direct or indirect contact between the reservoir, host and the susceptible individual.**

Definition of communicable diseases

A communicable disease is an illness due to a specific infectious (biological) agent or its toxic products capable of being directly or indirectly transmitted from man to man, from animal to man, from animal to animal, or from the environment (through air, water, food, etc..) to man.

Common viral infections…

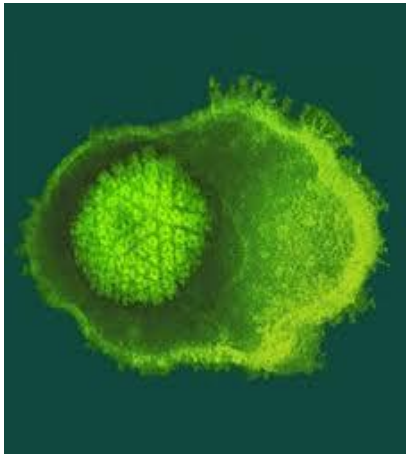
- **Measles**
- **Mumps**
- **Rubella**
- **Poliomyelitis**
- **Hepatitis A,B,C,D,E**
- **Chickenpox (Varicella)**
- **Dengue**
- **HIV/AIDS**

Common bacterial infections …

- **Diphtheria**
- **Pertussis**
- **Tetanus**
- **Tuberculosis**
- **Typhoid fever**
- **Leprosy**

Viral Infections

Varicella (Chicken Pox)



- **Acute & highly communicable disease**
- **Varicella zoster Virus**
- **Vaccine available**
- **Transmitted by respiratory secretions in contact and droplet, contaminated objects**
- **Characterized by sudden onset of low grade fever, vesicular rash appearing on the first day.**

Communicable 1 day before eruption of vesicles to 6 days after first crop of vesicles have formed

- **Pre eruptive or prodromal phase – sudden onset of mild to moderate fever, malaise, back pain, shievering, anorexia.**
- **Eruptive phase - In 24 hours highly itchy rash primarily over trunk--Starts as a macule which progresses into a papule and then a vesicle surrounded by erythema base, finally the fluid becomes cloudy (pastule), breaks and crusts over.**
- **Rash first appear symmetrically on trunk & scalp, then on face, arms & legs; trunks are covered profusely whether extremities & face have scanty rash.**
- **Buccal, pharyngeal mucosa & conjunctive are affected**
- **Palms & soles usually are not involved.**


Chicken Pox

Diagnosis

- **Clinical manifestations**
- **Virus isolation**
- **Antibody test**

Management (no specific treatment)

- **Isolation at home until vesicles dry (2-3 weeks) and 1 week after lesions are gone**
- **Very young and immunocompromised may need isolation in hospital**
- **Relief of itching – antipruritic drug & mild sedation**
- **Antiviral agents – Acyclovir (child >12yrs.)**
- **Antipyretic (avoid aspirin)**
- **Antibiotic to treat secondary complications (bacterial infections from scratching)**

- **Application of calamine lotion or potassium permanganate lotion**
- **Sponge bath with antiseptic lotion**
- **Nails to be cut short**
- **Special mouth care, non irritating mouth wash, saline gargle**
- **Soft tooth brush**
- **General hygiene, rest, restriction of movements**
- **Disinfection of articles**

Prognosis

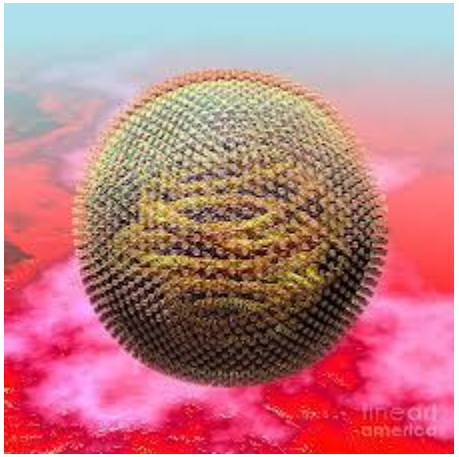
- **Self limiting disease with good prognosis**
- **Immune compromised children & encephalitis have bad prognosis.**

Prevention

- **Live attenuated chickenpox vaccine within 3 days of exposure to a case.**
- Chicken pox vaccine – all children under 13 yrs of age and all adult who have not had chicken pox
- Two doses : 1st dose – 12 to 18 month
- 2nd dose – 4-6 yrs.
- Older : 2 shots with 4 to 8 wk. between 1st and 2nd dose.

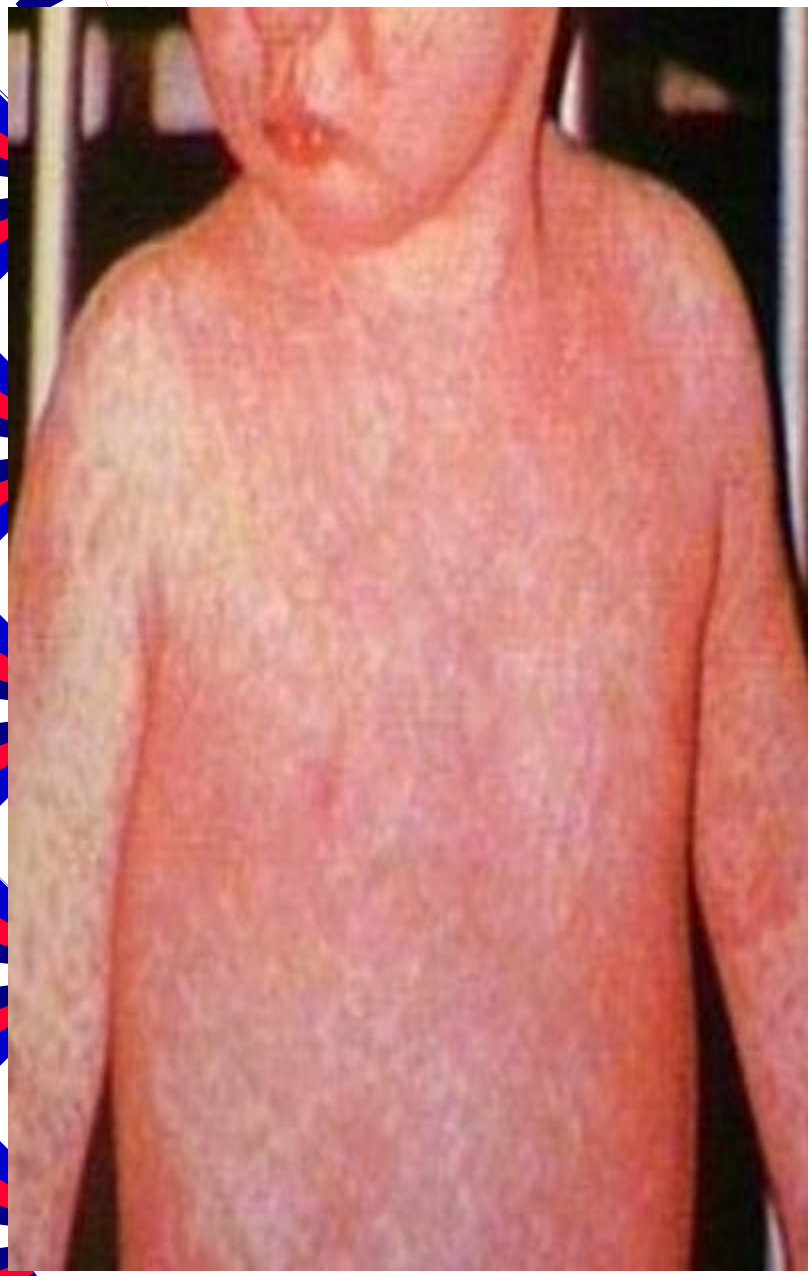
- **Passive immunity by Varicella Zoster immunoglobulin (child with leukemia, steroid therapy, susceptible pregnant women, neonates who's mother develop chickenpox 2 days before or 5 days after delivery).**

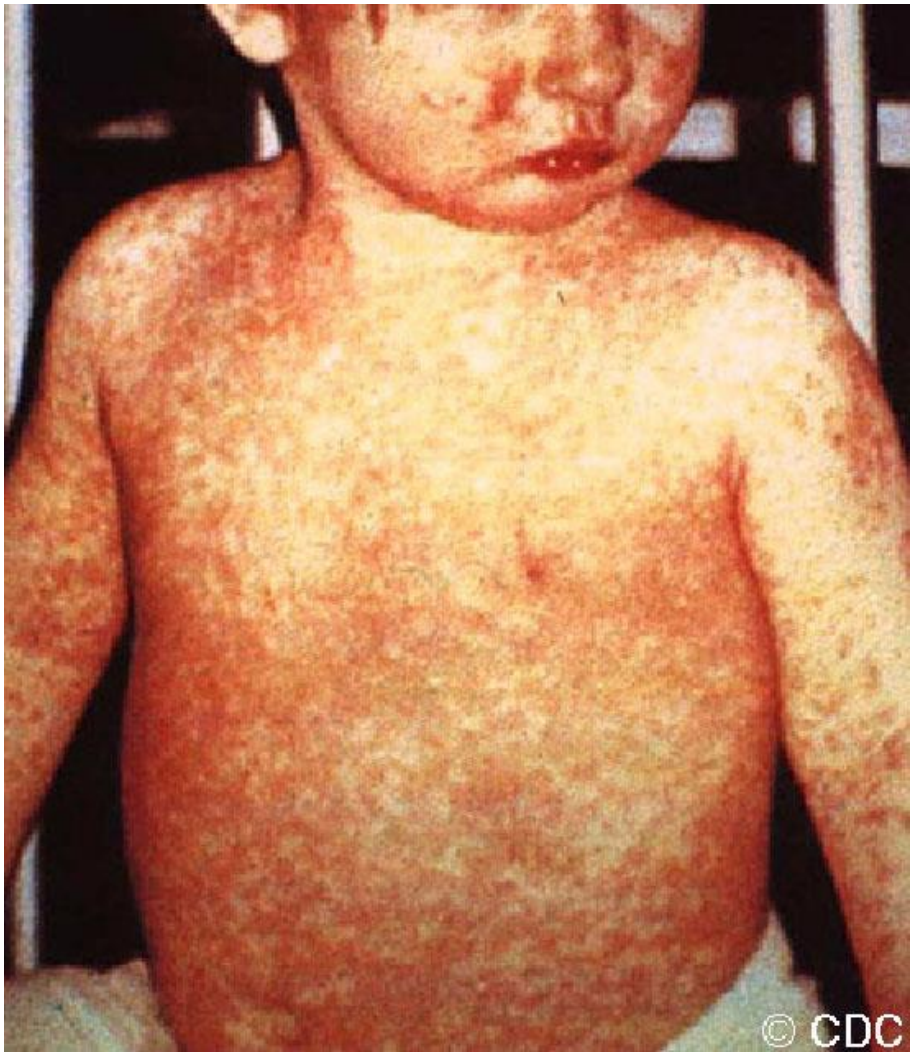
Rubeola (measles)



- **Highly infectious Viral infection caused by measles virus.**
- **Vaccine available “M” in MMR**
- **Transmitted by respiratory secretions, blood and urine of infected person**

Communicable just before the rash appears to 4-5 days after rash appears=highly contagious




© CDC

Signs & Symptoms (3 stages)

- **Prodromal or pre eruptive stage(3-5 days) = First 24 hours**
  - **Fever, malaise, cough, coryza, sneezing, nasal discharge, conjunctivitis, lacrimation, photophobia.**
- **In 48 hours**
  - **“Koplik spots” (small, irregular, red spots with minute bluish-white center) appears before the rash appears, first seen on buccal mucosa opposite the 1st & 2nd molars. Usually disappears after the rash appears.**

- **Eruptive stage = Raised erythema rash on face & behind ears that spread downward, usually 3-5 days after the onset of disease**
- **Then spreads to neck, trunk, limbs, palms, soles in next 3-4 days.**
- **Fever usually rise again or reduce gradually**

- **Anorexia, malaise, lymphadenopathy.**

Convalescent or post measles stage = disappearance of fever or rash, but child may be sick for number of days with loss of weight.

- **Investigation → clinical features helps in diagnosis, serological test, viral isolation, ELISA can be done**

Management

- **Isolation until rash disappears**
- **Bed rest, calm & quite environment**
- **Antipyretics**
- **Fluids and vaporizer for cough**
- **Skin care (itchy rash), antihistaminic / antipruritic**
- **Good nourishing diet**
- **Decrease lighting-photophobia, eye rubbing and corneal abrasion**
- **Antibiotics**
- **Oral hygiene, general cleanliness**

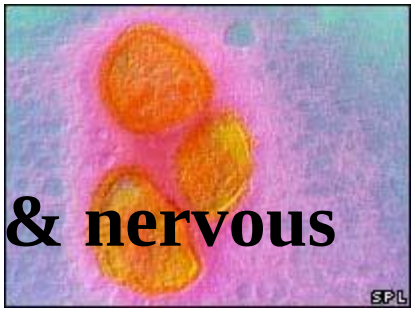
Preventive measures

- **Live attenuated active immunization, 0.5ml, s/c, single dose at 9-12 months of age.**
- **Protection for life time**
- **MMR**
- **Passive immunization with gammaglobulin, IM, 0.25ml/kg for infants & 0.5ml/kg for children (short term immunity)**
- **Isolation & appropriate disposal of infected materials**

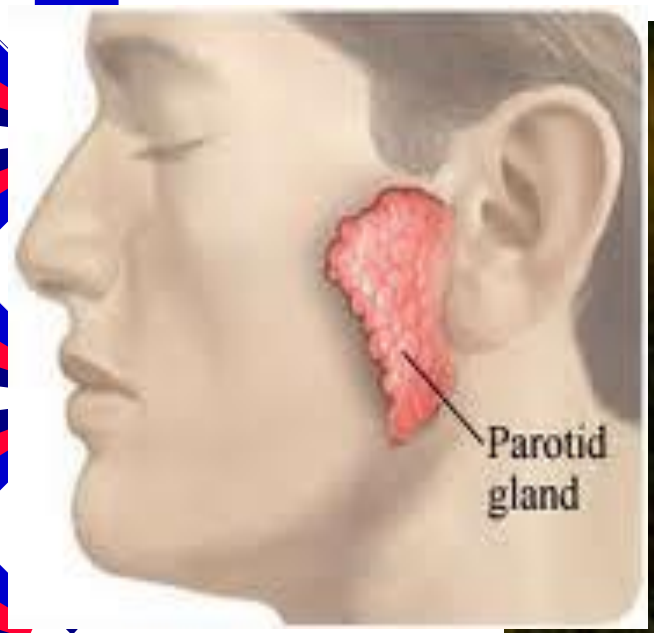
Prognosis

- **Usually good in well nourished child**
- **Self limiting unless it is complicated**
- **>90% of death may occur in severe resp. & neurological complications**
- **Survivors of post measles enchephalopathy may have long term neurological deficit.**

Mumps (Epidemic Parotitis)



- **Viral infection affecting glandular & nervous tissues**
- **Myxovirus , RNA virus**
- **>85% belongs to ped. age group (5-15 yrs.)**
- **Morbidity high but mortality negligible**
- **Transmitted by direct contact of saliva and respiratory droplet**
- **Communicable immediately before (4-6days) swelling begins & a week or more thereafter**
- **Peak incidence in winter or spring**
- **Overcrowding may lead to epidemics**


Parotid
gland

- **Virus enters through nose or mouth**
- **It proliferates in the parotid glands & the resp. mucosa**
- **Virus may also affect testes, pancreas, ovaries & prostate gland**

Clinical Manifestations

- **Fever, Headache, Malaise, Anorexia, nausea, sore throat, ear-ache aggravated by chewing within 24 hrs.**
- **Within 3rd day: parotitis (enlarged parotid gland)- unilateral or bilateral, pain, tenderness**
- **Enlargement of the gland may displace the ear upward & outward.**
- **Submaxillary & sublingual glands may also be involved later**
- **Neurological manifestations may be noticed as aseptic meningitis, enchephalitis, auditory nerve damage, GB syndrome, facial palsy, cerebral ataxia.**

Diagnosis and Management

Diagnosis by classic presentation, serum antibody testing 1 month after infection.

CSF study, blood count & virus isolation

<u>Treatment:</u>

- **analgesics for pain**
- **Antipyretics**
- **Steroids for swelling & pain**
- **Isolation**
- **Bed rest**
- **Warm saline mouth wash, liquid-Soft diet**
- **Cold compress to neck**

Complications

- **Orchitis**
- **Epididymitis**
- **Testicular atrophy**
- **Sterility**
- **Oophoritis**
- **Fetal death or LBW in first trimester of pregnancy**
- **Meningo-enchephilitis**
- **Pancreatitis, hepatitis, nephritis, carditis, thyroiditis**

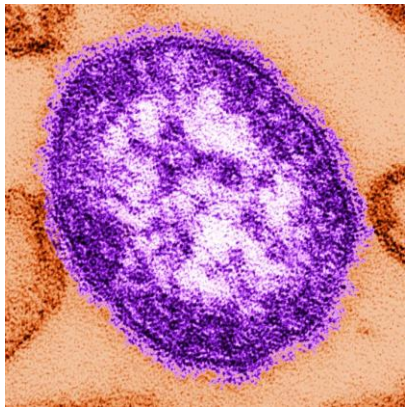
Prevention

- **Active immunization by MMR vaccine(1st dose 12-15month/15-18month; 2nd dose 4-6 yrs.)**
- **Passive gammaglobulin after exposure**
- **Isolation, disinfection of infected articles**

You shouldn't give the vaccine if:

- **a severe allergic reaction following the first MMR shot.**
- **allergic to gelatin or neomycin.**
- **pregnant or are planning to become pregnant in the next 4 weeks. (The vaccine is safe if breastfeeding.)**
- **immune system is weak because of cancer drugs, corticosteroids, or AIDS.**

Rubella (German measles)



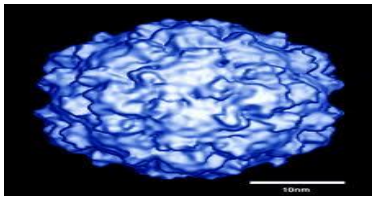
- **Viral Infection**
- **Transmitted by direct contact of nasopharyngeal secretions, feces, urine, or articles freshly contaminated**
- **Communicable 7 days before to 5 days after rash appears**

Signs/Symptoms

- **Rash on face which rapidly spreads downward to neck, arms, trunk and legs**
- **by end of first day body is covered with pinkish-red maculopapules**
- **Rash disappears in same order as it appeared**
- **Rash gone by 3rd day**
- **also low grade fever, Headache, Malaise, cough, sore throat**

Diagnosis and Management

- **Diagnosis by symptoms, (serology available 1 month after infection)**
- **Treatment**
  - **Antipyretics**
  - **Comfort measures**
  - ****Pregnant people must avoid infected child=fetal death**



Poliomyelitis

- **Acute viral disease caused by RNA enterovirus (polio virus)**
- **It has 3 serotypes (type1 – Burnhide; type 2- Lansing; type 3- Leon)**
- **Type 1 is most common & type 2 is least common**
- **Man is the only reservoir**
- **Feces & oropharyngeal secretions are infected materials**

- **The cases are most infectious 7-10 days before & after onset of symptoms**
- **Virus can live in water for 4months & in stool for 6 months in a cold environment.**
- **Mode of transmission through feco-oral route, directly through contaminated fingers & indirectly through contaminated water, milk, foods, flies & articles of daily use.**
- **Mostly occur in between 6months & 3yrs.**
- **Maternal antibody can protect for first few months.**

- **Males are more affected than females**
- **Polio is most likely to occur in rainy season**
- **Overcrowding, poor sanitation. Lack of hygiene, open field defecation facilitates the exposure of infection.**
- **4 types : Asymptomatic, Abortive , paralytic & non paralytic poliomyelitis**

Types

- **Asymptomatic : 90-95% persons infected with the virus but are asymptomatic, considered as silent cases.**
- **Abortive : illness is mild & self limiting & aborts in 4-8% of cases; fever, sore throat, headache, nausea, vomiting, anorexia & abdominal pain without any neurological features.**
- **Non paralytic : >1% ; the virus enters the nervous system without destroying the cells. May present febrile illness.**

- **Additional presenting features are neck rigidity, headache, backache, pain in legs & neck, nausea, vomiting without any paralysis; recovery → rapid (within 10 days).**
- **Paralytic : <1% cases, virus invades CNS & result varying degree of paralysis; feature – acute assymmetrical flaccid paralysis along with fever.**

Diagnosis

- **History**
- **Physical examination**
- **Stool exam.**
- **Serum for polio antibody**
- **LP (best to be avoided!)**

Management – no specific treatment !

- **Strict bed rest on hard bed**
- **Minimum & gentle handling of affected part**
- **Positioning(neutral), overstretching of paralyzed limb should be avoided**
- **Suctioning**
- **Analgesics**
- **Moist or dry heat application**
- **Sedation**
- **Mechanical Ventilation**
- **Pulse Oxymetry**
- **Tracheostomy**

- **Continuous bladder drainage**
- **Prevent constipation**
- **Fluid & electrolyte management**
- **Nutritional management**
- **Hygienic care**
- **Passive/active physiotherapy**
- **Rehabilitation**
- **Orthotic devices**
- **Surgery**

Complications

- **Resp. distress, pneumonia, atelectasis, pulm. edema, resp. failure.**
- **Heart failure, myocarditis, cardiac arrest**
- **GI bleeding, fecal impaction, perforation**
- **Paralysis of bladder, renal stone, UTI**
- **Bony deformity**

Prognosis

- **5-10% cases may be complicated with resp. paralysis**
- **Worse in sudden onset, with high fever & in older children**
- **Varies from complete recovery to complete paralysis.**

Prevention

- **Active immunization**
- **Pulse polio**
- **Surveillance for AFP**
- **Avoiding overcrowding place & swimming pools**
- **Promotion of personal hygiene, food hygiene**
- **Use of sanitary latrine, avoidance of open field defecation**

Hepatitis

- **Virus A, B, C, D, E (G, F)**
- **A,C,D,E – RNA Virus; B – DNA Virus**

Hepatitis A/D/E

- **Hep. A is an enterovirus**
- **Multiplies only in hepatocytes**
- **Virus is fairly resistant to heat(60degree for 1hr.) & chemicals(not affected by chlorine)**
- **Can survive >10wks. in well water**
- **Period of infectivity is maximum between 2wks before & 1wk after the onset of jaundice**
- **Infective materials are infected stool, Urine, blood, serum**

- **Feco-oral transmission, directly by person to person by contaminated hands & utensils or indirectly by contaminated water, food & milk or by flies.**
- **It can be transmitted also by parenteral route by blood & blood products or by contaminated needles.**
- **Sexual transmission may occur in oral & anal contact**
- **Incubation period 15-45 days, average 30 days.**

- **Clinical features (nonspecific symptoms) – fever, chills, headache, fatigue, generalized weakness, aches & pains followed by anorexia, nausea, vomiting, dark urine, clay color stool & jaundice.**
- **Disease is benign in nature with complete recovery within several weeks.**
- **More common in children than adults.**
- **One attack gives prolonged immunity & may lasts for life.**
- **Favorable environment – rainy season with heavy rainfall, poor sanitation, overcrowding, poor personal hygiene mainly inadequate hand washing, improper cooking, poor food hygiene & unsafe water supply.**

- **Investigation : history, clinical examination, bilirubin level, SGOT, SGPT, Anti HAV antibody.**
- **Management : complete bed rest, CHO rich food with glucose & adequate protein, fat restriction, frequent small amount of feeding, adequate amount of fluid, vitamin supplementation.**
- **Prevention : promoting safe water, improving food hygiene, personal hygiene & environmental sanitation**

- **Control measure – disinfection of stool & fomites of infected person**
- **Passive immunization – Anti HAV gammaglobulin to the close contacts of a case (efficacy lasts for 6 months)**
- **Active immunization – live or inactivated hep. A vaccine (only 4 inactivated vaccines are currently available internationally; schedule, dose varies manufacturer to manufacturer)**

Hep B/C

- **Previously known as serum hepatitis**
- **HBV has 3 antigens – surface antigen/Australia antigen(HBsAg). Core antigen(HBcAg) & e antigen (HBeAg).**
- **Mode of transmission – parenteral route (infected blood & blood product transfusion, dialysis, contaminated syringe & needles, skin pricks, dental procedure, tattooing, ear & nose piercing, circumcision, acupuncture, may also by shaving razor/blade or tooth brush)**

- **Perinatal vertical transmission – 3rd trimester, at time of delivery, early puerperal period.**
- **Sexual transmission**
- **Infected insect bite (mosquito, bed bugs) is also suspected as route of transmission**
- **Incubation period – 45-180 days.**
- **Infective materials : contaminated blood & body secretions (saliva, vaginal secretions, semen)**
- **10% become carrier**

- **High risk group : recipients of blood & blood products, infant of carrier mother, homosexuals, IV drug users.**
- **Clinical features similar to other hepatitis; nausea & vomiting are uncommon & anorexia is mild.**
- **Serum sickness feature: rash, arthralgia, urticaria; others features as purpura, aplastic anemia, pleural effusion, myocarditis, glomerulonephritis.**
- **Investigation : history taking, physical exam., hepatic enzymes, HBsAg,antibody**

- **Management : bed rest, no specific dietary restriction, glucose intake, alpha interferon or acyclovir, antibiotics neomycin or ampicillin in fulminant hepatitis, exchange blood transfusion or plasmapheresis in hepatic failure.**
- **Prevention : active immunization Hep B vaccine, child below 10yrs 0.5ml, IM, (older children needs double dose); 2nd dose 1month after first dose & 3rd dose after 6 months.**

- **Passive immunization – hyperimmune hepatitis B immunoglobulin in post exposure, 0.06ml/kg, IM within 24 hrs of exposure.**
- **Post exposure : accidental needle prick, exposure to infected blood & neonate of HBsAg positive mothers.**
- **Neonate of HBsAg positive mothers should receive HBIg & HB vaccine at separate site within 12-24 hrs of birth followed by 2^{nd} & 3^{rd} dose of vaccine at 1 & 6 months of age.**

- **Other precautions: universal precautions, sterilization, screening of blood products & donors.**
- **Complications : liver cirrhosis, liver cancer, liver failure**

Remember ! (Hep. B Carrier)

- **Prevent other people from coming in to contact with blood. In case of bleeding or trauma, the wound should be dressed properly.**

- **Items contaminated by carrier's blood should be disinfected with bleach for 30 min. before washing.**

- **Use condom during sex unless partner is known to be protected from Hep. B virus**

- **Advise all household contacts & partner to have their blood checked & ensure that they are vaccinated.**

- **Do not share razor, shaver, toothbrush, nail clipper, needles, injecting quipments.**

- **Do not donate blood, sperm or body organ.**

- **Baby of mother- Hep. B Vaccine + immunoglobulin shortly after birth**

What is dengue fever?

Dengue Fever is an illness caused by infection with a virus transmitted by the *Aedes mosquito*.

The word dengue is derived from African word denga: meaning *fever with hemorrhage*.

Dengue Virus

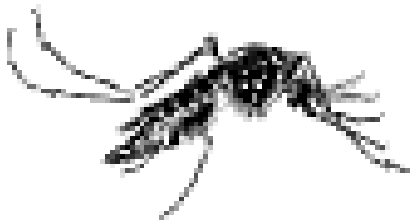
1. Causes dengue and dengue hemorrhagic fever
2. It is an arbovirus
3. Transmitted by mosquitoes
4. Has 4 serotypes (DEN-1, 2, 3, 4)

•Each serotype provides specific lifetime immunity, and short-term cross-immunity

•All serotypes can cause severe and fatal disease

The most common epidemic vector of dengue in the world is the *Aedes aegypti* mosquito. It can be identified by the white bands or scale patterns on its legs and thorax.

They are approximately 5 mm in size:



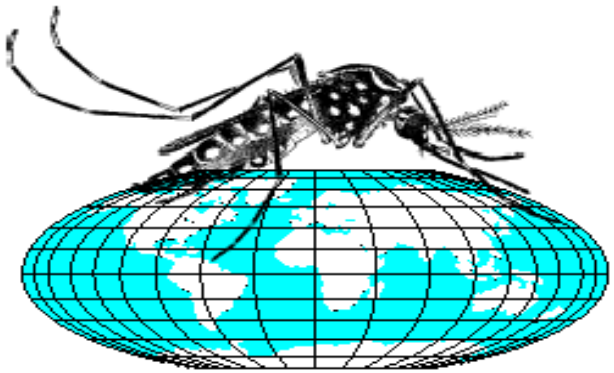
Magnified 5 times

Dengue mosquitos bite in the early morning and the late afternoon.

Aedes aegypti

- **Dengue transmitted by infected female mosquito.** This is because they need the protein found in blood to produce eggs. Male mosquitoes feed only on plant nectar.
- **Primarily a daytime feeder**
- **Lives around human habitation**
- **Lays eggs and produces larvae preferentially in artificial containers**

On average, a female *Aedes* mosquito can lay about 300 eggs during her life span of 14 to 21 days.



Clinical Characteristics of Dengue Fever

- Fever
- Headache
- Muscle and joint pain
- Nausea/vomiting
- Rash
- Hemorrhagic manifestations

Patients may also report other symptoms, such as –

→**itching**

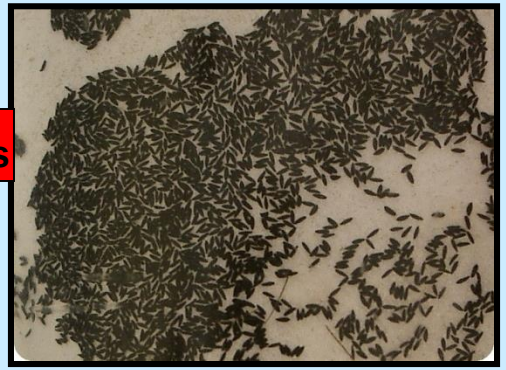
→**aberrations in the sense of taste, particularly a metallic taste.**

→**severe depression after the acute phase of the illness.**

Life cycle of the *Aedes* Mosquito

1-2 days

Eggs



2-3 days

Larvae

4-5 days

Pupae

Stagnant water

1. Classic dengue fever;
2. Dengue hemorrhagic fever (DHF) and
3. Dengue shock syndrome (DSS).

Dengue shock syndrome is actually a severe form of DHF.

Clinical Case Definition for Dengue Fever

Classical Dengue fever or Break bone fever is an acute febrile viral disease frequently presenting with headaches, bone or joint pain, muscular pain, rash, bradycardia, extreme weakness, anorexia, nausea, vomiting, and leucopenia. Child generally recovers within 7 days.

Clinical Case Definition for Dengue Hemorrhagic Fever

Necessary Criteria:

1. **Fever, or recent history of acute fever, abdominal pain**
2. **Hemorrhagic manifestations (petechiae, purpura, echymoses, epistaxis, gum bleeding, hematemesis, malena)**
3. **Low platelet count (100,000/mm3 or less)**
4. **Objective evidence of "leaky capillaries:"**

- **Elevated hematocrit (20% or more over baseline)**
  - **low albumin**
  - **pleural or other effusions**

*** Positive tourniquet test**

Example of a skin rash due to dengue fever

Four Grades of DHF

Grade 1

Fever and nonspecific constitutional symptoms; Positive tourniquet test is only hemorrhagic manifestation

Grade 2

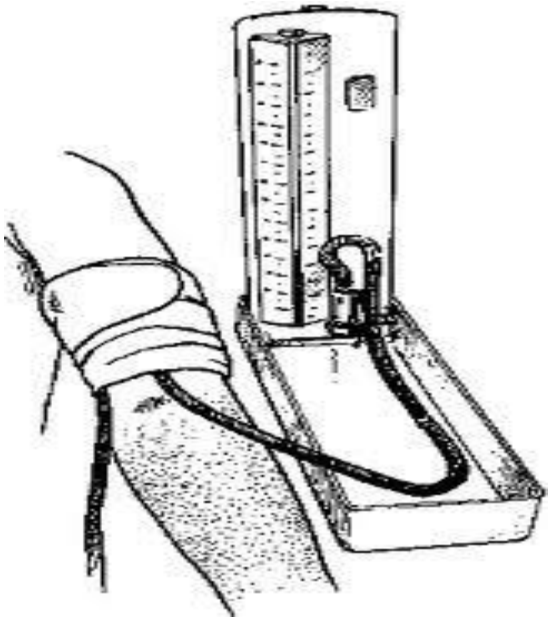
Grade 1 manifestations + spontaneous bleeding

Grade 3

Signs of circulatory failure (rapid/weak pulse, narrow pulse pressure, hypotension, cold/clammy skin)

Grade 4

Profound shock (undetectable pulse and BP)



Positive tourniquet test

- **pressure in between systolic & diastolic for 5 min.**
- **>20 petechiae** /2.5cm^2(1 inch^2).

Danger Signs in Dengue Hemorrhagic Fever

- **Abdominal pain - intense and sustained**
- **Persistent vomiting**
- **Abrupt change from fever to hypothermia, with sweating and prostration**
- **Restlessness or dizziness**

***All of these are signs of impending shock and should alert clinicians that the patient needs close observation and fluids management.**

Hemorrhagic Manifestations of Dengue

- Skin hemorrhages:
  petechiae, purpura, ecchymoses
- Gingival bleeding
- Nasal bleeding
- Gastrointestinal bleeding:
  Hematemesis, melena, hematochezia
- Hematuria
- Increased menstrual flow

Signs and Symptoms of Encephalitis/Encephalopathy Associated with Acute Dengue Infection

- Decreased level of consciousness: lethargy, confusion, coma
- Seizures
- Nuchal rigidity
- Paresis

LABORATORY CRITERIA

- **POSITIVE TOURNIQUET TEST**
- **ISOLATION OF DENQUE VIRUS**
- **INCREASED IgM ANTIBODIES**
- **DENQUE ANTIGEN DETECTION BY IMMUNOHISTOCHEMISTRY, IMMUNOFLUROSCENCE, ELISA**
- **PCR**

- **LEUCOPENIA,THROMPOCYTOPENIA**
- **RAISED Hct%, PROLONGED PT, PTT**
- **STOOL FOR OCCULT BLOOD**

Management

Indications of hospitalization

- **Restlessness or lethargy, frequent vomiting one or two days of febrile illness.**
- **Cold extremities or circumoral cyanosis.**
- **Bleeding in any form.**
- **Rapid and weak pulse.**
- **Capillary refill time > 3 seconds.**
- **Narrowing of pulse pressure (<20 mm Hg) or Hypo tension.**
- **Hematocrit of 40 or rising hematocrit.**
- **Platelet count of < 1,00000/ mm3**
- **Acute abdominal pain**
- **Evidence of Plasma leakage. Eg. Pleural effusion /Ascities**

The management of dengue fever is symptomatic and supportive.

- **Bed rest is advisable during the acute febrile phase.**
- **Antipyretics or sponging should be used to keep the body temperature < 40^0C.**
- **Analgesics and mild sedation may be required to control pain**
- **Fluids and electrolyte replacement therapy is required when there are deficits due to sweating/ fasting / thirst / vomiting or diarrhea.**
- **Because of the dengue hemorrhagic manifestation, aspirin should not be given to reduce fever or control pain.**

- **Electrolyte and dextrose Solution or Fruit Juice or both are preferable to plain water.**
- **The type of fluid used are 1) Crystalloid and 2) Colloidal**
- **I. Crystalloid (10-20ml/kg b.wt)**
- **1/3 to ½ of the total fluid as physiologic saline solution (NS)**
- **½ to 2/3 of the remainder as 5% glucose in water.**
- **For acidosis ¼ of the total fluid should be sodium bicarbonate.**
- **II. Colloids - Dextran 40 and plasma**

- Sedation (in marked agitation).
- Oxygen therapy (in shock).
- Transfusion with fresh whole blood.
- Fresh Frozen Plasma (FFP) (in cases of massive bleeding).
- Platelet transfusions (for children with platelet count of 50,000 / mm3 and having significant bleeding manifestations).
- Prophylactic platelet concentrate (indicated when platelet count is less than 10000-20000 / mm3).
- Intercostal tube or ascitic drainage tube insertion

- **Small doses of frusemide (0.25 to 0.5 mg / kg b/w 6th hourly)[to avoid insertion of intercostal drains.]**
- **child should be monitored constantly**
- **Pulse, BP, RR & Temp. be taken every 15 to 30 minutes; are more often until the shock resolves.**
- **Accurate record of intake and output**

1. Elimination of mosquito breeding places

- **Cover water containers**—Tight covers on water storage containers, will prevent the mosquitos laying their eggs there. If the cover is loose, mosquitos can go in and out.

- **Septic tanks and soak-away pits**—Cover and seal these, so that dengue mosquitos cannot breed there.

- **Removal of rubbish**—Garbage articles and other rubbish found around houses can collect rain water. They should be removed or smashed and buried in the ground or burned, where this is permissible.

- **Biological control**—Mosquito wigglers can be controlled by small larva-eating fish, such as guppies. These fish can be found in streams or ponds or obtained through pet shops. Bacterial pesticides will also kill mosquito wigglers.

- **Chemical control**—Safe and easily used larvicides such as temephos sand core granules can be placed in water containers to kill developing wigglers.

2. Prevent mosquito bites

People can protect themselves from mosquito bites by using any of the following means—

- **Mosquito coils and electric vapour mats**—Slow burning **mosquito coils** or electric vapour mats are effective in the rainy season, just after sunrise and/or in the afternoon hours before sunset, when dengue mosquitos bite.

- **Mosquito nets**—Nets placed over sleeping places can protect small children and others who may rest during the day. The effectiveness of such nets can be improved by treating them with permethrin (a pyrethroid insecticide). Curtains (cloth or bamboo) can also be treated with insecticide and hung at windows or doorways, to repel or kill mosquitos.

- **Repellents**—Mosquito repellents can be applied to exposed parts of the body where mosquitos bite. Care should be taken in using repellents on small children and the elderly.

- **Screens**—Screens on windows and doorways are effective protection against the entry of mosquitos in homes.

- **Protection of people sick with dengue**—Mosquitos become infected when they bite people who are sick with dengue. Mosquito nets and mosquito coils will effectively prevent mosquitos from biting sick people and help stop the spread of dengue.

Do the 10-Minute Wipe-out everyday.

Change water in vases on alternate days.

Do the 10-Minute Wipe-out everyday.

Remove water from flowerpot plates on alternate days.

Do the 10-Minute Wipe-out everyday.

Turn over all water storage containers.

Do the 10-Minute Wipe-out everyday.

Clear blockages and put insecticide in roof gutters monthly.

Unwanted items

Do not litter. Rubbish such as cups and bottles can collect rain water and breed mosquitoes.

Complications

- **Intracranial bleeding**
- **Encephalopathy**
- **Convulsions**
- **Renal failure**

Prognosis

- Children who develop profound shock rapidly with no detectable diastolic pressure or with unobtainable blood pressure,
- Children in shock with delayed admission to hospital,
- Children in shock with gastrointestinal hemorrhage have a poor prognosis.
- Mortality rates may exceed 50% in these groups BUT intensive care may reduce the mortality to as low as 2%.

Dengue is self limiting & benign in nature; full recovery is possible with appropriate management.

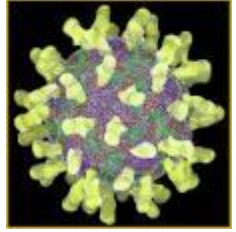
PREVENTION

- **Tissue culture-based vaccines for dengue virus types 1, 2, 3 and 4 are immunogenic but not available for general use.**
- **1st dengue vaccine – first registered in Mexico in Dec. 2015**
- **Live recombinant tetravalent vaccine**
- **3 doses → 0/6/12 months**
- **Age → 9-45 yrs in endemic areas**

- **Prophylaxis depends on use of insecticides, repellents, body protective clothing, and screening of houses to avoid the bite of the mosquito.**
- **Destruction of A. Aegypti breeding sites also is effective.**

- **If water storage is mandatory, a cover lid or a thin layer of oil may prevent egg deposits or hatching.**
- **A larvicide, such as Abate, available as a 1% sand granule formulation , may be added safely to drinking water.**
- **Adulticidal (malathion or fenitrothion)**
- **diesel oil or kerosene**

Common Cold



- The common cold is a respiratory infection caused by over 200 different viruses.
- Symptoms include congestion, sore throat and cough.
- It can be spread through direct and indirect contact.
- Treatment includes rest, liquids and medications.
- Prevention include handwashing , cough hygiene and avoiding contact with infected persons.

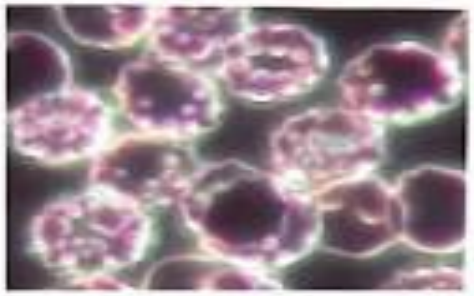
- **Influenza, more commonly called “flu”, is a respiratory infection caused by several groups of viruses.**
- **Symptoms include high fever, fatigue, muscle and joint aches.**
- **It is spread through direct contact with infected people and water droplets in the air from coughs and sneezes.**
- **Treatment includes rest, liquids, and medications.**
- **Prevention includes avoiding contact with infected persons and vaccines.**

- **<u>Mononucleosis</u> is a viral infection common among teens and young adults.**
- **Symptoms include tiredness, loss of appetite, sore throat and fever.**
- **It is caused by direct contact with an infected person's saliva through kissing, sharing utensils and water droplets in the air from coughs and sneezes.**
- **Treat symptoms with pain relievers, rest and liquids.**
- **Prevention includes avoiding contact with infected persons and not eating or drinking after anyone else.**

Sexually Transmitted Diseases

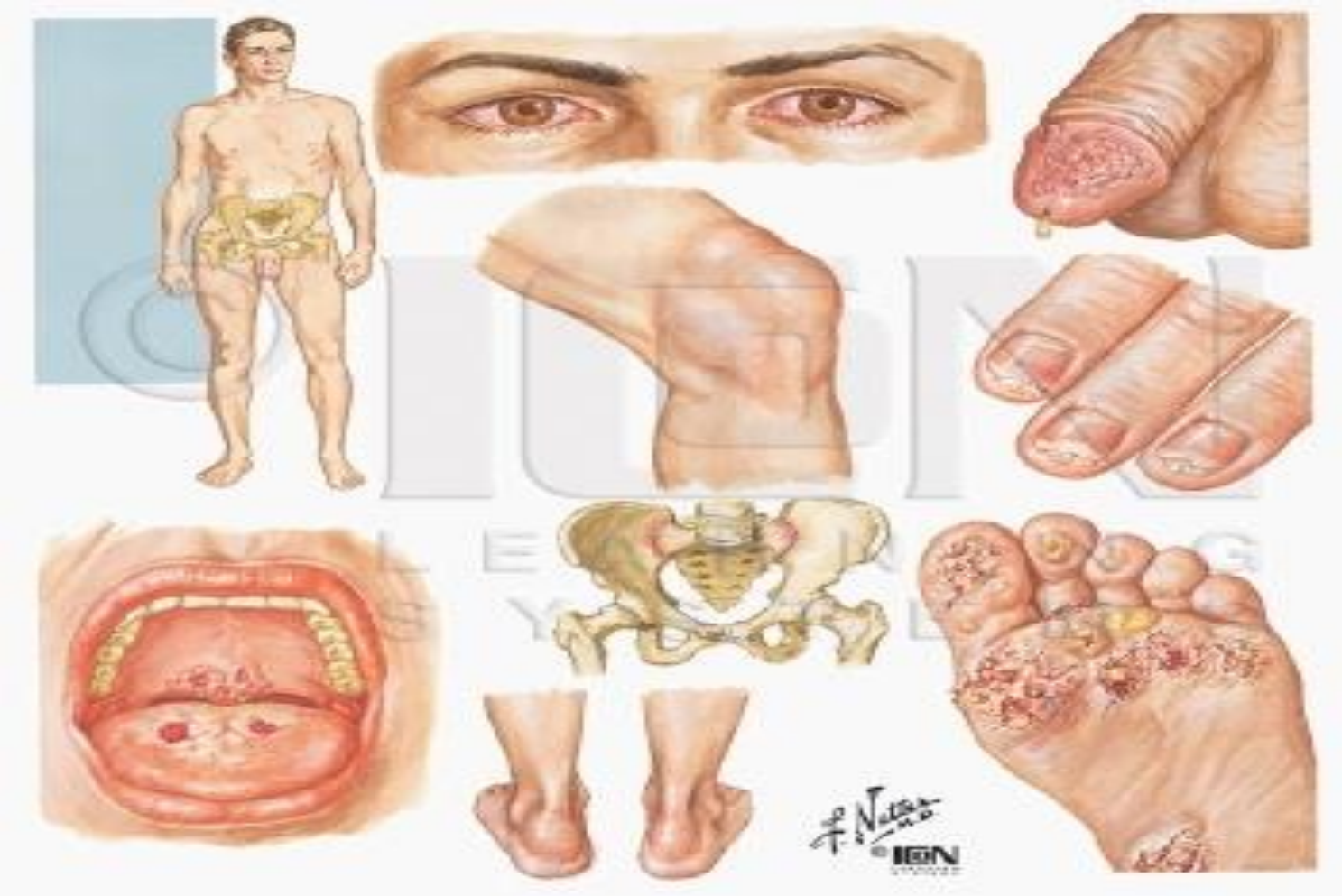
- **Chlamydia (bacteria)**
- **Gonorrhea (bacteria)**
- **Genital Herpes (virus)**
- **Syphilis (bacteria)**
- **HIV/AIDS**

Chlamydia



- **A group of infections (Chlamydia Trachomatis) that attack the reproductive system**
- **Most common type of STD**
- **If detected, it can be cured with antibiotics**
- **If undetected, it can lead to damage to the reproductive organs**

- **Symptoms : often there are no symptoms, however, sometimes there will be pain and an unusual liquid coming from the penis or vagina**



Gonorrhea

- **An STD caused by bacteria that live in warm, moist body areas.**
- **Symptoms include a burning feeling during urination and an unusual liquid coming from the penis or vagina.**
- **If treated, it can be cured with the use of antibiotics.**

Gonorrhea

Genital Herpes

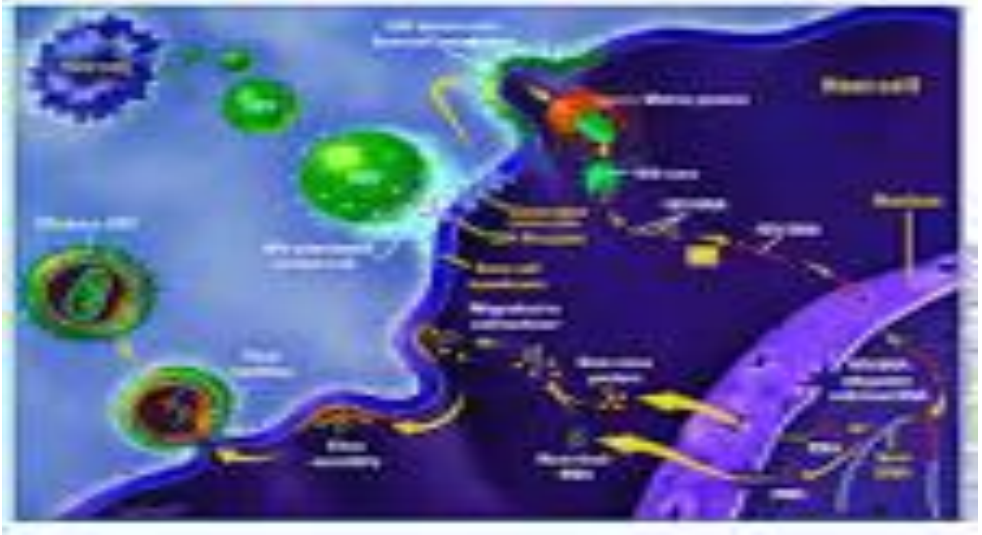
- **An STD caused by the herpes simplex type II virus**
- **Symptoms include fever and painful, itchy sores where the disease entered the body**
- **There is no cure**

Syphilis

- An STD that attacks many parts of the body
- It is fatal without treatment
- Early symptoms include a reddish, painless sore at the place where the disease entered the body
- It can be cured with antibiotics

- Syphilitic chancre

HIV/AIDS



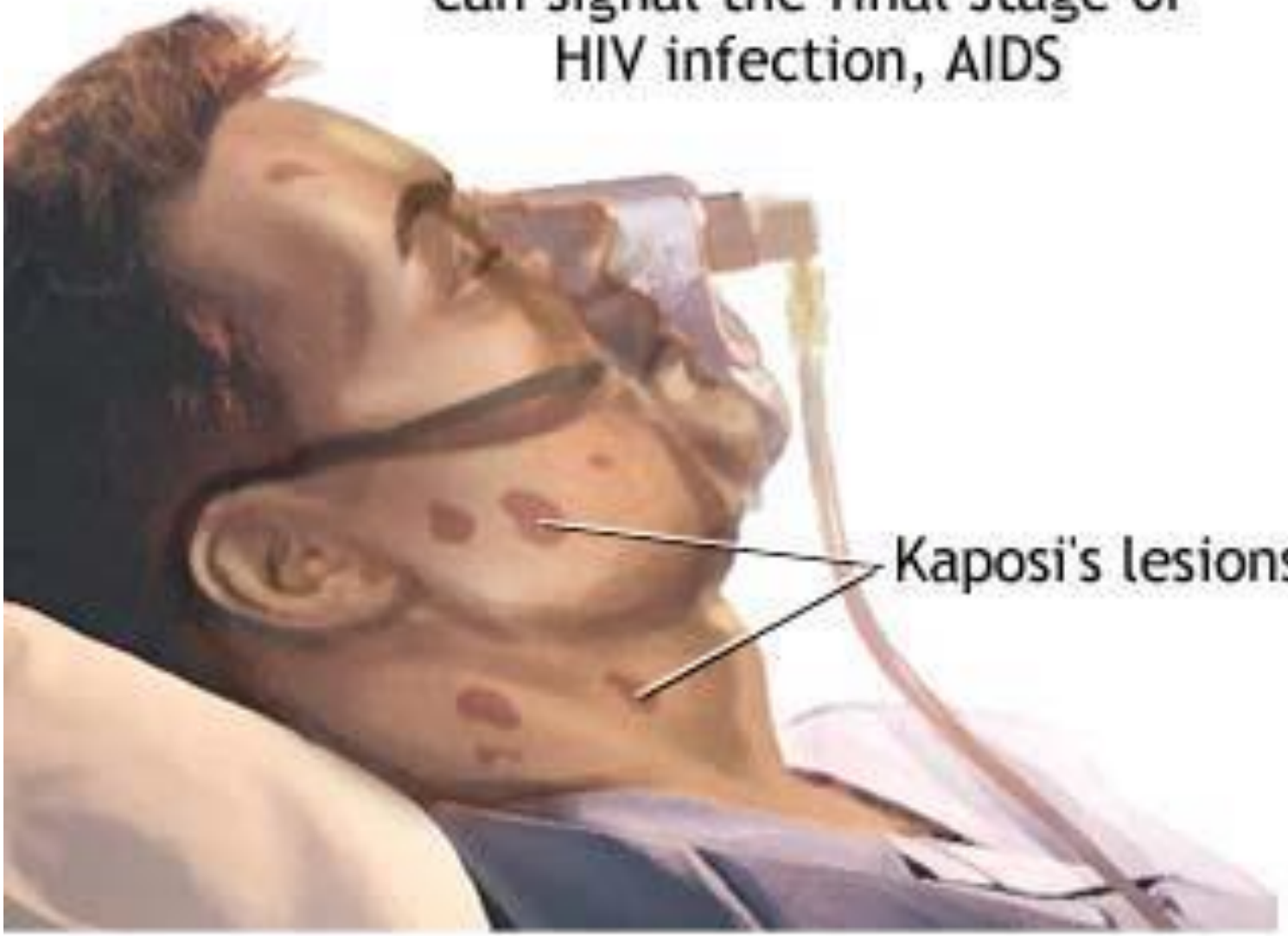
- **HIV is the virus that causes AIDS, it attacks the immune system.**
- **Early symptoms may include a rash, a sore throat, fever and tiredness.**
- **It is spread through contact with bodily fluids, mainly through sexual activity and sharing needles during intravenous drug use.**

HIV/AIDS

HIV is not spread through

- **the air**
- **sweat or tears**
- **mosquitos**
- **donating blood**
- **touching, such as shaking hands or hugging**
- **contact with objects, such as eating utensils**

Opportunistic infections such as pneumocystosis or malignancies such as Kaposi's sarcoma can signal the final stage of HIV infection, AIDS

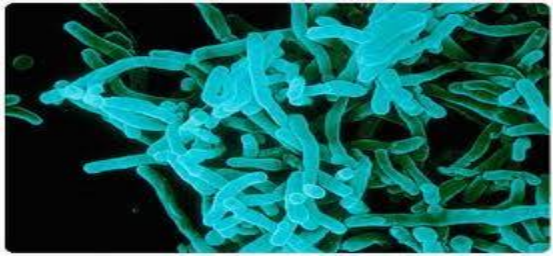


HIV/AIDS

- **Nearly everyone infected with HIV develops AIDS.**
- **People with AIDS cannot fight off diseases that healthy people could easily resist.**
- **Aids has no cure, so people eventually die from one of the diseases.**
- **Prevention techniques include practicing abstinence and never sharing with anyone else a needle or any object that breaks the skin.**

Bacterial Infections

Diphteria

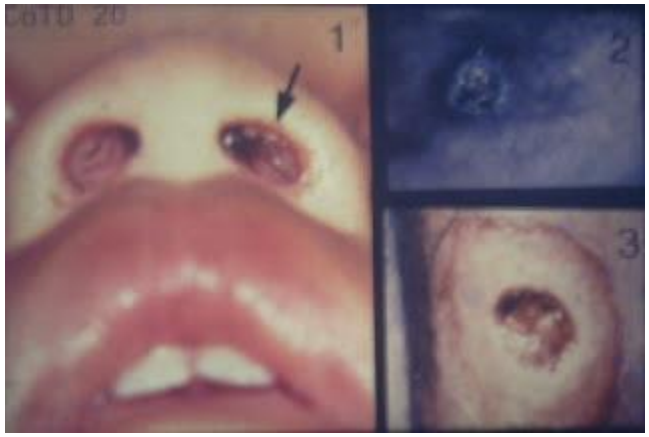


- **Highly contagious Bacterial infection – Corynebacterium Diphtheriae.**
- **It has no invasive power but produces powerful exotoxin.**
- **May survive in dust & fomites for short time.**
- **Transmitted by direct contact with respiratory secretions, droplet, discharge of skin lesions, contaminated objects & infected dust.**

- **Portals of entry – mainly respiratory tract; others : cuts, wounds, ulcers, occassionally through eye, genitalia, middle ear etc.**
- **Mainly affect 1-5 yrs old children**
- **Occurs in all season but found more in winter or in autumn.**
- **May occur in different location : Faucial, Laryngeal, Nasal, & Cutaneous.**
- **The onset is acute with fever, malaise, headache, anorexia, delirium, drowsiness.**

Nasal Diphtheria

- **Uncommon**
- **Mildest type & may extend to pharynx**
- **Usually localized to the septum or turbinates of the nose.**
- **Serosanguineous discharge from nose, excoriation of upper lip with minimum infectious features.**



Faucial or Pharyngotonsillar Diphtheria

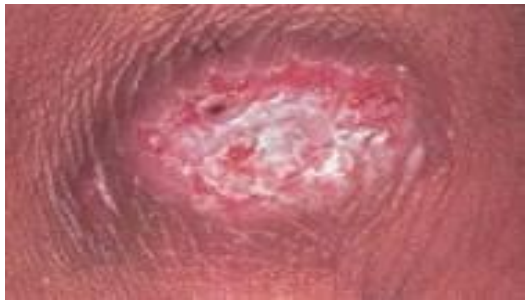
- **Most common type**
- **Sore throat, difficulty in swallowing, low grade fever, tachycardia, redness & swelling with exudate over the area, formation of whitish gray membrane, cervical lymphadenopathy & edema of submandibular area (Bullneck appearance)**

Laryngeal Diphtheria

- Most serious type but less common form.
- Hoarseness of voice, aphonia, croup, cough, restlessness, prostration, dyspnea, chest retraction, cyanosis, cervical lymphadenopathy, edema of neck(Bull neck), formation of membrane over larynx leading to resp. obstruction.

Cutaneous Diphtheria

- Skin, ears, eyes & genitalia
- Tender ulcer surrounded by erythema & covered with a membrane.



Diagnosis and Management

- History & physical examination
- Diagnosed by culture of discharge (free of bacteria after 3 neg. culture).

- strict isolation, bed rest for 2-3 wks.
- Antidiphtheric serum(ADS), an antitoxin to neutralize exotoxin, IM/IV after skin test
- Antibiotic therapy – penicillin/erythromycin for 2 wks.

- Easily digestable diet with high calorie
- Antipyretic, sedative
- IV fluid, NG tube feeing, oxygen
- Tracheostomy if obstructed airway
- Suctioning
- Mechanical ventilation in resp. failure

Prognosis

- **If left untreated, 50% die.**
- **4-5% die of complications like resp. obstruction, resp. paralysis, myocarditis, Circulatory failure, permanenet cardiac damage, paralysis.**

Prevention

- **Active immunization by DPT**
- **Isolation**
- **Disinfection**
- **Schick test & throat swab culture for all close contacts**
- **Passive immunization with ADS**

Schick test- *to determine whether or not a person is susceptible to diphtheria.*

- **Béla Schick -Hungarian-born American pediatrician.**
- **0.1 ml of diluted diphtheria toxin is injected intradermally into the arm**
- **If a person does not have enough antibodies to fight it off, the skin around the injection will become red and swollen, indicating a positive result.**

- **This swelling disappears after a few days.**
- **If the person has an immunity, then little or no swelling and redness will occur, indicating a negative result.**

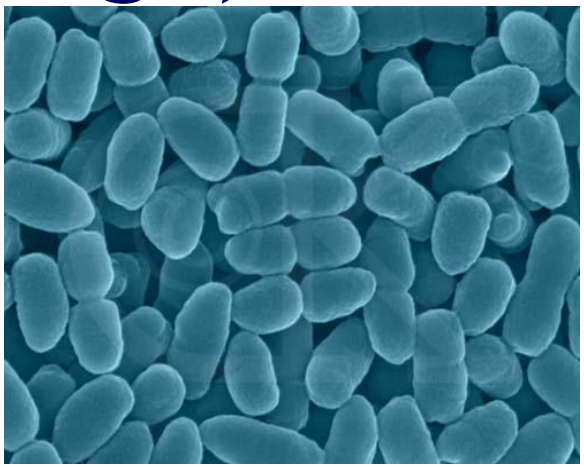
Results can be interpreted as:

- **Positive: when the test results in a wheal of 5–10 mm diameter**
- **Pseudo-positive: when there is only a red colored inflammation and it disappears rapidly**

- **Negative reaction:**
- **pseudo negative reaction:**

**** The test was created when immunizing agents were scarce and not very safe, however as newer and safer toxoids were made available there was no more requirement for susceptibility tests.**

Pertussis (whooping cough)



- **Highly contagious**

respiratory infection caused by Bordetella pertussis.

- **Local tissue damage in respiratory tract, Colonizes the respiratory tract**
- **Systemic disease may be toxin mediated**
- **Transmitted by direct contact, droplet**
- **Communicable for up to 4 weeks**

- **Insidious onset, similar to minor upper respiratory infection with nonspecific cough**

- **Fever usually minimal throughout course**

Clinical Features

- **Catarrhal stage : 1-2 weeks**

  runny nose, sneezing, low fever, and a mild cough (commonly mistaken for cold).

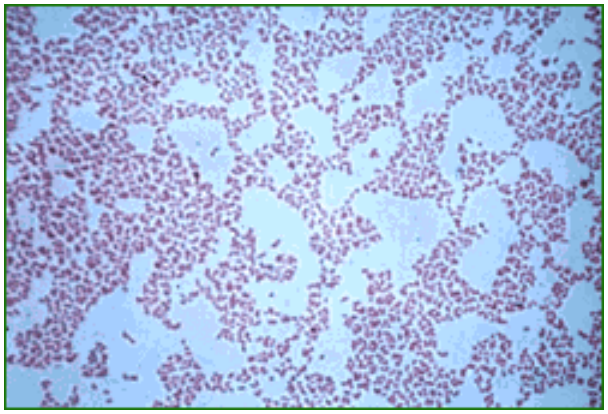
- **Paroxysmal cough stage : 1-6 weeks**

  whooping cough, which consists of bursts or paroxysms of numerous, rapid coughs.

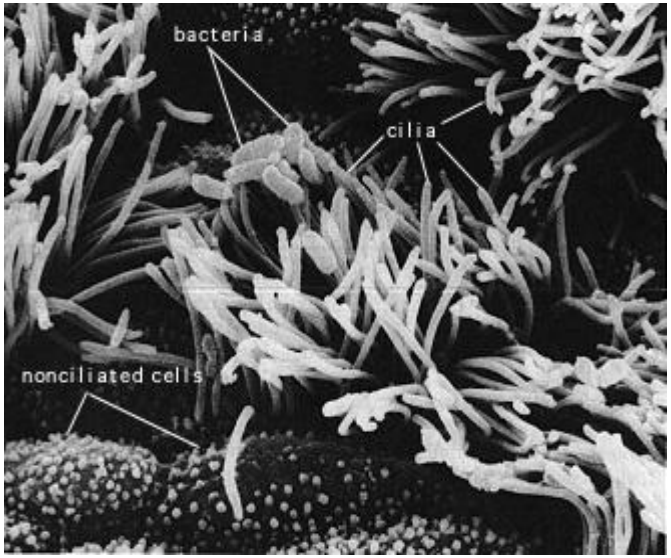
- **Convalescence : Weeks to months**

- **gradual recovery starts.**

Diagnosis



- **Isolation by culture**
- **PCR**
- **Direct fluorescent antibody**
- **Serological testing**



Management

Treatment:

- **hospitalization for infants or children who are dehydrated**
- **Bed Rest**
- **increase fluids**
- **Antibiotics –Erythromycin; Azithromycin**
- **Suctioning**
- **Humidifier**
- **Observe for airway obstruction (restlessness, retractions, cyanosis)**

Pertussis Complications

Condition	Percent reported
Pneumonia	5.2
Seizures	0.8
Encephalopathy	0.1
Death	0.2

Prevention

CDC recommends children be given the Diphtheria, Tetanus, and Pertussis (DTP) vaccine as early as 6 weeks but no later than 6 yrs.

Good hygiene

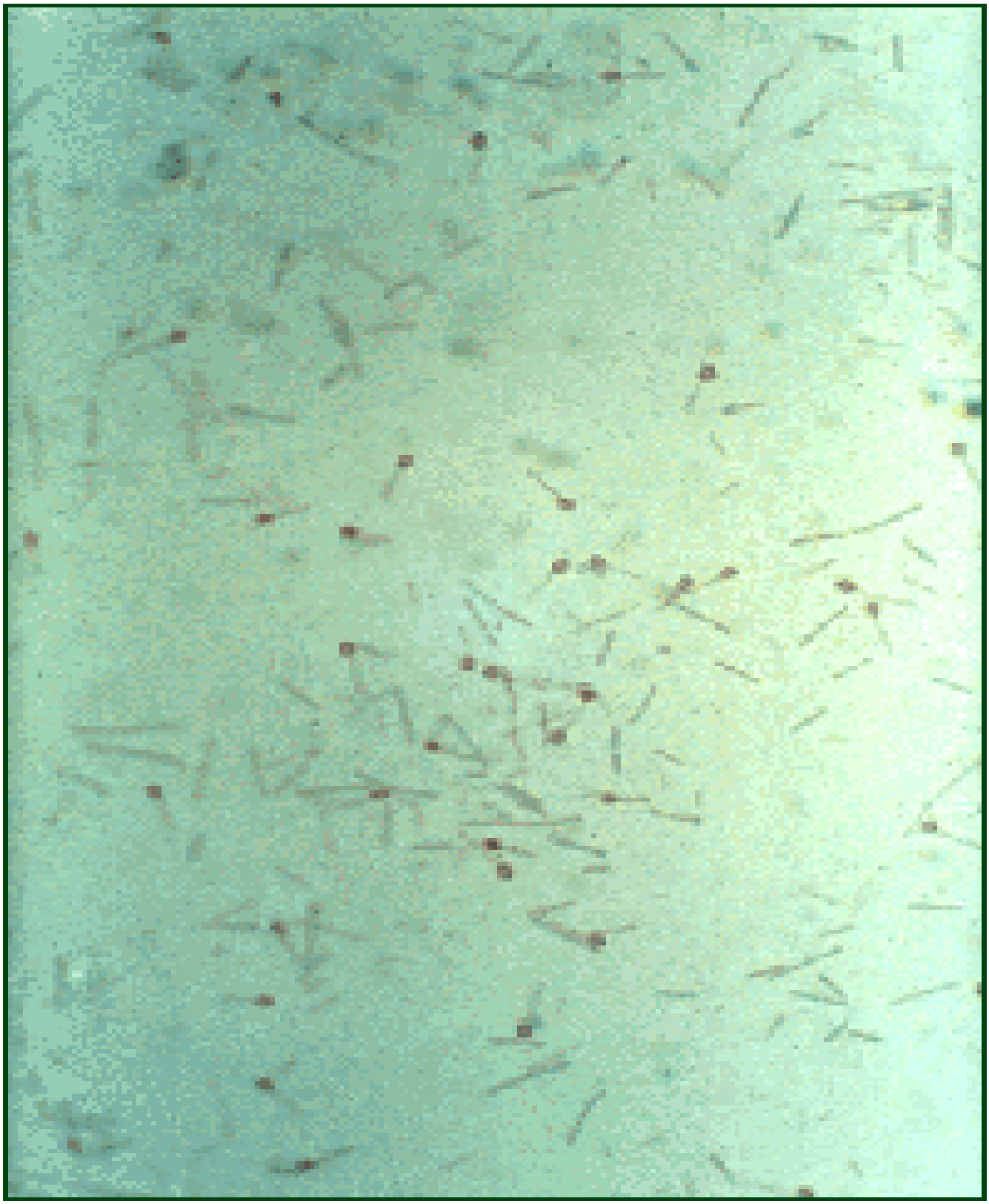
Cover mouth/nose when coughing and sneezing.

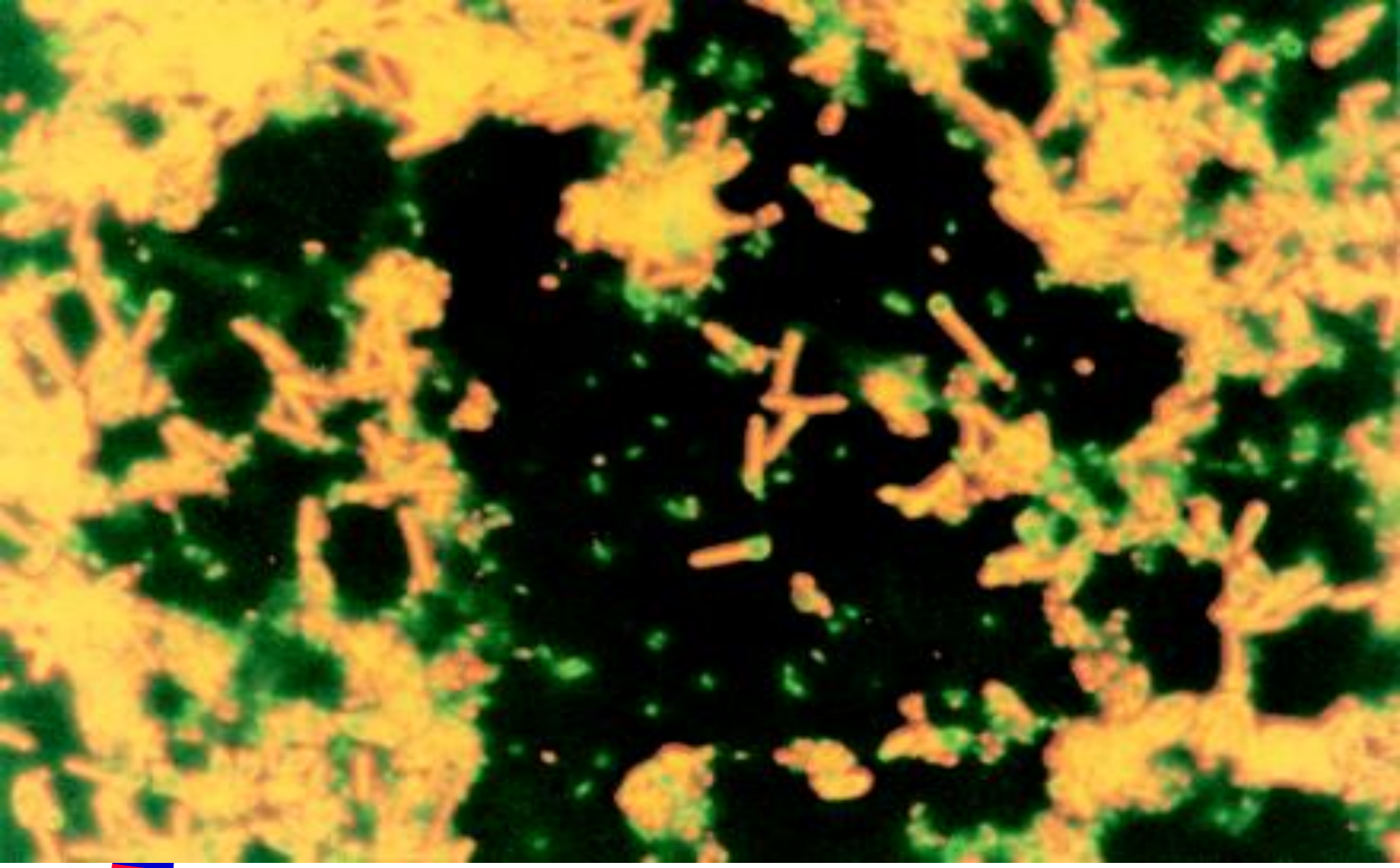
TETANUS

- **Tetanus is an acute, often fatal, disease caused by an exotoxin produced by the bacterium C*lostridium tetani.***

- **It is characterized by generalized rigidity and convulsive spasms of skeletal muscles.**

- **The muscle stiffness usually involves the jaw (lockjaw) and neck and then becomes generalized.**





Acridine orange stain of characteristic C tetani with endospores wider than the characteristic drumstick shape.

- *C.tetani* is a gram-positive, anaerobic rod that may develop a terminal spore, giving it a drumstick appearance.
- The organism is sensitive to heat and cannot survive in the presence of oxygen. The spores, in contrast, are very resistant to heat and the usual antiseptics.
- They can not survive autoclaving at 249.8 °F (121 °C)for 20 minutes.
- The spores are also relatively resistant to phenol and other chemical agents.

- **The spores are widely distributed in soil and in the intestines and faeces of horses, sheep, cattle, dogs, cats, rats, guinea pigs, and chickens. Soil may contain large numbers of spores. Spores may persist for months to years.**
- ***C. tetani* produces two exotoxins, tetanolysin and tetanospasmin. The function of tetanolysin is not known with certainty. Tetanospasmin is a neurotoxin and causes the clinical manifestations of tetanus.**

- **Occurrence:** Tetanus occurs worldwide but is most frequently encountered in densely populated regions in hot, damp climates with soil rich in organic matter.

- **Reservoir:** Organisms are found primarily in the soil and intestinal tracts of animals and humans.

Incubation Period: 8 DAYS (3-21 DAYS)

- **Mode of Transmission:** Transmission is primarily by contaminated wounds,Tissue injury (surgery,burns,deep puncture wounds, crush wounds, Otitis media, dental infection, animal bites, abortion).
- **Communicability**

Tetanus is not contagious from person to person. It is the only vaccine-preventable disease that is infectious but not contagious.

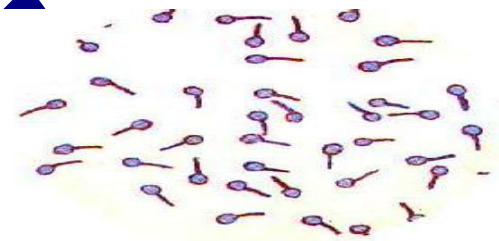
Peak in winter and summer season

- **Age : It is the disease of active age (5-40 years), New born baby, female during delivery or abortion.**
- **Sex : Higher incidence in males than females**
- **Occupation : Agricultural workers are at higher risk**
- **Environmental and social factors: Unhygienic custom habits, Unhygienic delivery practices.**

Diagnosis Of Tetanus

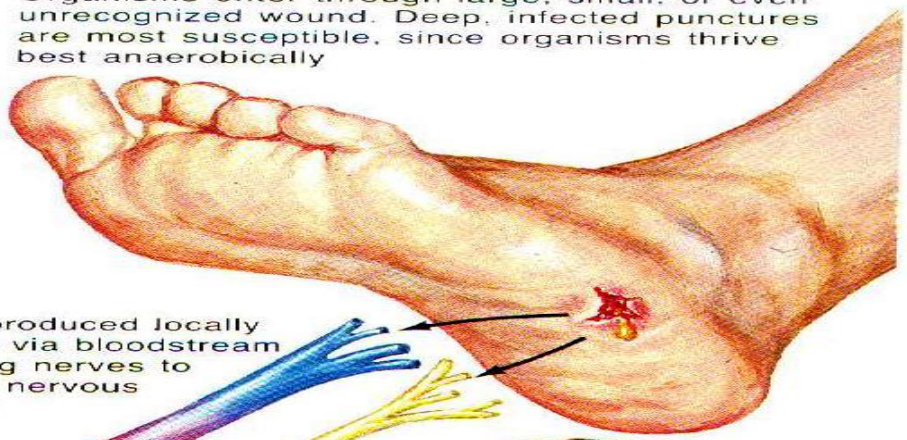
Clinically it is confirmed by noticing the following features:

1. **Risus sardonicus .**
2. **Lock jaw.**
3. **Opisthotonos (extension of lower extremities, flexion of upper extremities and arching of the back. The examiners hand can be passed under the back of the patient when he lies on the bed in supine position.)**
4. **Neck rigidity**

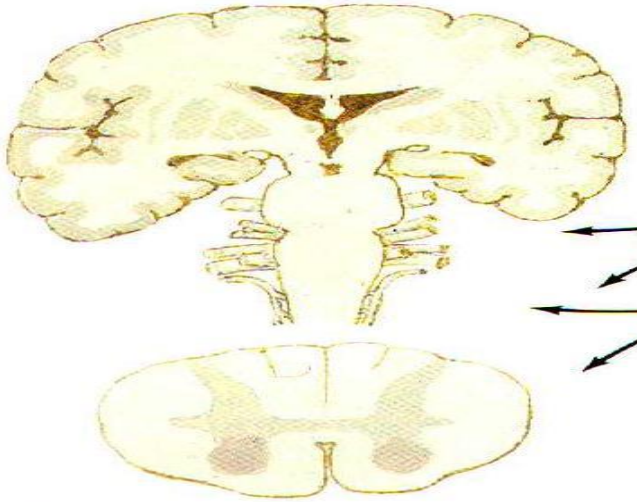


Clostridium tetani: gram-positive, spore-bearing rods

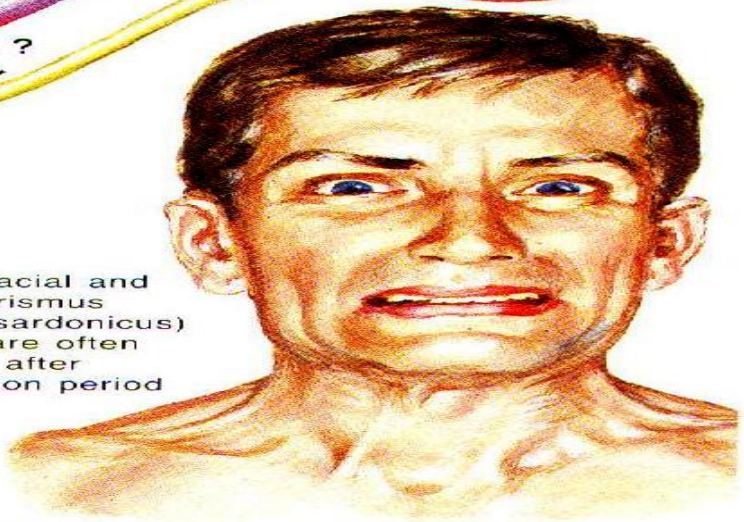
Organisms enter through large, small, or even unrecognized wound. Deep, infected punctures are most susceptible, since organisms thrive best anaerobically



Toxin produced locally passes via bloodstream or along nerves to central nervous system



Motor neurons of spinal cord (anterior horn) and of brainstem become hyperactive because toxin specifically attacks inhibitory (Renshaw) cells



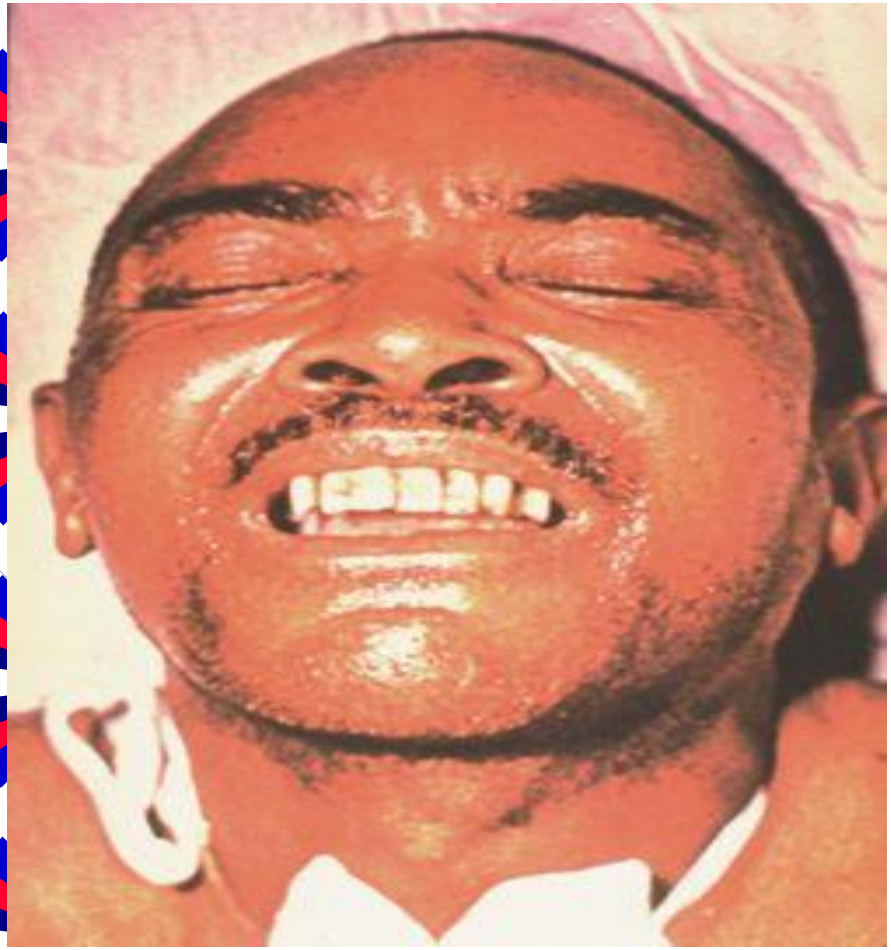
Spasm of jaw, facial and neck muscles (trismus [lockjaw], risus sardonicus) and dysphagia are often early symptoms after variable incubation period

F. Netter M.D. © CIBA

Complete tetanic spasm in advanced disease. Patient rigid in moderate opisthotonos, with arms extended, abdomen boardlike. Respiratory arrest may occur

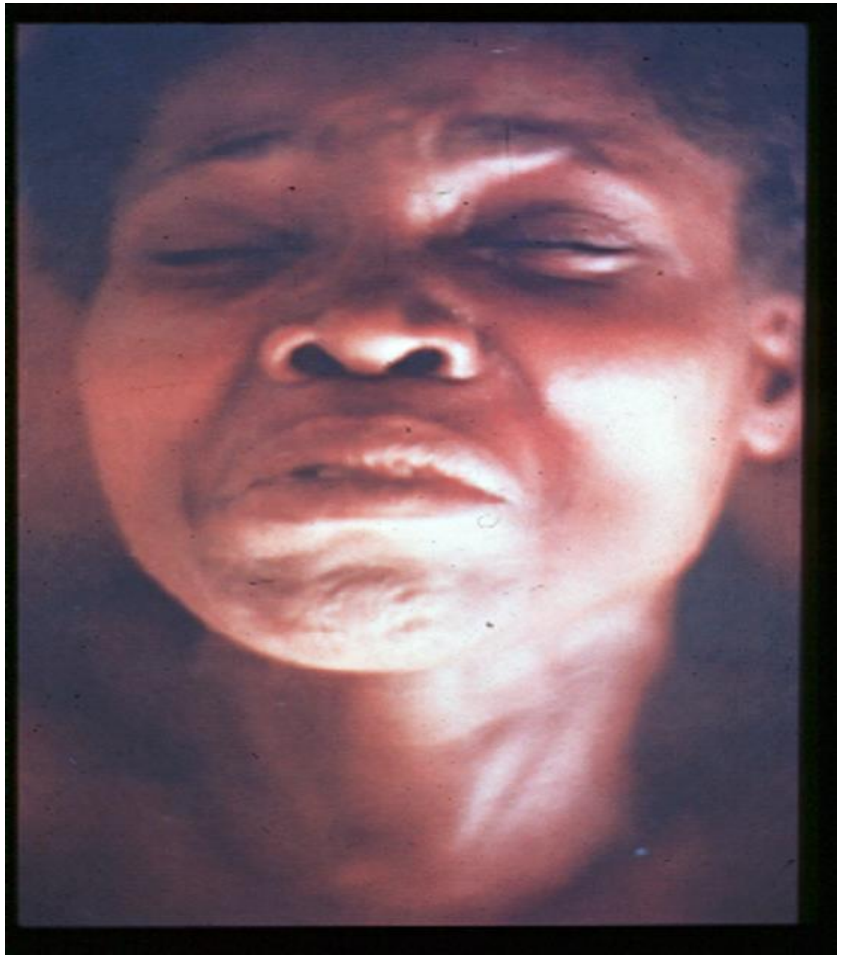
Risus sardonicus -*Spasm of facial muscles*

(angle of mouth muscles) producing grinning face.

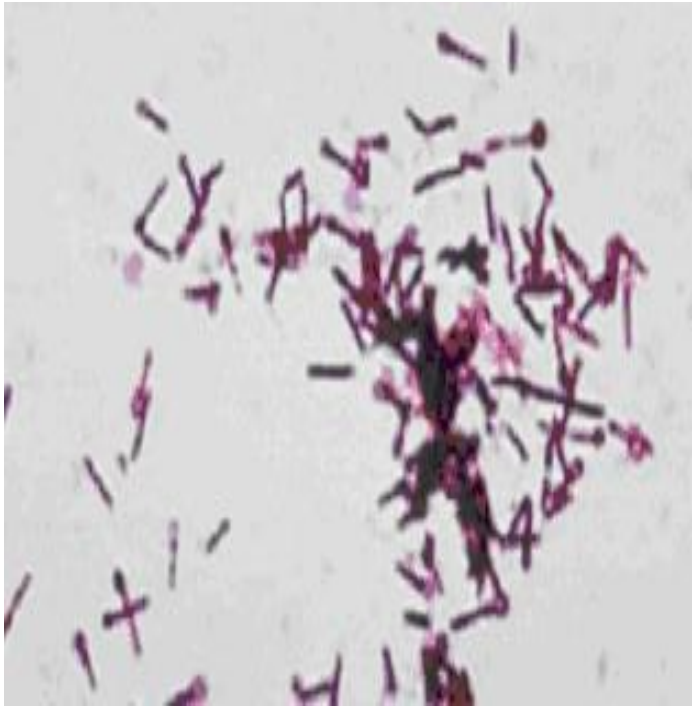


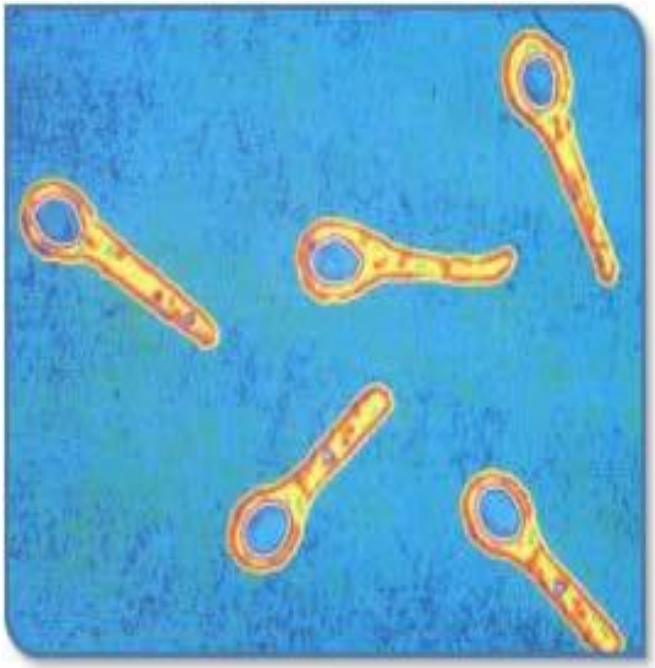
Trismus

- **Pt. first notices increased tone in masseter (Trismus, lock jaw).**
- **Dysphagia.**
- **Stiffness / pain in neck, shoulder, back muscles appear concurrently / or soon thereafter.**
- **Rigid abd & stiff prox.limb muscles.**



- **Wound cultures – C.tetani can be isolated from wounds**
- **Electromyograms – continous discharge of motor units, shortening**
- **Muscle enzymes – raised**





Type of Tetanus (local/generalised)

- **Traumatic tetanus**
- **Cephalic tetanus**
- **Puerperal tetanus**
- **Otogenic tetanus**
- **Idiopathic tetanus**
- **Tetanus Neonatorum**

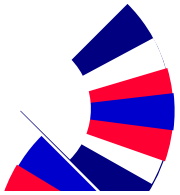
Treatment – general measures

- **Resp. support**
- **Protect airway**
- **Admit in a quiet room in ICU**
- **Continuous careful observation & cardiopulmonary monitoring**
- **Minimize stimulation**
- **Explore wounds – debridement**
- NEUTRALIZE TOXIN : **Inj. Human Tetanus Immunoglobulin 3000 – 6000 units IM, usually in divided doses.**

- **ANTIBIOTIC THERAPY :**
  - **IV Penicillin; IV Metronidazole**
  - **Allergic to Penicillin : consider Clindamycin & Erythromycin**

Control of Spasms

- **Nurse in a quiet dark room**
- **Avoid noise & other stimuli**
- **IV Diazepam / Lorazepam / Midazolam**
- **Barbiturates & Chlorpromazine**
- **Continued spasms : intubate & ventilate**



PREVENTION

- **Spores are extremely stable,although immersion in boiling water for 15 minutes kills most spores.**
- **Exposure to saturated steam under 15 lbs.of pressure for 15-20 minutes at 121°c is highly effective against spores (Autoclave).**
- **Sterilization by dry heat is slower than by moist heat (1 - 3 hrs at 160 °C),but it is also effective against spores.**
- **Ethylene oxide sterilization (EO/ETO) is also sporicidal.**
- **Fumigation**

- **Active Immunization**
- **Passive Immunization (ATS Ig)**

1. **ATS(equine-horse) Ig- 1500 IU/s.c after sensitivity test**

(or)

2. **ATS(human) Ig- 250-500 IU, no anaphylactic shock, very safe and costly.**

- **Antibiotics**

Persons Seven Years of Age or Older Who Have Not Been Immunized

- Immunization requires at least three doses of Td.
- 1st dose should be administered on the First visit
- 2nd dose 4 – 8 weeks after the first dose of Td and
- 3rd dose after 6 months of the second Td.
- A booster dose of Td should be repeated every 10 years throughout life

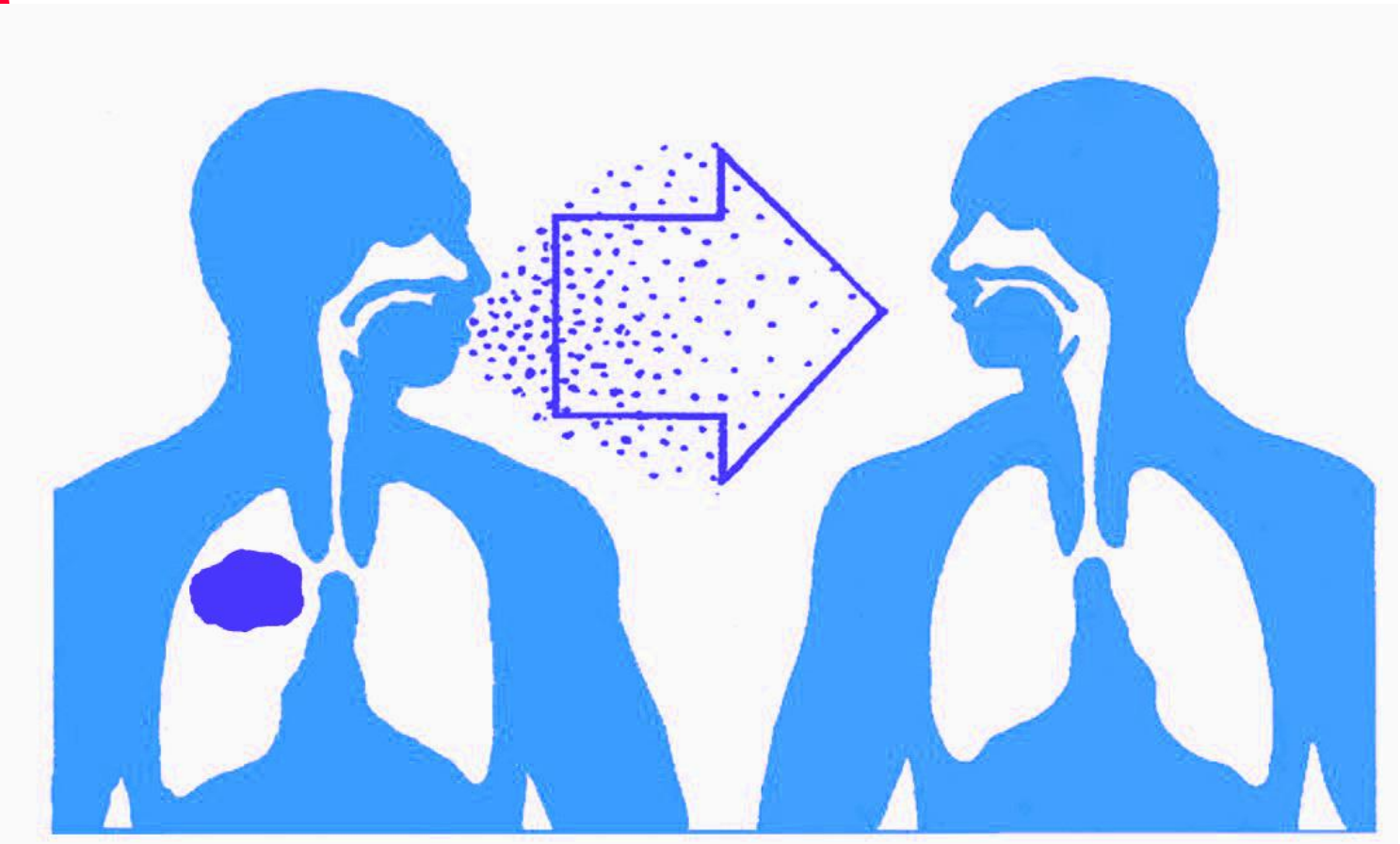
PREVENTION OF NEONATAL TETANUS

- **2 doses of T.T to all pregnant women between 16 to 36 weeks of pregnancy with an interval of 1 to 2 months between the two doses.**
- **The first dose as early as possible & the second dose a month later preferably 3 weeks before delivery.**
- **If the pregnant woman is previously immunized, a booster dose is sufficient.**
- **If the pregnant woman is not immunized, then the new born should be protected against tetanus by giving tetanus human immunoglobulin 750 IU with in 6 hours of birth.**

What is Tuberculosis?

- **Tuberculosis is a infectious, chronic disease caused by Mycobacterium Tuberculosis that enter the lungs when breathing them in.**
- **TB germs are most commonly found in the lungs, but sometimes they can move to other parts of the body(skin, bones, joints, intestines, lymph glands, meninges).**

How Are TB Germs Spread?



How Are TB Germs Spread?

- **TB germs are passed through the air when a person who is sick with TB disease coughs, sings, sneezes, laughs or talks.**
- **To become infected with TB germs, a person usually needs to share air space with someone sick with TB disease (e.g. live, work, or play together).**
- **The amount of time, the environment, and how sick the person is all contribute to whether or not to get infected.**
- **In most cases, the body is able to fight off the germs**

How Are TB Germs NOT Spread?

- **Through quick, casual contact, like passing someone on the street**
- **By sharing utensils or food**
- **By sharing cigarettes or drinking containers**
- **By exchanging saliva or other body fluids**
- **By shaking hands**
- **Using public telephones**

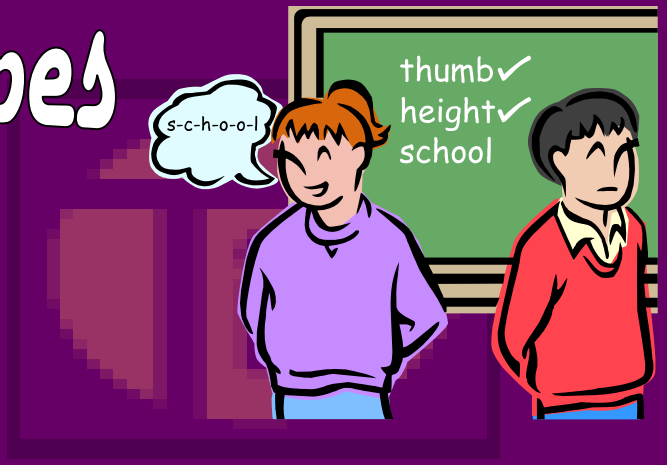
TB Infection vs. TB Disease

There is a difference between TB "infection" and TB "disease"

- **TB infection: TB germs stay in lungs, but they do not multiply or make the person sick**
  - **You cannot pass TB germs to others**
- **TB disease: TB germs stay in lungs or move to other parts of the body, multiply, and make the person sick**
  - **You can pass the TB germs to other people**

- **Transplacental transmission may occur causing congenital TB.**
- **Incubation period : weeks, months or years; average 3-8 weeks.**
- **It depends upon host parasite relationship, closeness of contact, extent of disease & sputum positivity of the source.**
- **‘Social disease’ : responsible social factors – poor housing, poor ventilation, overcrowding, air pollution, less sunshine, population explosion, undernutrition, poor quality life style, lack of awareness, poor economy etc.**

What Are The Types Of Tuberculosis



Mycobacterium **which is carried by humans.**

- ***Mycobacterium*** **T.B. (lungs, intestines, bones, joints, skin, and the genitourinary, lymphatic, and nervous systems).**

Avian Tuberculosis

Avian which is carried by birds

- transmitted by ingestion and inhalation of aerosolized infectious organisms from feces.
- Oral ingestion of food and water contaminated with feces is the most common method of infection.
- If the bacterium is inhaled, pulmonary lesions and skin invasions may occur
- transmission of avian TB is from bird to human not from human to human.

BOVINE TUBERCULOSIS

Bovine **tuberculosis is carried by cattle.**

- **People may get Bovine TB, by eating food that has been contaminated by the bacteria or from drinking un-pasteurized milk from cows that are infected with the virus.**
- **Bovine TB is most likely going to effect the joints and bones.**

Symptoms of Tuberculosis

- **The primary stage of the disease may be symptom-free, or the individual may experience a flu-like illness.This is called the “inactive stage.”**
- **Within the active stage of the disease, there might be a slight fever, night sweats, weight loss, fatigue.**
- **The symptoms my vary.**

Physical Symptoms

This is an example of tuberculosis of the skin it is normally referred to as Warty T.B. and someone will only contract this type of tuberculosis if they have had prior exposure to tuberculosis.

Common Symptoms of TB Disease

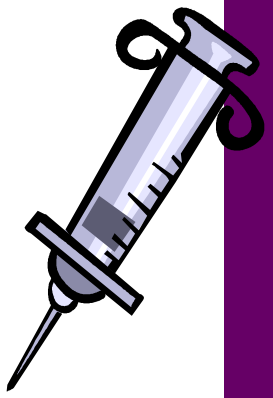
- **Cough (2-3 weeks or more)**
- **Coughing up blood, dyspnea, cyanosis**
- **Chest pains**
- **Fever, malaise**
- **Night sweats, tachycardia, pallor**
- **Feeling weak and tired**
- **Losing weight without trying**
- **Decreased or no appetite, failure to thrive**

Diagnosis - History

- **TB should be suspected in children with growth failure, malnutrition, PUO, prolonged cough, recurrent chest infection, enlargement of lymph gland, asthma, pleural effusion, pneumonia not responding to antibiotics & unsatisfactory recovery from measles or pertussis or typhoid.**
- **h/o infection in family, other exposure**

Get Tested

- **Isolation of AFB :**
  - **Sputum . C-Xray**
  - **Mantoux test**
  - **Laryngeal swab**
  - **Peritoneal fluid**
  - **CSF . FNAC**
  - **CT Scan . Blood**

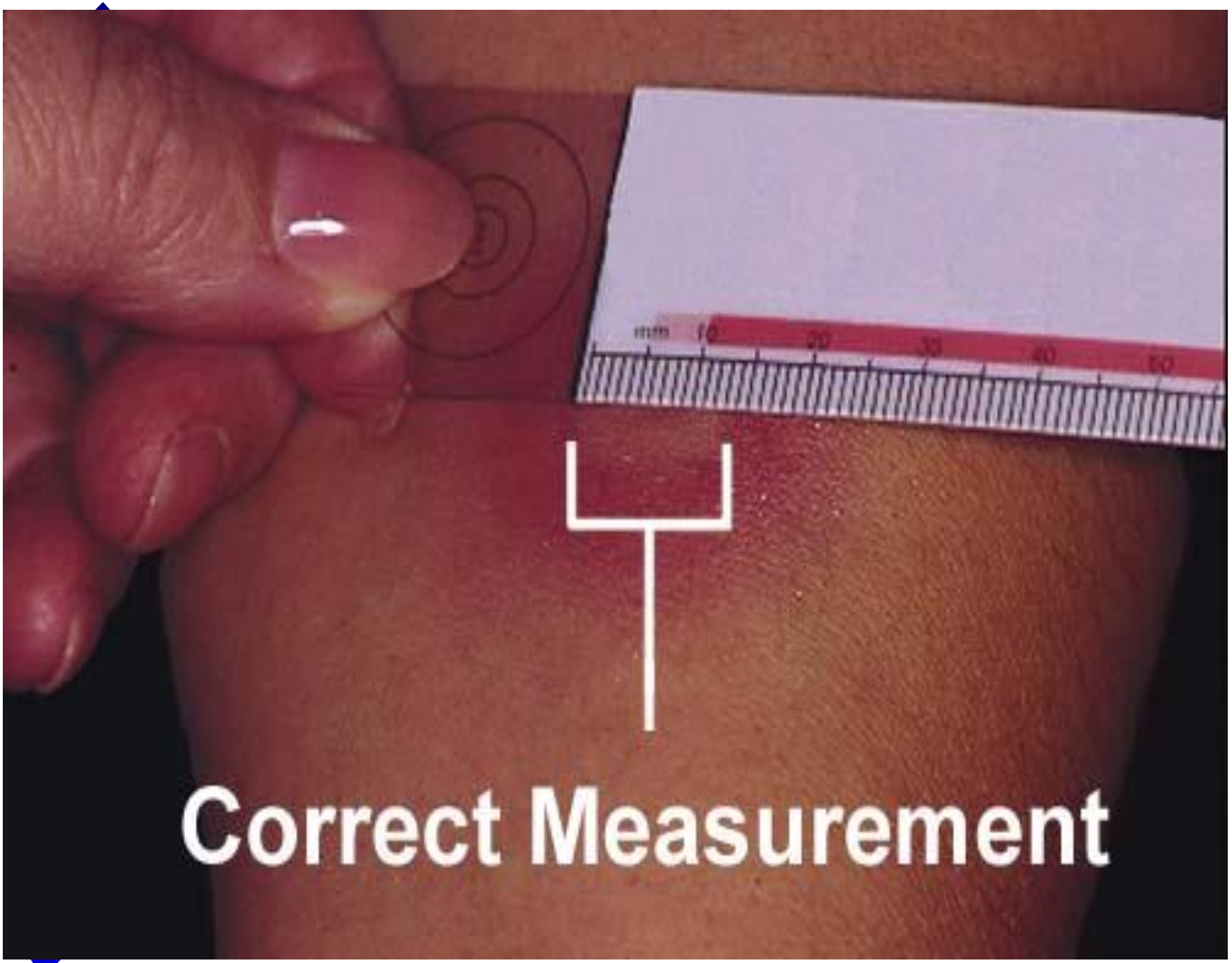


- **Immunodiagnosis of antitubercular antibody & antigen by radioimmunoassay.**
- **Tuberculin test (Mantoux test) – ID 0.1ml of tuberculin into the anterior aspect of left forearm to raise a wheel of about 6-8mm diameter → reading of reaction after 48-72hrs → induration of 10mm or more = positive; <5mm = negative reaction.**

[Purified protein extracts from M TB cultures are injected into skin. Immune T cells that have been sensitized to TB from prior infection migrate to the injection site, release chemicals that produce local inflammation and induration (bumpy reaction)]

Variations of +PPD

Blisters, granulomas, local necrosis may occur


Correct Measurement

Positive PPD

+

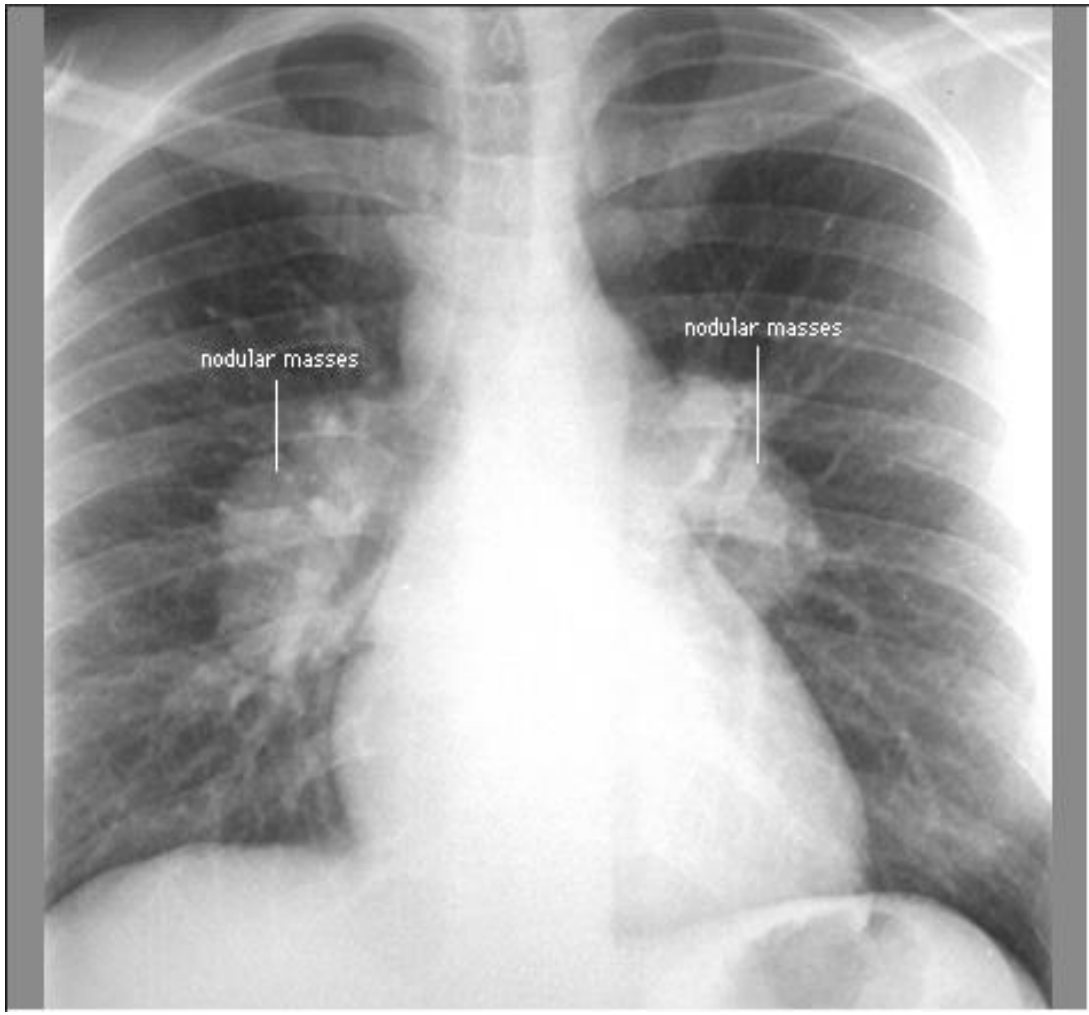
Negative CXR

=Latent TB Infection

Positive PPD

+

TB-Positive CXR



= active TB

BCG test

- **I/D injection of BCG vaccine in left deltoid region → induration of more than 5-6mm after 3 days of injection is accepted as positive.**

Treatment for TB Infection

- **TB infection is treated with antitubercular medicine for atleast 6-9 months.**
- **The bactericidal drugs – Streptomycin, Isoniazid, Rifampicin, Pyrizinamide**
- **Bacteriostatic drugs – Ethambutal, para aminosalicylic acid, thiacetazone, kanamycin**
- **Other – amikacin, ampicillin, ciprofloxacin; steroids**

- **Short course chemotherapy regimen for 6-9 months or more (intensive & continuation phase)**
- **DOTS (RNTCP)**
- **WHO regimen (6-8-12 months regimen for child)**

Common surgical interventions…

- **In Pleural effusion, ascites, abscess, hydrocephalus, GI bleeding.**

Treatment

- **Skin TB : No treatment since most people develop an immune response and warts go away by themselves.**
- **liquid, gel, pad or ointment form.**
- **If treatment fails, wart can be removed by:**

- “freezing it with liquid nitrogen,

- burning it off with electricity or a laser,

- excising it (a minor surgical procedure),

- dissolving it by wrapping it in a plaster patch impregnated with salicylic acid.”

Supportive nursing measures…

- **General nursing care**
- **Supervised Drug compliance : single daily dose in empty stomach**
- **Avoidance of defaulter**
- **Assessment of adverse reactions**
- **Good diet with balanced intake of protein & vitamin**
- **Fresh air, sunshine, hygienic measures, rest**
- **Follow up**

Prognosis

- **Age, early diagnosis, duration of infection, type of disease, site of infection, nutritional status, continuation of treatment.**
- **Worse in TB meningitis, chronic pulm. TB, TB with malnutrition, drug resistant cases**

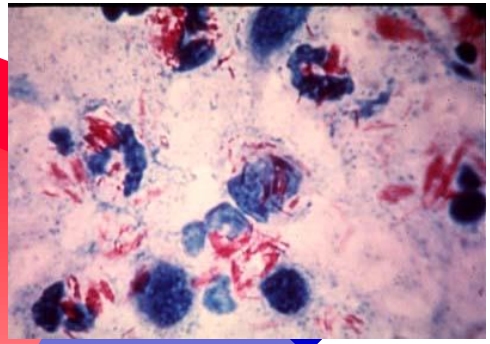
Prevention

- **Active immunization by BCG vaccine**
- **Increasing education & awareness**
- **Promotion of health & nutritional status**
- **Socio-environmental improvement**
- **Early detection & treatment**

Health Education…information & explanation about

- **Mode of transmission, early symptoms, treatment facilities, regularity of treatment**
- **Home care**
- **Method of coughing & sneezing**
- **Disposal of sputum**
- **BCG vaccination**
- **Hygienic living with improved environmental sanitation, well ventilation, avoidance of dampness, over crowding, indiscriminate spitting, prevention of malnutrition, promotion of balanced diet, intake of boiled milk**
- **Family support, family based treatment**

Leprosy

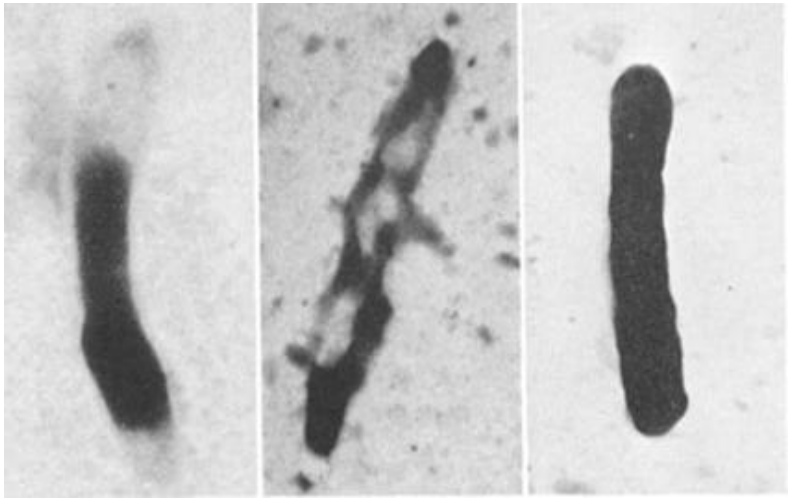


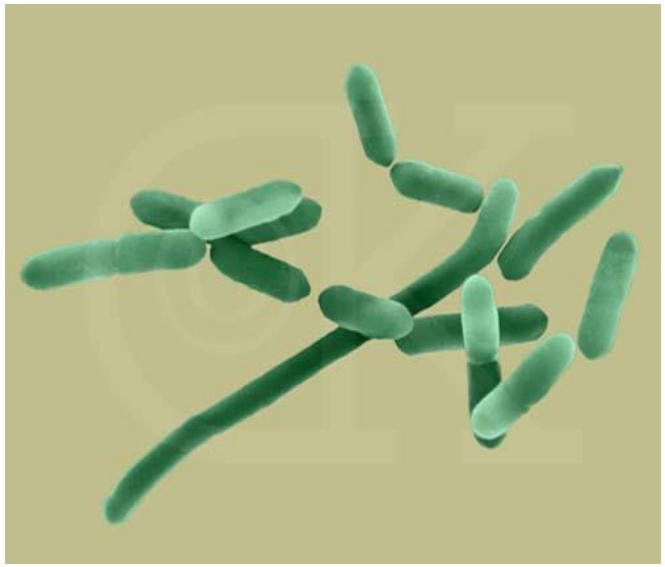
Introduction

- **Leprosy is a chronic infection of the skin, muscles, eyes, bones, peripheral nerves testes & internal organ caused by Mycobacterium Leprae.**

Etiologic agent

- **Mycobacterium Leprae, discovered in 1873 by G.A. Hansen thus Leprosy is also known as Hansen's disease.**
- **appear as solid rods with rounded ends, while those is irregular stain are dead.**





- **M. leprae is an acid & alcohol fast *(Ziehl-Neelsen)*, gram positive bacilli.**
- **Prefer to grow in cooler regions of the body < 37°c.**

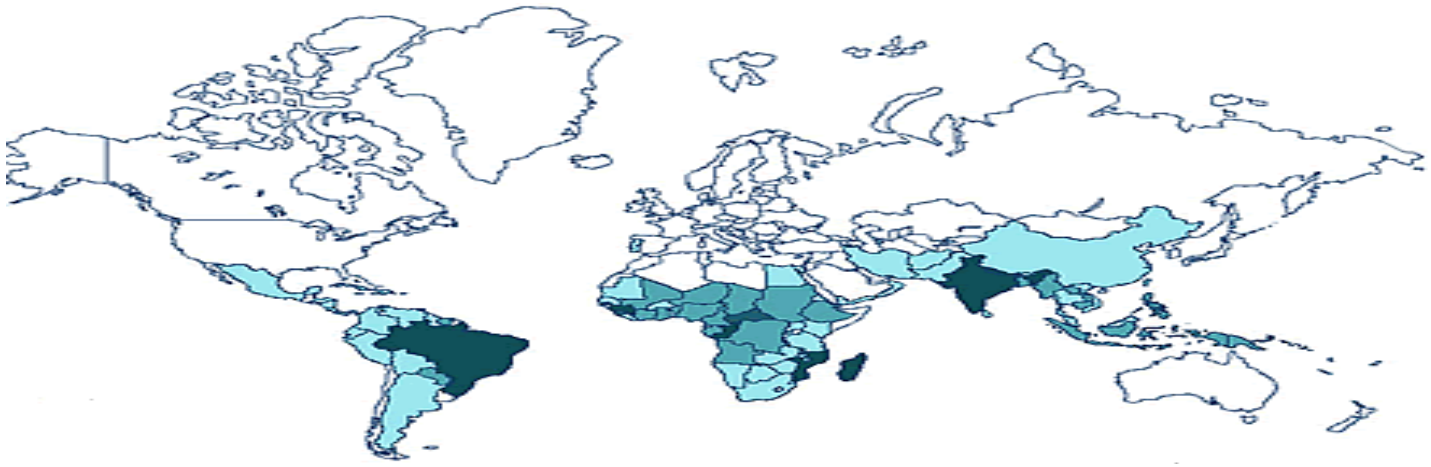
Prevalence:

- In the past 20 years more than 14 million patients have been cured.
- In 1985 »»» 12/10 000, dropped in 2000 »» > 1/10 000, with a 20% annual decrease in new cases detected globally since 2001.
- Leprosy is eliminated from 113 countries of 122 where leprosy was considered a public health problem in 1985.

Epidemiology

- **In 9 countries in Africa, Asia & Latin America »»» more than 1/10 000**
- **83% of cases are present in 6 countries: India, Brazil, Burma, Indonesia, Madagascar & Nepal.**

(WHO, 2005)

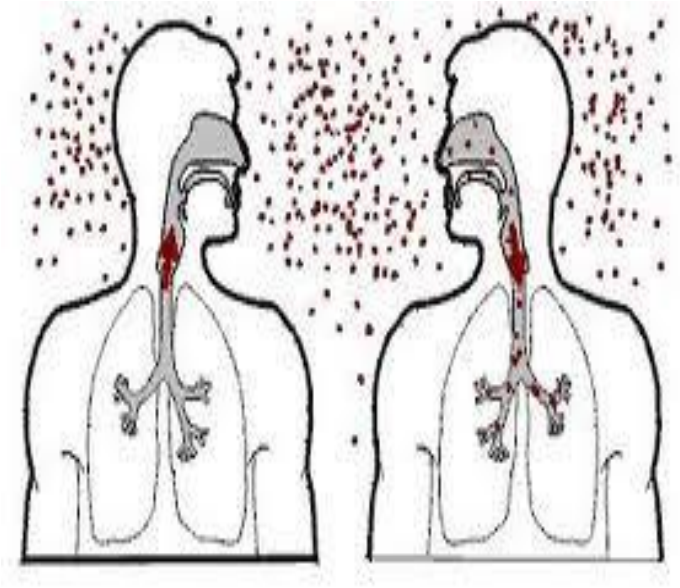


Epidemiology

- **Primary host is human.**
- **Sex: Male more affected than females (M/F ratio 1.5-2 to 1) except in some areas of Africa.**
- **Age: All ages, about 20% of cases occur in children below 10 years, but it is extremely rare in infants.**

Transmission

- **Aerosol spread of nasal secretion, & uptake through nasal or respiratory mucosa.**
- **M. Leprae in nasal secretion can survive up to 36 hours, or as much as nine days in tropical areas.**
- **Bacilli can also exit through ulcerated or broken skin of positive cases**
- **Also by contaminated soil, cloths, linen, breast milk, by tattoing needles, insect etc.**
- **Humid & over crowded place, lack of ventilation, poor personal hygiene (Social disease).**



Classified by Indian Leprosy Association in 1981…

- **Indeterminate type : early cases with 1 or 2 vague hypopigmented macule & definite sensory impairment. Lessions are smear negative.**
- **Tuberculoid leprosy : 1 or 2 well defined lesions(flat or raised), hypopigmented, erythematous & anesthetic. Lessions are smear negative.**
- **Borderline leprosy:4 or more lesions(flat or raised), well or ill defined, hypopigmented, erythemotous, with sensory impairment or loss; bacteriologically may or may not be positive.**

- **Lepromatous leprosy : diffuse infiltration or numerous flat or raised, poorly defined, shiny, smooth, symmetrically distributed lesions & smear positive.**
- **Pure neuritic type : nerve involvement without any skin lesion. Lesions are smear negative.**

- **A simpler field classifications depending on the number of skin lesions:**

- **<u>Paucibacillary :</u> (single to 2-5 patchs), accounts for 60% of total leprosy cases, smear negative, indeterminate/tuberculoid/boderline tuberculoid/ pure neuritic type.**
- **<u>Multibacillary :</u> (more than 5 patchs), smear negative cases, lepromatous & borderline lepromatous type.**

Incubation

- **Children younger than two years do not have leprosy symptoms.**
- **In addition, people residing in non-endemic countries who have visited a site with endemic leprosy may develop the disease many years after the initial exposure**
- **Leprosy is a chronic disease with a long incubation period**
- **the incubation period is estimated to range from 2–12 years (can be longer).**

Leprosy clinical features :

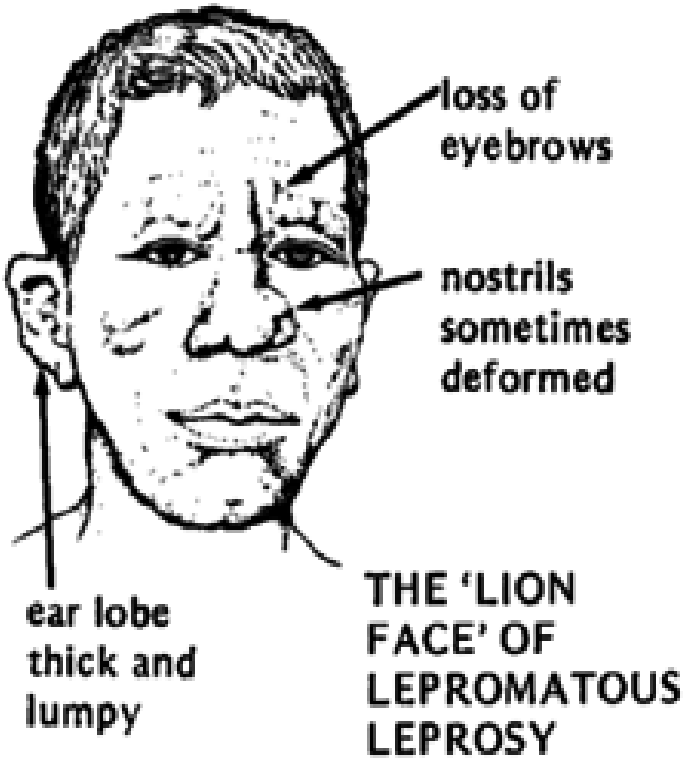
- **It attacks the nerves of the hands, feet and face.**
- **If left untreated can take away the ability to move fingers, toes and eyelids.**
- **It can also destroy the ability to feel pain so those affected are prone to injuries and burns.**

- **Skin involvement:**

Commonly macules or plaques; rarely papules or nodules are seen.

In tuberculoid and BT, lesions are few, hypopigmented with raised edges, and with reduced sensation

- **Lepromatous form - many flat or raised skin lesions, symmetrical, poorly defined, shiny, smooth .**



THE 'LION FACE' OF LEPROMATOUS LEPROSY

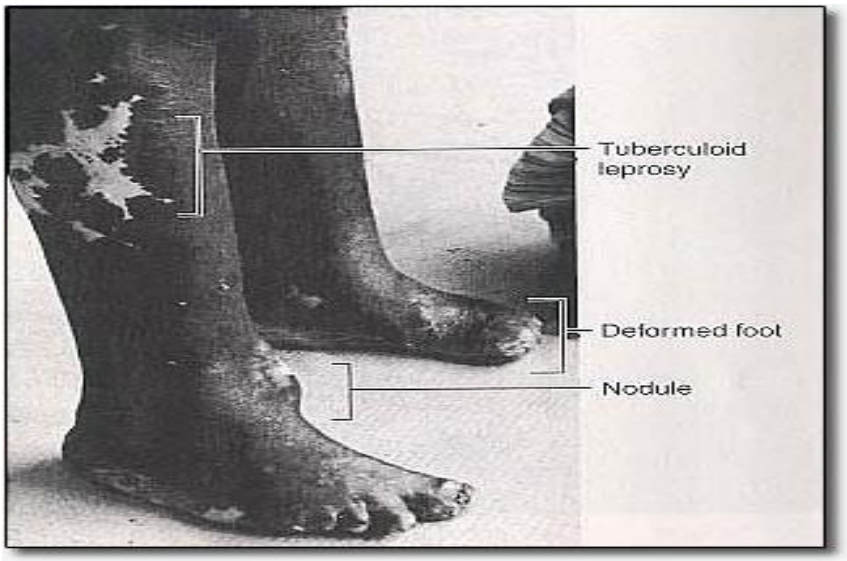
Nerve damage:

- **Peripheral nerve trunk damage:**

Posterior tibial, ulnar, median, lateral popliteal and facial.

Involved nerves are enlarged, and with regional sensory and motor loss.

Glove & stocking sensation



Eye involvement:

- Blindness (nerve damage & direct invasion)
- Corneal ulceration

- **Systemic features:**
- **Nasal mucosa/cartilage destruction → saddle shape.**
- **Bone destruction →osteomylitis.**
- **Testicular atrophy → loss of testosterone .**

Diagnosis

- History / physical examination
- Skin smear, nasal smear or nasal scraping
- Punch biopsy from the edge of the skin or nasal lesion

Others

- Immunological test (lepromin test)
- ELISA
- Radioimmunoassay
- Slit smear technique

Treatment

- **Chemotherapy:**

All patient should receive multi-drug therapy (MDT).

First line drugs: Rifampicin, Clofazimine, and Dapsone.

Type of leprosy*	Drug treatment		Duration of treatment (months)
	Monthly supervised	Daily, self administered	
Paucibacillary	Rifampicin 600 mg	Dapsone 100 mg	6
Multibacillary	Rifampicin 600 mg, clofazimine 300 mg	Clofazimine 50 mg, dapsone 100 mg	12
Paucibacillary single lesion	Rifampicin 600 mg, ofloxacin 400 mg, minocycline 100 mg		Single dose

Second line therapy: Minocycline, clarithromycin, and ofloxacin, are highly effective against M. leprae.

Reversal reaction:[high fever, arthralgia, adenopathy, orchitis]

Peak time: during the first 2 month of therapy, even up 12 months, and after (MDT) is completed.

- Corticosteroids(prednisolone 1mg/kg) 40-60mg daily, taper 5 mg every 2-4 weeks, duration of therapy 3-4 months.

- Anti- inflammatory: Clofazimine 300mg daily. Or

Thalidomide 400mg daily, or pentoxifylline.

Recovery rate for nerve function 60-70%, less with pre-existing nerve damage or recurrent reaction.

Prophylaxis

Immunoprophylaxis:

- **BCG offer variable protection against leprosy (34-80%)**

Chemoprophylaxis:

- **Rifampicin, to close contact of a case, and can be given to children under the age 12 years (15mg/kg monthly for 6 months)**

BEFORE TREATMENT

AFTER TREATMENT

Hansen's disease

At the age of 7, this girl had thickened facial skin due to Hansen's disease. After 2 years of treatment with antibiotics, her appearance had improved dramatically.

Rehabilitation with correction of deformities…

Supportive nursing care (hospital/home based)

- **Isolation of infected cases**
- **Good hygienic care**
- **Balanced diet**
- **Care of affected hands or feet**
- **Prevention of injury**
- **Aseptic wound care**
- **Emotional support**
- **Follow up**
- **Health education**

The Cure

- **The good news is that today leprosy can be cured.**
- **Multi-Drug Therapy (MDT), cures most patients in 6 months, and the more infectious patients within 1 year.**
- **If treatment is started early, deformities and disabilities can be prevented**

Prevention

- **Knowledge & Awareness**
- **Avoidance of transmission**
- **Early detection**
- **Adequate Treatment**
- **Chemoprophylaxis**
- **Immunoprophylaxis**
- **Isolation of infected cases**

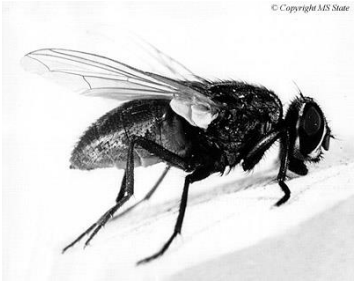
Typhoid fever (Enteric fever)

Definition

- **An infectious feverish disease caused by the bacterium Salmonella typhi and less commonly by *Salmonella paratyphi*.**

- **Acute generalized infection of the reticulo endothelial system, intestinal lymphoid tissue, and the gall bladder.**

- **The infection comes from either an ill person or a healthy carrier. The bacterium is passed on with water and foods and can withstand both drying and refrigeration.**



Causes

1. Caused by the bacterium *Salmonella Typhi (90%)* .

2. Ingestion of contaminated food or water.

3. Contact with an acute case of typhoid fever.

4. Water is contaminated where inadequate sewerage systems and poor sanitation.

5. Contact with a chronic asymptomatic carrier.

6. Eating food or drinking beverages that handled by a person carrying the bacteria.

7. Open field defecation

8. Health ignorance, illiteracy, poor socio economic condition

Ingestion of contaminated food or water

(*Salmonella* bacteria)

Invade small intestine and enter the bloodstream

Goes to the liver, spleen, and bone marrow

Multiply and reenter the bloodstream

Bacteria invade the gallbladder, biliary system, and the lymphatic tissue of the bowel and multiply in high numbers

Then pass into the intestinal tract and can be identified for diagnosis in cultures from the stool tested in the laboratory

- **Bacilli can be readily killed by drying, pasteurization & common disinfectants**
- **Primary source of infection : stool & urine**
- **Secondary source : contaminated water, food, hands, flies**
- **Mode of transmission : feco-oral or urine-oral route**
- **Bacilli may survive for about 7 days in water, 1 month in ice or ice cream & 70 days in soil**
- **Incidence is highest in 5-19 yrs of age**

Symptoms

- **No symptoms - if only a mild exposure; some people become "carriers" of typhoid.**
- **Poor appetite,**
- **Headaches,**
- **Generalized aches and pains,**
- **Rapid rise of temp.,**
- **Extreme Lethargy**
- **vomiting, Diarrhea,**
- **Have a sustained fever as high as 103 to 104 degrees Fahrenheit (39 to 40 degrees Celsius),**
- **Chest congestion develops in many patients, and abdominal pain and discomfort are common**
- **Constipation(adult), mild vomiting.**

- **In severe cases, apathy, cloudiness of consciousness & delirium**
- **Palpable spleen & liver**
- **Typhoid rash(macular red rose spot)may appear on about 6^{th} day of illness**
- **Occasionally bacillary dysentry, resp. infection or meningitis, convulsion, anemia, jaundice**

Diagnosis

- **Blood culture in first wk. of illness (75% of child),**
- **Bone marrow culture is highly sensitive (90%),**
- **Widal test (positive 60% in 2nd wk. & 80% in 3rd wk.)**
- **stool & urine cultures test (after 2 wks of illness)**

- **Slide agglutination test**
- **Antimicrobial susceptibility testing**
- **Immuno electrophoresis**
- **ELISA**

Treatment

Medication

- **Antibiotics, such as ampicillin, chloramphenicol, fluoroquinolone**

  trimethoprim-sulfamethoxazole, Amoxicillin and ciprofloxacin, ceftriaxone etc. used to treat typhoid fever.
- **Prompt treatment of the disease with antibiotics reduces the case-fatality rate to approximately 1%.**
- **Corticosteroid (Dexamethasone) in severe cases**

Symptomatic management

- **Antipyretic**
- **Hydrotherapy**
- **IV fluid therapy, Adequate fluid intake**
- **Blood transfusion**
- **Oral nutrition with a soft digestible diet**
- **No specific limitations on activity**
- **Rest is helpful, but mobility should be maintained if tolerable**
- **The child should be encouraged to stay home until recovery**

Surgical Care

- Usually indicated in cases of intestinal perforation.
- Cholecystectomy

Supportive nursing care

- Bed rest
- Skin care
- Orodental hygiene (mouth care & antiseptic mouth wash)
- Isolation
- Care of bladder & bowel
- Monitoring

Prognosis

- **Generally good with adequate treatment**

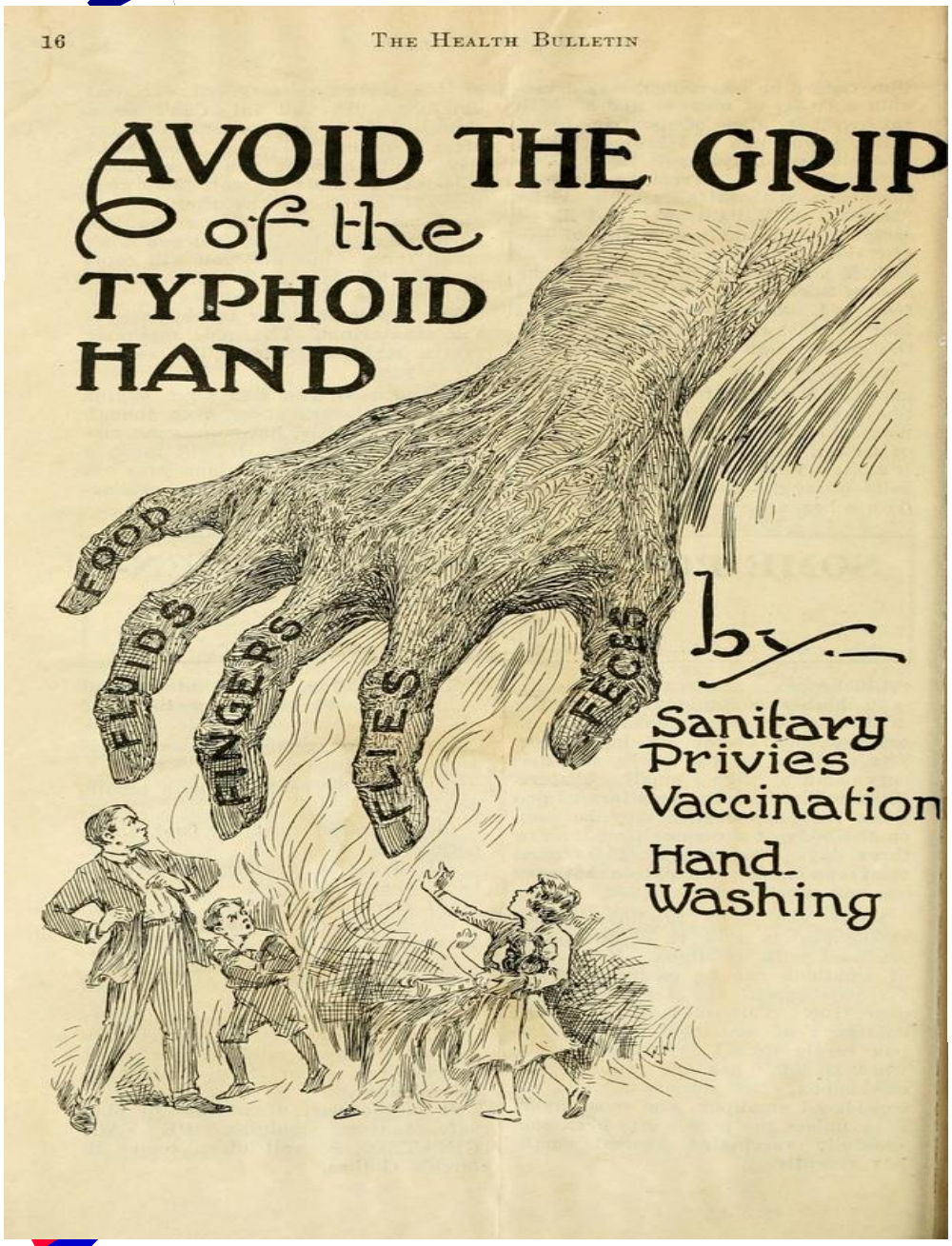
High mortality & morbidity is associated with

- **Malnutrition**
- **Infancy**
- **Antibiotic resistance**
- **Presence of complications**

Complications

- **Abdominal – intestinal perforation, GI bleeding, hepatitis, cholecystitis, peritonitis, gastroenteritis, UTI, pancreatitis, fatty liver or liver abscess**
- **Neurological – encephalopathy, meningitis, hemiplegia, G.B. Syndrome, depression, schizophrenia**
- **Hematologic – hemolytic anemia, bone marrow depression**

- **Cardiovascular – myocarditis, pericarditis, endocarditis, venous thrombosis**
- **Respiratory – pneumonia, bronchitis, empyema**
- **Others – parotitis, bed sore, otitis media, tonsilitis, alopecia, arthritis, osteomyelitis**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THE HEALTH BULLETIN
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Hand
Washing

Prevention

Prevention

1. Vaccination

First type of vaccine:

- **Contains killed *Salmonella typhoid* bacteria**

- Whole cell vaccine – 2 doses of S/C injection with 0.5 ml for child aged >10 yrs. & 0.25ml for younger

- Vi-vaccine – single dose, 0.5ml S/C or IM, for children 2 yrs & above (efficacy 5 yrs)

Second type of vaccine:

- **Oral capsule contains a live but weakened strain of the *Salmonella* bacteria, for children older than 6 yrs on 3 alternate day.**

- ✓ **Be vaccinated against typhoid while traveling to a country where typhoid is common.**
- ✓ **Need to complete vaccination at least one week before travel.**
- ✓ **Typhoid vaccines lose their effectiveness after several years so check with doctor if it is time for a booster vaccination.**

2. Avoid risky food and drinks

- **Buy bottled drinking water or boil water before drinking it.**
- **Ask for drinks without ice, unless the ice is made from bottled or boiled water. Avoid Popsicles and flavored ices.**
- **Eat food that have been thoroughly cooked and that are still hot and steaming.**
- **Avoid raw vegetables and food that cannot be peeled.**
- **When eat raw fruit and vegetables that can be peeled, peel yourself. Don’t eat the peelings.**
- **Avoid foods and beverages from street vendors.**

- **Improve sanitation**
- **Hygienic disposal of stool & urine**
- **Disinfection of contaminated articles**
- **Adequate hand washing**
- **Health education about safe water, food hygiene, food handling, kitchen hygiene, personal hygiene, sanitary sewage disposal, control of flies**