LYMPHATIC FILARIASIS

Problem Statement of Lymphatic Filariasis

- Global: Affects 120 million people in 120 countries; 1.1 billion people live in areas with risk of infection
- SEAR: 600 million live in endemic areas; 60 million infected
- India: Lymphatic filariasis is a major public health problem in India with 553 million people at risk in 233 districts; heavily endemic in UP, Bihar, Jharkhand, Andhra Pradesh, Orissa, Tamil Nadu, Kerala, Gujarat
Lymphatic Filariasis

- Description: Lymphatic Filariasis covers infection with 3 closely related nematode worms
- Causative Agents: Wuchereria bancrofti, Brugia malayi, Brugia timori
- Definitive Host: Man
- Intermediate Host: Mosquito
LYMPHATIC FILARIASIS

- Vectors of Lymphatic filariasis:
  - Bancroftian filariasis: Culex, Anopheles, Aedes
  - Brugian filariasis: Mansonia, Anopheles, Coquillettidia

- Main Vectors of Lymphatic filariasis in India:
  - Bancroftain Filariasis: Culex quinquefasiatus (C. fatigans)
  - Bancroftain Filariasis: Mansonia annulifera, Mansonai uniforms

- Mode of Transmission: Bite of Infected Vector mosquito
Stages of filariasis:

- **Pre-Patent-Period:** Time interval between inoculation of Infective larvae and first appearance of detectable microfilariae (Mf)

- **Clinical Incubation Period:** Time interval between invasion of infective larvae to development of clinical manifestations (8-16 months)

- **Mosquito becomes infective:** When third stage larve migrates to Proboscis of mosquito vector

- **Asymtomatic amicrofilaraemia stage:** Absence of Mf or clinical manifestations
Stages of filariasis:

- **Asymptomatic microfilaraemia:** Blood positive for MF but no clinical manifestations; act as carriers and an important source of infection

- **Occult Filariasis (cryptic filariasis):** No clinical manifestations or Mf in blood

Due to a hypersensitivity reaction to Filarial Antigens

Example: Tropical pulmonary eosinophilia
Filariasis
(*Wuchereria bancrofti*)

**Mosquito Stages**

1. Mosquito takes a blood meal (L3 larvae enter skin)
2. L3 larvae
3. Migrate to head and mosquito's proboscis
4. L1 larvae
5. Microfilariae shed sheaths, penetrate mosquito's midgut, and migrate to thoracic muscles
6. L1 larvae
7. Mosquito takes a blood meal (ingests microfilariae)
8. Adults produce microfilariae that migrate into lymph and blood channels

**Human Stages**

1. Mosquito takes a blood meal (L3 larvae enter skin)
2. Adults in lymphatics
3. Adults produce sheathed microfilariae that migrate into lymph and blood channels
4. Microfilariae shed sheaths, penetrate mosquito's midgut, and migrate to thoracic muscles
5. L1 larvae
6. Mosquito takes a blood meal (ingests microfilariae)
7. L3 larvae
8. Migrate to head and mosquito's proboscis

\(i\) = Infective Stage
\(d\) = Diagnostic Stage
Filarial Detection Tests

- MC method used for epidemiological assessment of Lymphatic Filariasis (through mass blood survey): Thick film using 20 cu. Mm. of capillary blood (collected between 830pm upto 12 midnight)

- Most sensitive method for detecting low density microfilaraemia: Membrane Filter Concentration Method.
Filarial Detection Tests

- **DEC Provocatin test (100 mg DEC oral):** Mf can be induced to appear in blood during daytime
  - Blood is examined 1 hour after DEC administration
- **Good method to detect low density microfilariaemia, when other methods fail:** Xenodiagnosis
  - Mosquitoes allowed to feed on patients, then dissected 2 weeks later
Treatment of Filariasis

- Chemotherapy of Filariasis: Diethylcarbamazine (DEC)
  - Bancroftian filariasis: 6mg/kg/day X 12 days (Total 72 mg/kg)
  - Brugian filariasis: 3-6 mg/kg/day X 6-12 days (Total 18-72 mg/kg)
- DEC is effective in killing Mf
- No effect on Infective (stage III) larvae
- Uncertain effect on adult worm
Treatment of Filariasis

- Filariasis never causes explosive epidemics. Favourable factors for success of control programme are.
  - Parasite does not multiply in Insect vector
  - Infective larvae do not multiply in Human Host
  - Life cycle of parasite is quite long (15 years or more)
Treatment of Filariasis

● DEC medicated salt:
  – Dose: 1-4 gm DEC/kg of salt
  – Is a type of Mass Treatment (using very low dose of drug)
  – Treatment duration: 6-9 months
Treatment of Filariasis

- National Filaria Control Programme (NFCP), 1955 is now a component of National Vector Borne Diseases Control Programme (NVBDCP), 2003-04
  - NVBDCP covers Malaria, Filariasis, Japanese Encephalitis, Kala Azar, Chikungunya fever and Dengue
### Assessment of Filaria Control Programmes:

<table>
<thead>
<tr>
<th>Methods</th>
<th>Parameters</th>
<th>Inclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clinical</strong></td>
<td>Incidence of acute manifestations</td>
<td>Adenolymphangitis, epididymoorchitis, Lymphoedema, Hydrocoee, Chyluria</td>
</tr>
<tr>
<td></td>
<td>Prevalence of Chronic Manifestations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mf rate (species specific)</td>
<td>% showing Mf in blood in population</td>
</tr>
<tr>
<td><strong>Parasitological</strong></td>
<td>Filaria Endemicity Rate</td>
<td>Mf in blood and / or disease manifestations</td>
</tr>
<tr>
<td></td>
<td>Microfilarial density (Intensity of infecn)</td>
<td>No Mf per unit volume (20 mm³) blood</td>
</tr>
<tr>
<td></td>
<td>Average infestation rate (Prevalence of Mf)</td>
<td>Average no of Mf per positive slide.</td>
</tr>
<tr>
<td><strong>Entomological</strong></td>
<td>Vector density per 10 hour man catch % mosquito with infective state III Larvae Annual biting rate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Types of larval breeding places</td>
<td></td>
</tr>
</tbody>
</table>
Rabies (Hydrophobia)⁰

- Hydrophobia is pathognomonic (though few consider Aerophobia as pathognomonic)

- Causative agent: Lyssavirus Type 1 (Bullet shaped neurotropic RNA virus).

- Types of rabies virus: Street virus and Fixed virus
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Street Virus (SV)</th>
<th>Fixed Virus (FV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>Naturally occurring cases</td>
<td>Serial brain passage of SV</td>
</tr>
<tr>
<td>Incubation period</td>
<td>20 – 60 days</td>
<td>4 – 6 days</td>
</tr>
<tr>
<td>Pathogenicity</td>
<td>For all mammals</td>
<td>Sometimes pathogenic</td>
</tr>
<tr>
<td>Negri Bodies</td>
<td>Formed</td>
<td>Not formed</td>
</tr>
<tr>
<td>Importance</td>
<td>Cause rabies</td>
<td>Used for vaccine preparation Q</td>
</tr>
</tbody>
</table>
Rabies (Hydrophobia)

• Incubation period: Variable [4 days to many years; ~ 3 to 8 weeks]
• Rabies is a dead-end infection in man
• Negri bodies (Pathognomonic of Rabies): Intracytoplasmic eosinophilic inclusion bodies with basophilic granules in neurons
Rabies (Hydrophobia)

- **Mode of transmission:**
  - Animal bites (dogs, cats, monkeys, cow, goat, sheep, buffalo, horse EXCEPT RAT BITE and HUMAN BITE)
  - Licks (on abraded skin or abraded/unabraded mucosa)
  - Aerosols (Rabies infected bats)
  - Person to person: Rare but possible
  - Corneal and organ transplantation
Water: An Effective Natural Barrier against Rabies

- **Rabies-free area:** No case of Rabies in man or animals for past 2 years.
- **Rabies is not found in:**
  - Australia
  - Cyprus
  - Ireland
  - Japan
  - Britain
  - China (Taiwan)
  - Iceland
  - Malta
  - New Zealand
  - Andaman and Nicobar Islands (India)
  - Lakshadweep (India)
Local Wound Treatment

- Cleansing: Flush and wash wound area with plenty of soap and running water for minimum 5-10 minutes

- Suturing: not recommended; if necessary, do 24-48 hours later

- Anti-rabies serum: Local application with prior sensitivity testing

- Observe animal: for 10 days
## Nervous Tissue Vaccines (NTV) for Rabies: OLDER VACCINES

Dosage schedules (for class of treatment):

<table>
<thead>
<tr>
<th>Class</th>
<th>Pasteur institute, Coonoor</th>
<th>Central Research Institute, Kasauli</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Adults</td>
<td>Children</td>
</tr>
<tr>
<td>Class I</td>
<td>2 ml</td>
<td>1 ml</td>
</tr>
<tr>
<td>Class II</td>
<td>3 ml</td>
<td>3 ml</td>
</tr>
<tr>
<td>Class III</td>
<td>5 ml</td>
<td>3 ml</td>
</tr>
</tbody>
</table>
• Administration: Deep Subcutaneous route in anterior abdominal wall

• Chief and dreaded complication of Vaccine treatment: Neuroparalysis (1 in 2000)
<table>
<thead>
<tr>
<th>Class &amp; risk</th>
<th>Types of exposures</th>
<th>Recommended PEP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class I</strong></td>
<td>- Licks on unbroken skin</td>
<td>None (if history is reliable)</td>
</tr>
<tr>
<td>(Slight risk)</td>
<td>- Scratches without oozing of blood</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Consumption of unboiled milk of suspected animal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Handling raw flesh of suspected animals</td>
<td></td>
</tr>
<tr>
<td><strong>Class II</strong></td>
<td>- Licks on fresh cuts</td>
<td>Start vaccine immediately (May be discontinued if animal remains healthy after an observation period of 10 days or found –ve for rabies by diagnostic techniques)</td>
</tr>
<tr>
<td>(Moderate risk)</td>
<td>- Scratches with oozing of blood</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- All bites except on head, neck, face, palms, fingers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Minor wounds &lt; 5</td>
<td></td>
</tr>
<tr>
<td><strong>Class III</strong></td>
<td>- All bites or scratches with oozing of blood on head, neck, face, palms, fingers</td>
<td>Start rabies immunoglobulin and vaccine immediately. (May be discontinued if animal remains healthy after an observation period of 10 days or found –ve for rabies by diagnostic techniques)</td>
</tr>
<tr>
<td>(Severe risk)</td>
<td>- Lacerated wounds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Multiple wounds &gt; 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Bites from wild animals</td>
<td></td>
</tr>
</tbody>
</table>
**Cell Culture & Purified Duck Embryo Vaccine: NEWER VACCINES**

Potency (minimum): 2.5 IU per single intramuscular dose

*Type of prophylaxis Schedule:*

<table>
<thead>
<tr>
<th>Type of prophylaxis</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post exposure prophylaxis</td>
<td>Day 0, 3, 7, 14, 28, 90</td>
</tr>
<tr>
<td>Post exposure prophylaxis</td>
<td></td>
</tr>
<tr>
<td>• Abbreviated multisite schedule (2-1-1)</td>
<td>Day 0 (2 sites), 7, 21</td>
</tr>
<tr>
<td>• 2site intradermal schedule (2-2-2-0-1-1)</td>
<td>Day 0, 3, 7 (all 2 sites each), 28, 90</td>
</tr>
<tr>
<td>• 8site intradermal schedule (8-0-4-0-1-1) Q</td>
<td>Day 0 (8 sites), 7 (4 sites), 28, 90</td>
</tr>
<tr>
<td>Pre exposure prophylaxis</td>
<td>Day 0, 7, 28</td>
</tr>
<tr>
<td>Post exposure prophylaxis of previously vaccinated</td>
<td></td>
</tr>
<tr>
<td>• Severe bite / unknown antibody titer</td>
<td>Day 0, 3, 7</td>
</tr>
<tr>
<td>• Non-Severe bite/antibody titer &gt; 0.5 I/ml</td>
<td>Day 0, 3</td>
</tr>
</tbody>
</table>
Other Management Guidelines

- **Anti-Rabies serum:**
  - Horse Anti-rabies Serum: 40 IU/kg on Day 0 (50% in Wound, 50% i.m)
  - Human Rabies Immunoglobulin Q: 20 IU/kg (maximum in wound, rest i.m gluteal)
  - Serum Sickness with Horse Serum: 15-45%

- **Persons under Antirabic treatment should avoid:**
  - Alcohol (during and 1 month after treatment)
  - Undue physical and mental strain and late nights
  - Corticosrteroids and other immunosuppressive agents
• **Intramuscular injections of Cell Culture and Purified Duck Embryo Vaccines:** Deltoid (not in Buttocks)
  – Volume of intradermal dose of Rabies Vaccine is 1/5\textsuperscript{th} of intramuscular dose
  – Sites for intradermal rabies vaccines: Deltoid, Lateral thigh, Suprascapular region, Lower quadrant of abdomen
  – Booster injections in Pre-exposure prophylaxis: at intervals of 2 years
• **Immunisation of Dogs:** Primary Immunisation at 3-4 months and boosters at regular intervals
  – BPL inactivated NTV: single dose 5ml for dogs (3ml for cats), revaccination after 6 months, subsequently every year
  – Modified live Virus Vaccine: Single dose 3ml, boosters every 3 years

• **Most logical and cost effective approach for control of Urban Rubies:** Elimination of stray dogs and swift mass immunization
  – At least 80% of entire dog Population of the area must be immunized
JAPANESE ENCEPHALITIS

- Causative agent: Group B arbovirus (Flaivivirus)
- **Host factors:**
  - Pigs are ‘Amplifier Hosts’: Pigs themselves do not manifest overt symptoms but circulate the virus.
  - Cattle and buffaloes are ‘Mosquito attractants’: Infected but not the natural hosts of JE virus.
  - Horses are only domestic animals which show signs of encephalitis due to JE virus.
  - Birds are also involved in Natural History: pond herons, cattle egrets, poultry and ducks.
  - Man is an ‘Incidental Dead end Host’: Man to Man transmission is not seen. 85% cases occur in Children <15 years of age.
JAPANESE ENCEPHALITIS

- Vectors of JE: Cuisine mosquitoes and some Anophelines
  - Culex tritaeniorhynchus (most important vector), Culex vishnuii and Culex gelidus
- IP of JE in man: 5-15 days (9 – 12 days in mosquitoes)
- Case fatality rate: 20 -4% (may reach upto 58%)
Transmission Cycle of Japanese Encephalitis Virus

Reintroductions of Infected Mosquitoes or Vertebrates

Viral Amplification

Vertical Transmission

Infected Vertebrate Reservoir

Children and Horses
JAPANESE ENCEPHALITIS

• Epidemiology in India:
  – JE has been reported by 26 states and UTs in India
  – Gorakhpur District of UP contribute the largest no of cases
  – 85% of cases of JE are reported in age below 15 years BUT JE IS INFREQUENT IN INFANCY
  – Not all humans bitten by mosquitoes develop the disease: Ratio of JE overt disease to inapparent infection varies from 1:300 to 1:1000
  – Endemicity of JE in India: 1-2 cases per village
<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Strain(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouse brain derived, purified &amp; inactivated vaccine</td>
<td>Nakayama Strain</td>
</tr>
<tr>
<td></td>
<td>Beijing Strain</td>
</tr>
<tr>
<td>Cell culture derived, inactivated vaccine</td>
<td>Beijing P3 Strain</td>
</tr>
<tr>
<td>Cell culture derived, live attenuated vaccine</td>
<td>SA 14-14-2 Strain (in India)</td>
</tr>
</tbody>
</table>
JE Vaccines
- Mouse brain derived inactivated vaccine:
  - 2 primary doses 4 weeks apart, booster after 1 year and subsequently at 3 yearly intervals until the age of 10-15 years
  - Dose: 0.5 ml for children aged <3 years (1 ml for age > 3 years)
  - Route: Subcutaneous
  - Vaccine is most useful in interepidemic period
  - Pre-exposure prophylaxis: 3 Primary doses on day 0, 7, 28 (or 2 primary doses 4 weeks apart)
  - Booster after 1 year and then every 3 years
Kyasanur Forest Disease (KFD)

- KFD is also known as ‘Monkey Disease’
- Causative agent: Group B Togavirus (Flavivirus)
- Reservoir: Rats and squirrels
- Amplifier hosts: Pigs
- Man is ‘incidental dead-end host’
Kyasanur Forest Disease (KFD)

- Vectors of KFD:
  - In India: Hemophysalis spinigera (Hard Tick)
  - Outside India: Soft Tick

- IP: 3 – 8 days
Kyasanur Forest Disease (KFD)

- Control measures:
  - Control of ticks
  - Restriction of cattle movement
  - Vaccination: Killed KFD vaccine
  - Personal protection: through repellants
PLAGUE

- Synonyms: Black Death, Mahamari, The great death
- Causative agent: Yersinia pestis (Gram negative, non-motile cocco-bacillus)
  - Bipolar staining with Wayson’s stain
- Reservoir of Infection: Wild rodents (Tatera indica in India)
- Source of Infection: Infected rodents, fleas and cases of pneumonic plague
PLAGUE

• Commonest and most efficient vector of Plague: Rat flea (Xenopsylla cheopsis Q)
  – Both sexes of fleas bite and transmit the disease
• Mode of transmission: Bite of an infected flea, direct contact with tissues of infected animal or droplet infection (pneumonic plague)
### Types of Plague:

<table>
<thead>
<tr>
<th>Type</th>
<th>IP</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonic Plague</td>
<td>1-3 days</td>
<td>Complication of Bubonic-Septicemic plague</td>
</tr>
<tr>
<td>Bubonic Plague</td>
<td>2-7 days</td>
<td>MC type of Plague(^Q)</td>
</tr>
<tr>
<td>Septicemic Plague</td>
<td>2-7 days</td>
<td>Occurs of Accidental laboratory infections</td>
</tr>
</tbody>
</table>
Drug of choice for treatment Q: Streptomycin 30 mg/kg i.m. x 7-10 days

Drug of choice for chemoprophylaxis Q: Tetracycline 500 mg QID x 5 days
Flea Indices in Plague

- Total flea index: Is average no. of fleas of all species per rat
- Cheopsis index: Is average no. of X. cheopsis per rat; Is an ‘indicator of potential explosiveness’ if outbreak occurs
- Specific percentage of fleas: Percentage of different fleas
- Burrow index: Average no. of fleas per species per rodent burrow
Rickettsial Zoonoses:

*Description*: Are a group of specific communicable diseases caused by Rickettsial organisms and transmitted to man by Arthropod vectors (Q fever excepted)
<table>
<thead>
<tr>
<th>Disease</th>
<th>Agent</th>
<th>Vector</th>
<th>Reservoir</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhus Group Q</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epidemic typhus</td>
<td>R. prowazekii Q</td>
<td>Louse Q</td>
<td>Humans</td>
</tr>
<tr>
<td>Murine typhus</td>
<td>R. typhi</td>
<td>Flea</td>
<td>Rodents</td>
</tr>
<tr>
<td>Scrub typhus</td>
<td>R. tsutsugamushi Q</td>
<td>Trombiculid mite</td>
<td>Rodents</td>
</tr>
<tr>
<td>Spotted Fever Gp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indian Tick typhus</td>
<td>R. conori</td>
<td>Tick</td>
<td>Rodents, dogs</td>
</tr>
<tr>
<td>RMSF</td>
<td>R. rickettsii</td>
<td>Tick</td>
<td>Rodents, dogs</td>
</tr>
<tr>
<td>Rickettsial pox</td>
<td>R. akari</td>
<td>Mite</td>
<td>Mice</td>
</tr>
<tr>
<td>Others</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q Fever</td>
<td>Coxiela burnetii</td>
<td>NIL</td>
<td>Cattle, sheep, goat</td>
</tr>
<tr>
<td>Trench Fever</td>
<td>Artonella quintana Q</td>
<td>Louse</td>
<td>Humans</td>
</tr>
</tbody>
</table>
Epidemic Typhus

- Is a type of rickettsial disease of typhus group:
  - Recrudescent form of Epidemic typhus: Brill Zinsser Disease
  - Was the ‘most formidable rickettsial disease in past’

- Causative agent: R. prowazekii

- Vector: Louse (P. capitis, P. corporis)
Epidemic Typhus

• Mode of transmission: (IS NOT BY LOUSE-BITE)
  – Scratching and inoculation with infected louse faeces
  – Crushing infected louse on body
  – Inhalation of infected louse faeces or dust
Epidemic Typhus

- Clinical picture: Prolonged febrile illness, vasculitis

- Drug of choice: Tetracycline

- Under International Health Regulations (IHRs), ‘Louse borne typhus is a disease under surveillance’
Endemic Typhus

- Is also known as ‘Flea borne typhus’ or ‘Murine typhus’
- Caustive agent: Rikettsia typhi (R. mooseri)
- Reservoir: Rats
- Mode of transmission: Rat flea (xenopsylla cheopsis) – BUT NOT THROUGH BITE,
- Rather through faeces inoculation on skin or inhalation of dried infective faeces
- Incubation period: 1 – 2 weeks
- Weil-felix reaction: Becomes positive with Proteus OX-19 in 2nd week
- Drug of choice: Tetracycline
Scrub Typhus

- Most widespread Rickettsial Disease
- Causative agent: Ricketts tsutsugamushi
- Vector: Trombiculid Mite (Leptotrombidium delinese and L. akamushi)
- IP: 10-12 days
- Typical clinical features: Eschar (punched out ulcer covered with a blackened scar, indicates location of mite bite)
- Weil Felix Reaction is strongly positive with Proteus strain OXK
Q Fever

Causative agent: Coxiella burnetii

– Only rickettsial disease without any vector (soft tick in few animal cases)

– Only Rickettsial disease without any skin lesion

• Mode of Transmission: Inhalation of Infected dust, Aerosol transmission, direct contract, Contaminated food like meat, milk and milk products

• IP: 2-3 weeks
Q Fever

- Clinical features:
  - Acute onset with fever, chills, general malaise and headache
  - ‘Pneumonia like picture’
  - Absence of rash/local lesion
  - Inapparent infections

- Treatment:
  - Tetracycline
  - Pasteurization/Boiling of milk
Causative agent of Leishmaniasis:

<table>
<thead>
<tr>
<th>Types of Leishmaniasis</th>
<th>Causative agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visceral leishmaniasis (Kala Azar)</td>
<td>Leishmania donovani</td>
</tr>
<tr>
<td>Cutaneous Leishmaniasis (Oriental Sore)</td>
<td>Lesihmania tropica</td>
</tr>
<tr>
<td>Muco-Cutaneous Leishmaniasis</td>
<td>Leishmania braziliensis</td>
</tr>
</tbody>
</table>
Reservoir of Infection: Dogs, jackals, foxes, rodents and other mammals

- Indian Kala Azar is a non-zoonotic infection: Man as reservoir

- Peak age of Kala Azar in India 5 -9 years

- Vectors Female phlebotamine sandflies
# Leishmaniasis

<table>
<thead>
<tr>
<th>Types of Leishmaniasis</th>
<th>Vector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visceral Leishmaniasis (Kala Azar)</td>
<td>Phlebotomus argentipes</td>
</tr>
<tr>
<td>Cutaneous Leishmaniasis (Oriental Sore)</td>
<td>Phlebotomus papatasi</td>
</tr>
<tr>
<td></td>
<td>Phlebotomus sergenti</td>
</tr>
</tbody>
</table>

- Habit of Sandfly: Cracks and crevices of walls, tree holes caves
- Insecticide of choice for sandfly: DDT (sprayed only up to a height of 6 feet from floor) 1-2gm/sq. metre
LEISHMANIASIS

- Mode of transmission:
  - Bite of female phlebotamine sandflies
  - Contamination of bite wound
  - Contact (crushing of insects while feeding)
  - Blood transfusion

- IP: 10 days to 2 years (average 1 - 4 months)
LEISHMANIASIS

• Aldehyde Test Napier:
  – Becomes Positive after 2-3 months of disease onset and reverts to negative 6 months after cure
  – Useful Test for surveillance (but not for diagnosis)
  – Non-specific test: Positive in many chronic infections where albumin: globulin ratio is reversed
LEISHMANIASIS

- Serological tests:
  - ELISA: for diagnosis as well as epidemiological field survey
  - Rk 39 dipstick test
  - Indirect Flourescent Antibody test (IFAT)
  - Direct Agglutination Test (DAT)
Leishnanin (Montenegro) test:

- Procedure: Intradermal injection of 0.1 ml leishmanin 9 a preparation of 106% ml washed promstigotes suspended in 0.5% phenol saline) on flexor surface of forearm.

- Examine after 48-72 hrs:
  - Induration > 5 mm: positive
  - Induration < 5 mm: negative
LEISHMANIASIS

- Useful Test for.
  - Immunity status
  - Inferring endemicity or epidemicity of infection
  - Identifying groups at risk of infection

*Test results in Leishmaniasis:*
<table>
<thead>
<tr>
<th>Type of Leishmaniasis</th>
<th>Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visceral Leishmaniasis (Kala azar)</td>
<td></td>
</tr>
<tr>
<td>Active Phase</td>
<td>Negative</td>
</tr>
<tr>
<td>Within 1 yr of recovery</td>
<td>Positive</td>
</tr>
<tr>
<td>Cutaneous Leishmaniasis</td>
<td>Positive</td>
</tr>
<tr>
<td>Mucocutaneous Leishmaniasis</td>
<td></td>
</tr>
<tr>
<td>4-6 weeks after onset</td>
<td>Positive</td>
</tr>
</tbody>
</table>
Prophylaxis & Treatment

- There are no drugs available for personal prophylaxis of Kala azar.

- Treatment of Leishmaniasis:
  - Sodium stibogluconate (DOC in kala Azar control Program)
  - Miltefosine
  - Pentamidine
  - Ketoconazole
  - Sitamaquine
  - Mepacrine
  - Paramomycin
  - Amphotericin B
  - Allopurinol
  - Urea Stibamine
Causative agent: Chlamydia trachomatis (immune types A, B, C)

- Sexually transmitted C. trachomatis (serotypes D, E, F, G, H, I, J, K) may cause a milder infection ‘inclusion Conjunctivitis’

IP: 5-12 days
TRACHOMA

● Mode of transmission:
  – Direct or indirect contact with ocular disharges or fomites
  – Eye seeking flies
  – Venereal transmission
TRACHOMA

- MC infected age group: 2-5 yrs aged children
- Communicability: Trachoma is a disease a low infectivity
- Reservoir of infection: Children with active disease, chronically infected older children and adults
- Predisposing factors: Direct sunlight, dust, smoke and irritants (such as kajal or surma)
Field diagnosis of Trachoma: At least 2 of following diagnostic criteria in children 0-10 years age

- Follicles on upper Tarsal conjunctiva
- Limba follicles or their sequelae (Herbert’s Pits)
- Conjunctival scarring (Trichiasis, Entropion)
- Vascular pannus
WHO classification of Trachoma:

- **TIF** (Trachomatous Inflammation Follicular): Presence of > 5 large follicles on upper tarsal conjunctiva

- **TII** (Trachomatous Inflammation Intense): Obsecuration of > 50% of deep tarsal vessels of upper tarsal conjunctiva
Trachoma Treatment

- Treatment of choice for Trachoma:
  - Azithromycin 20 mg/kg oral start

- Current WHO recommendations for antibiotic treatment of trachoma:
  - District level prevalence is > 10% in 1-9 years old children: Mass treatment with Azithromycin
  - District level prevalence is 5-10% in 1-9 years old children: Targeted treatment with Azithromycin (the identification and treatment of all members of any family in whom one or more members have follicular trachoma)
  - District level prevalence is < 5% in 1-9 years old children: Azithromycin distribution may not be necessary
Trachoma Treatment

- Mass treatment for Trachoma: [NEW GUIDELINES-WHO]
  - Indication of mass treatment in Trachoma: > 10% prevalence of severe and moderate Trachoma in children < 10 yrs of age [NEW GUIDELINES-WHO]
  - Treatment: 1% tetracycline ointment BD for 5 consecutive days each month or OD for 10 days each month for 6 consecutive months, or for 60 consecutive days.
SAFE Strategy (WHO)

- Surgery: for Trichiasis and Entropion
- Antibiotic use: Azithromycin is Drug of choice
- Facial cleanliness
- Environmental improvement
SAFE Strategy (WHO)

Surgery to correct advanced stages of the disease

Antibiotic distribution of Pfizer-donated Zithromax® to treat active infection

Face washing to reduce disease transmission

Environmental change to increase access to clean water and improved sanitation
TETANUS

- **Causative agent:** Clostridium tetani (Gram + ve, anaerobic, drumstick appearance)
- **Reservoir:** Natural habitat is soil and dust
- **IP:** 6-10 days (1 day to several months)
- **Period of communicability:** None (no person to person transmission)
- **Mode of transmission:** Contamination of Wounds with spores
Tetanus toxin: Second most lethal toxin (Most lethal toxin is Botulinum toxin)

- Lethal dose for a 70 kg man: 0.1mg
- Acts on 4 areas of nervous system:
  - Motor End Plates in Skeletal System
  - Spinal Cord
  - Brain
  - Sympathetic System
- Principal action: Blocks inhibition of Spinal reflexes
- Sensitivity to toxin is more in males
Herd Immunity in Tetanus: Does not protect the individual

Tetanus is best prevented by: Active immunization with Tetanus toxoid (TT)

Aim of active Immunisation with TT:
- Vaccinate the entire community
- Ensure protective level of antitoxin ~ 0.01 IU/ml serum throughout life
## Prevention of Tetanus in Wounded

<table>
<thead>
<tr>
<th>Immunity Category</th>
<th>Wounds &lt; 6hrs old, clean, non-penetrating Rating, with negligible tissue damage</th>
<th>Other Wounds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>Nothing more required</td>
<td>Nothing more required</td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>Toxoid 1 dose</td>
<td>Toxoid 1 dose</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Toxoid 1 dose</td>
<td>Toxoid 1 dose + Human Tetanus Immunoglobulin</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td>Toxoid complete course</td>
<td>Toxoid complete course + Human Tetanus Immunoglobulin</td>
</tr>
</tbody>
</table>
Where,

A. Complete course of toxoid or booster dose in previous 5 years

B. Complete course of toxoid or booster dose in previous 5-10 years

C. Complete course of toxoid or booster dose in > 10 years ago

D. Has not had a complete course of toxoid or status is unknown
Neonatal Tetanus/8th Day Disease

- NNT has a marked seasonal incidence in India > 50% of total annual cases occur in months of July, August and September
- Cleans for safe delivery for prevention of NNT:
<table>
<thead>
<tr>
<th>3 Cleans</th>
<th>5 Cleans</th>
<th>7 Cleans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean Hands</td>
<td>Clean Hands</td>
<td>Clean Hands</td>
</tr>
<tr>
<td>Clean delivery</td>
<td>Clean delivery</td>
<td>Clean delivery</td>
</tr>
<tr>
<td>surface</td>
<td>surface</td>
<td>surface</td>
</tr>
<tr>
<td>Clean Cord care</td>
<td>Clean Cord cut/blade</td>
<td>Clean Cord cut/blade</td>
</tr>
<tr>
<td></td>
<td>Clean cord tie</td>
<td>Clean cord tie</td>
</tr>
<tr>
<td></td>
<td>Clean cord stump</td>
<td>Clean cord stump</td>
</tr>
<tr>
<td></td>
<td>Clean towel</td>
<td>Clean water</td>
</tr>
</tbody>
</table>
Neonatal Tetanus/8th Day Disease

- 7 Cleans are proposed under RCH-III
- Clean cord stump implies ‘No Applicant’
- Clean towel and clean water are for hands washing

• NNT Elimination (Classification of districts, India is based on 3 parameters: incidence rate, TT-2 or booster coverage and % attended deliveries)
<table>
<thead>
<tr>
<th>Classification</th>
<th>Rate</th>
<th>TT-2 coverage</th>
<th>Attended deliveries</th>
</tr>
</thead>
<tbody>
<tr>
<td>NNT High Risk</td>
<td>&gt;1/1000 LB</td>
<td>&lt;70%</td>
<td>&lt;50%</td>
</tr>
<tr>
<td>NNT Control</td>
<td>&lt;1/1000 LB</td>
<td>&gt;70%</td>
<td>&gt;50%</td>
</tr>
<tr>
<td>NNT Elimination Q</td>
<td>&lt;0.1/1000 LB</td>
<td>&gt;90%</td>
<td>&gt;75%</td>
</tr>
</tbody>
</table>
LEPROSY/HANSEN’S DISEASE

Leprosy Situation in India [2013]

- Prevalence: 0.68 per 10000 population
- Annual new case detection rate: 1.0 per 10,000 population
- % children: 9.7%
- % MBL: 49%
- 33 states/UTs achieved elimination
- Cure rate: 90-95%
LEPROSY/HANSEN’S DISEASE

Classifications of Leprosy:

<table>
<thead>
<tr>
<th>Ridley Jopling classification</th>
<th>Indian classification</th>
<th>Madrid classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>TT (Tuberculoid)</td>
<td>Indeterminate</td>
<td>Indeterminate</td>
</tr>
<tr>
<td>BT (Borderline Tuberculoid)</td>
<td>Tuberculoid</td>
<td>Tuberculoid</td>
</tr>
<tr>
<td>BB (Borderline borderline)</td>
<td>Borderline</td>
<td>Borderline</td>
</tr>
<tr>
<td>BL (Borderline Lepromatous)</td>
<td>Lepromatous</td>
<td>Lepromatous</td>
</tr>
<tr>
<td>LL (Lepromatous Leprosy)</td>
<td>Pure Neuritic(^Q)</td>
<td></td>
</tr>
</tbody>
</table>

(pure neuritic type Leprosy (Indian classification): No skin lesions)
LEPROSY/HANSEN’S DISEASE

- Operational Classification of Leprosy (according to skin smear positivity) to serve as a basis for Chemotherapy:

<table>
<thead>
<tr>
<th></th>
<th>Paucibacillary Leprosy (PBL)</th>
<th>Multibacillary Leprosy (MBL)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Included types</strong></td>
<td>Indeterminate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Polar tuberculoid (TT)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Border tuberculoid (BT)</td>
<td></td>
</tr>
<tr>
<td><strong>Multidrug therapy(^Q) (MDT) in NLEP (Drugs)</strong></td>
<td>Rifampicin 600 mg OAMS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dapsone 100 mg daily</td>
<td></td>
</tr>
<tr>
<td><strong>Treatment duration(^Q)</strong></td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td><strong>Follow up(^Q) (after treatment)</strong></td>
<td>Annually for 2 yrs</td>
<td></td>
</tr>
</tbody>
</table>

(BI: Bacteriological Index; OAM: Once a month supervised)
Epidemiology of Leprosy

- **Description:** Chronic infectious disease caused by *Mycobacterium leprae* and affecting mainly peripheral nerves
  - Leprosy is a disease of ‘high infectivity but low pathogenicity’
  - Attack rate of Leprosy among house-hold contacts: 4.4 – 12%
  - Youngest case of Leprosy in India: 2 ½ month infant
  - Leprosy is often known as a ‘Social disease’
  - Is probably the oldest disease known to mankind
Epidemiology of Leprosy

- Mode of transmission of Leprosy: Q
  - Droplet infection (MC Q)
  - Contact transmission (Direct skin to skin or indirect with soil/fomites)
  - Breast milk from lepromatous mothers
  - Transplacental
  - Insect vectors
  - Tattooing needles
Epidemiology of Leprosy

• Diagnosis of leprosy under NLEP is currently based on clinical grounds:
  - PBL: 1 – 5 skin lesions
  - MBL: > 5 skin lesions
Important Points of Leprosy

- Level of Leprosy for declaring it as a Public Health Problem: ≥1/10,000
- Elimination Level of Leprosy: <1/10,000
  - India eliminated Leprosy in December 2005
- Goal for Leprosy under National Health Policy 2002: Elimination by 2005
- Leprosy exhibits ‘both cell mediated immunity (CMI) and humoral immunity’
# Tests for Detecting Immunity in Leprosy

<table>
<thead>
<tr>
<th>Tests of Cell Mediated Immunity</th>
<th>Tests of Humoral Immunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lepromin test</td>
<td>FLS-ABS Test</td>
</tr>
<tr>
<td>Lymphocyte transformation test</td>
<td>Monoclonal antibodies test</td>
</tr>
<tr>
<td>Leucocyte migration inhibition test</td>
<td>ELISA tests</td>
</tr>
<tr>
<td></td>
<td>Radioimmuneassay</td>
</tr>
</tbody>
</table>
Lepromin Test:

- Test of CMI in Leprosy
- Test: 0.1 ml Lepromin intradermal on inner aspect of forearm
- Antigens used in Lepromin test:
  - Dhamendra antigen (extensively used in India)
  - Misuda antigen
- WHO recommended concentration of Dhamendra Antigen: 1/16
- Readings: After 48 hours and after 21 days
Lepromin Test:

- Reactions in Lepromin test:
  - Early Reaction (FERNANDEZ REACTION):
    - Read at 48 hours
    - Redness > 10 mm indicates +ve test
    - Indicates prior exposure or infection
    - Delayed type of hypersensitivity
    - Induced by soluble components of leprosy bacilli
    - Superior to late reaction
    - Corresponds to Mantous Reaction (TB)
Lepromin Test:

– Late Reaction (LATE MITSUDA REACTION):

- Read at 21 days
- Nodule > 5 mm diameter is +ve
- Indicates cell mediated immunity
- Induced by bacillary component of antigen
- BCG vaccine can convert it from –ve to +ve
Lepromin Test:

- Value of Lepromin test:
  - Is not a diagnostic test
  - Uses of Leplromin test:
    - Evaluation of CMI status of patients
    - Aid to confirm the classification of Leprosy
    - Estimation of prognosis of cases
Lepromin Test:

– Drawbacks of Lepromin test as a diagnostic test:

- Positive in non-cases
- Negative in lepromatous and near-lepromatous cases
### Interpretation of Lepromin Test:

<table>
<thead>
<tr>
<th>Reaction</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>++ to +++</td>
<td>Tuberculoid Leprosy (TT) Q</td>
</tr>
<tr>
<td>+ to ++</td>
<td>Macula-anaesthetic Leprosy (MA)</td>
</tr>
<tr>
<td>- or + or +</td>
<td>Intermediate Leprosy (I)</td>
</tr>
<tr>
<td>+ to ++</td>
<td>Borderline Tuberculoid Leprosy (BT)</td>
</tr>
<tr>
<td>+ or +</td>
<td>Borderline Borderline Leprosy (BB)</td>
</tr>
<tr>
<td>- or +</td>
<td>Borderline Lepromatous Leprosy (BL)</td>
</tr>
<tr>
<td>-</td>
<td>Lepromatous Leprosy (LL)</td>
</tr>
</tbody>
</table>
Definitions under National Leprosy Elimination Program (NLEP)

- Paucibacillary Leprosy (PBL): 1 – 5 skin lesions and/ or only one nerve involvement
- Multibacillary Leprosy (MBL): 6 or more skin lesions and/ or more than one nerve involvement
- Adequate treatment: Patient has received 6 months of therapy in 9 months (for PBL) or 12 months of therapy within 18 months (for MBL)
Definitions under National Leprosy Elimination Program (NLEP)

- Regular treatment: Received MDT for two-thirds of total duration of therapy, i.e., 4 months for PBL (out of 6 months of duration of therapy) and 8 months for MBL (out of 12 months of duration of therapy)

- Case: Clinical signs of leprosy (with or without bacteriological confirmation of diagnosis) and who has not yet completed a-fault course of treatment with Multi-Drug Therapy (MDT)

- Newly diagnosed case: Diagnosed case who has not taken MDT in past
Definitions under National Leprosy Elimination Program (NLEP)

- Defaulter: A leprosy patient on MDT, who has not collected treatment for 12 consecutive months.

- Relapsed case: A patient whose therapy was terminated successfully, completed adequately, who subsequently develops new signs and symptoms of disease either during surveillance period or thereafter.
Leprosy is Not Amenable to eradication

- Long and variable incubation period (Most important reason)
- Disputed modes of transmission
- Presence of sub-clinical cases and our inability to detect them
- Complicated spectrum of disease manifestations
- Failure of cell mediated immunity in lepromatous cases
Leprosy is Not Amenable to eradication

- Bacterial resistance and persistence in the human body
- Absence of a vaccine
- Social and cultural taboos leading to concealment of disease
- Discovery of extra-human reservoir
## HIV Epidemiology

<table>
<thead>
<tr>
<th>Route of transmission</th>
<th>% of total cases (India)</th>
<th>Efficiency of route</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual</td>
<td>87%</td>
<td>0.01 – 1%</td>
</tr>
<tr>
<td>Blood and blood products</td>
<td>1%</td>
<td>&gt;90%</td>
</tr>
<tr>
<td>Sharing needles / syringes</td>
<td>2</td>
<td>0.3%</td>
</tr>
<tr>
<td>Mother to child transmission</td>
<td>5</td>
<td>3%</td>
</tr>
</tbody>
</table>
Causative organism: Human immunodeficiency virus (HIV) [Human T-Lymphotropic virus – III (HTLV-III): Lymphadenopathy virus (LAP)]

- Chances of HIV transmission in presence of STDs: Increase 8 – 10 times

- AIDS (Acquired Immunodeficiency Syndrome) is also known as ‘Slim Disease’
• Reservoir: Case and carriers
  – Source: Virus is in greatest concentration in blood, semen and CSF (lower concentrations in tear, saliva, breast milk, urine, cervical and vaginal secretions)
• IP: Few months to 10 years
Basic modes of transmission

- Sexual (MC)
- Blood and blood products
- Needles/syringes
- Mother to Child transmission (MTCT)
MC Opportunistic Infection (OI) in AIDS

- World: Pneumocystis carinii pneumonia (PCP)
- India: Tuberculosis (> Candida > PCP)
Epidemiological pattern of HIV epidemic in India: Type 4 pattern [Epidemic starts from highest risk group (commercial sex workers, homosexuals, drug users) to bridge population (clients of sex workers, STD patients, migrant population, partners of drug users), and then to general population]
HIV Situation in India [2012]

- Total no. of HIV cases: Less than 2 million (Rank 2)

- Prevalence of HIV: 0.27%
- Classification of states:

<table>
<thead>
<tr>
<th>Groups with states / UTs</th>
<th>Criteria of prevalence in</th>
<th>Antenatal clinics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I (High Prevalence): Q: Maharashtra, Tamil Nadu, Andhra Pradesh, Karnataka, Manipur, Nagaland</td>
<td>&gt;5%</td>
<td>&gt;1%</td>
</tr>
<tr>
<td>Group II (Moderate Prevalence): Gujarat, Goa, Pondicherry</td>
<td>&gt;5%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Group III (Low Prevalence): Remaining states &amp; Uts</td>
<td>&lt;5%</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>
Age and Sex distribution of HIV/AIDS in India [2006]:

<table>
<thead>
<tr>
<th>Distribution of HIV/AIDS cases</th>
<th>Cumulative cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age distribution</td>
<td></td>
</tr>
<tr>
<td>0 – 14 years</td>
<td>5%</td>
</tr>
<tr>
<td>15 – 29 years</td>
<td>32%</td>
</tr>
<tr>
<td>30 – 44 years</td>
<td>56%</td>
</tr>
<tr>
<td>&gt;45 years</td>
<td>7%</td>
</tr>
<tr>
<td>Sex distribution</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>71%</td>
</tr>
<tr>
<td>Female</td>
<td>29%</td>
</tr>
</tbody>
</table>
• First case of HIV/AIDS: 1986 (Chennai, Tamil Nadu)
• National AIDS Control Programme (NACP) launched: 1987
• National AIDS Prevention and Control Policy (NAPCP): 2001
Mother to Child Transmission (MTCT) of HIV

- MTCT in developing countries (India): 30%
- MTCT in developed countries: 20%
- Prevention of MTCT in India:
<table>
<thead>
<tr>
<th>Modality</th>
<th>Dose/ type</th>
<th>Reduction in MTCT by</th>
<th>Post-modality MTCT in India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zidovudine</td>
<td>Mother: 300 mg BD from 36 wks POG + 300 mg 3h during delivery Child: 2mg/kg 6h x 6 wks</td>
<td>66% Q</td>
<td>10%</td>
</tr>
<tr>
<td>Neivrapine</td>
<td>Single oral dose Mother: 200 mg at labor onset Child: 2mg/kg Q within 72 hrs of birth Q</td>
<td>50% Q</td>
<td>15% Q</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>Elective CS</td>
<td>50% Q</td>
<td>15%</td>
</tr>
</tbody>
</table>
HIV/AIDS Situation in World [2012]

- Total no. of People Living with HIV/AIDS [PLHA]: 34 million
- HIV prevalence: 0.8%
- MC opportunistic Infection: Pneumocystis carinii pneumonia
- Antiretroviral (ARV) treatment started in AIDS if: CD4 count < 350
National AIDS Control Programme, India

- National AIDS Control Programme (NACP) launched: 1987
- Screening tests used: ELISA/ RAPID/SIMPLE (ERS)
- Confirmatory diagnostic test used: Western Blot Assay (WBA)
WHO Clinical Staging For HIV Infection (13 years or older)

- **Stage 1:** (Performance scale 1: Asymptomatic, normal activity)
  - Asymptomatic
  - Persistent generalized lymphadenopathy
WHO Clinical Staging For HIV Infection (13 years or older)

- **Stage 2**: (Performance scale 2: Symptomatic, normal activity)
  
  - Weight loss <10% of body weight
  
  - Minor muco-cutaeous manifestations
  
  - Herpes zoster in last 5 years
  
  - Recurrent URTIs
WHO Clinical Staging For HIV Infection (13 years or older)

- **Stage 3:** (Performance scale 3: Bed-ridden <50% days in last month)
  - Weight loss > 10% of body weight
  - Unexplained chronic diarrhea > 1 month
  - Unexplained prolonged fever > 1 month
  - Oral candidiasis (Thrush)
  - Oral hairy leucoplakia
  - Pulmonary TB
  - Severe bacterial infection
WHO Clinical Staging For HIV Infection (13 years or older)

- **Stage 4:** (Performance scale: Bed-ridden > 50% days in last month)
  - HIV wasting syndrome (Weight loss > 10% + Chronic diarrhea + prolonged fever)
  - Pneumocystis carini pneumonia
  - Toxoplasmosis of brain
  - Cryptosporidiosis with diarrhea, > 1 month
  - Cryptococcosis, extrapulmonary
WHO Clinical Staging For HIV Infection (13 years or older)

Stage 4:

- CMV of organ (except liver, spleen, lymphnodes)
- Herpes virus (mucocutaneous > 1 month or visceral)
- Progressive multifocal leuкоencephalopathy (PML)
- Any disseminated endemic fungal infection
- Candidiasis (Oesophagus, trachea, bronchi or lungs)
WHO Clinical Staging For HIV Infection (13 years or older)

**Stage 4:**
- Atypical mycobacteria (disseminated)
- Non-typhoid salmonella septicaemia
- Extrapulmonary TB
- Lymphoma
- Kaposi’s sarcoma
- HIV encephalopathy
WHO Clinical Staging For HIV Infection (For children)

- **Stage 1:**
  - Asymptomatic
  - Persistent generalized lymphadenopathy
WHO Clinical Staging For HIV Infection (For children)

• Stage 2:
  – Unexplained chronic diarrhea
  – Severe persistent or recurrent candidiasis (outside neonatal period)
  – Weight loss or failure to thrive
  – Persistent fever
  – Recurrent severe bacterial infections
WHO Clinical Staging For HIV Infection (For children)

- **Stage 3:**
  - AIDS-defining opportunistic infections
  - Severe failure to thrive
  - Progressive encephalopathy
  - Malignancy
  - Recurrent septicaemia or meningitis
3 by 5 Initiative

- Launched by WHO and UNAIDS on 1\textsuperscript{st} Dec 2003
- Target: To provide antiretroviral treatment (ART) to 3 million people living with HIV/AIDS (PLHA) in developing countries by end of 2005
- Ultimate goal: To provide universal access to treatment for HIV/AIDS to all those who need it
3 by 5 Initiative

Focus on:
- Simplified, standardized tool to deliver ART
- New service to ensure an effective/reliable supply of medicines and diagnostics
- Rapid identification, dissemination and application of new knowledge and successful strategy
- Urgent sustained support to countries
- Global leadership
- Backed by strong partnership
<table>
<thead>
<tr>
<th>STI</th>
<th>Causative agent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5 Classical STD’s</strong></td>
<td></td>
</tr>
<tr>
<td>Syphilis</td>
<td>Treponema pallidum</td>
</tr>
<tr>
<td>Gonorrhea</td>
<td>Meisseria gonorrhoeae</td>
</tr>
<tr>
<td>Chanchroid</td>
<td>Hemophilus ducreyi&lt;sup&gt;Q&lt;/sup&gt;</td>
</tr>
<tr>
<td>LGV</td>
<td>Chlamydia trachomatis</td>
</tr>
<tr>
<td>Donovanosis</td>
<td>Calymmatobacteium granulomatis&lt;sup&gt;Q&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>HIV/AIDS</strong></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>Human immunodeficiency virus</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>Enterovirus 72 (Picornavirus)&lt;sup&gt;Q&lt;/sup&gt;</td>
</tr>
<tr>
<td>Hepatitis C</td>
<td>Hepadnavirus (Dane’s particle)</td>
</tr>
<tr>
<td>Hepatitis D</td>
<td>Hepacivirus</td>
</tr>
<tr>
<td><strong>Genital and anal warts</strong></td>
<td></td>
</tr>
<tr>
<td>Scabies</td>
<td>Sarcoptes scabei&lt;sup&gt;Q&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pubic louse</td>
<td>Phthirius pubis</td>
</tr>
<tr>
<td>Trichomoniasis</td>
<td>Trichomonas vaginalis (MC in World)</td>
</tr>
</tbody>
</table>
Sexually Transmitted Infections (STIs)

- Other sexually transmitted agents include:
  - Streptococcus group B
  - Campylobacter
  - Ureaplasma urealyticum
  - Entamoeba histolytica
  - Shigella
  - Human (alpha) herpes virus 1, 2
  - Candida albicans
  - Molluscum contagious
  - Mycoplasma hominis
  - Giardia lambia
  - Human (beta) herpes virus 5
Sexually Transmitted Infections (STIs)

- **Incubation periods of STIs:**

<table>
<thead>
<tr>
<th>STI</th>
<th>Incubation periodQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>SyphilisQ</td>
<td>9 – 90 days</td>
</tr>
<tr>
<td>LGVQ</td>
<td>3 – 12 days</td>
</tr>
<tr>
<td>DonovanosisQ</td>
<td>3 – 21 days</td>
</tr>
<tr>
<td>ChancroidQ</td>
<td>3 – 5 days</td>
</tr>
<tr>
<td>GonorrheaQ</td>
<td>1 – 5 days</td>
</tr>
<tr>
<td>Molluscum contagiosum</td>
<td>14 – 50 days</td>
</tr>
<tr>
<td>HIV/AIDSQ</td>
<td>Months – 10 years</td>
</tr>
</tbody>
</table>
## Endemic Treponematoses

<table>
<thead>
<tr>
<th>Disease</th>
<th>Causative agent</th>
<th>Mode of transmission</th>
<th>DOC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pinta</td>
<td>Treponema carateum</td>
<td>Non venereal (direct contact)</td>
<td>Benzathine Penicillin G⁹</td>
</tr>
<tr>
<td>Yaws</td>
<td>Treponema pertenue⁹</td>
<td>Non venereal⁹ (direct contact with secretions from infectious lesions, fomites, insect vectors)</td>
<td>Benzathaine Penicillin G⁹</td>
</tr>
<tr>
<td>Endemic syphilis</td>
<td>Treponema pallidum</td>
<td>Non venereal</td>
<td>Benzathaine Penicillin G</td>
</tr>
<tr>
<td>Syphilis</td>
<td>Treponema pallidum</td>
<td>Venereal</td>
<td>Benzathaine Penicillin G</td>
</tr>
</tbody>
</table>
Yaws/Pian/Bubas/Framboesia

- Causative agent: Treponema pertenue
- IP: 3-5 days
Yaws/Pian/Bubas/Framboesia

• Clinical features:
  – Early Yaws: Mother Yaws followed by generalized eruption
  – Late Yaws: by end of 5 yrs
    ✓ Crab Yaws: Lesions of soles and palms
    ✓ Gangosa: Destructive lesions of soft palate, hard palate and nose
    ✓ Goundu: osteo-periostitis of Superior maxillary bone
Yaws/Pian/Bubas/Framboesia

- Yaws has been declared eliminated from India in September 2006
- Man is the only known reservoir of Yaws (but no natural immunity)
- Yaws provide partial immunity to venereal syphilis
Yaws/Pian/Bubas/Framboesia

- WHO recommended treatment policies for Yaws:

<table>
<thead>
<tr>
<th>Treatment policy</th>
<th>Recommended for type of area</th>
<th>Prevalence</th>
<th>Treatment given to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total mass treatment</td>
<td>Hyperendemic</td>
<td>&gt;10%</td>
<td>Entire population with cases</td>
</tr>
<tr>
<td>Juvenile mass treatment</td>
<td>Mesoendemic</td>
<td>5-10%</td>
<td>All cases, all 0-15 yr children contacts</td>
</tr>
<tr>
<td>Selective mass treatment</td>
<td>Hypoendemic</td>
<td>&lt;5%</td>
<td>Cases, contacts of infectious cases</td>
</tr>
</tbody>
</table>
Yaws/Pian/Bubas/Framboesia

- With decline of Yaws, emphasis of control strategy has shifted to ‘surveillance & containment’
- Epidemiologically Yaws is not vulnerable to eradication:
  - Cases are contagious for months or years after onset of symptoms
  - Latent cases occur frequently (treponemes persist in CSF & lymph nodes even after cure)
Yaws/Pian/Bubas/Framboesia

Epidemiologically Yaws is not vulnerable to eradication$^Q$:

– Immunity acquired is only partial

– Disease is not fatal

– Accurate diagnosis by non-medical personnel is a problem

– No vaccine available for Yaws
Syndromic Approach (simplified STD Treatment)

- **Concept:** The traditional method of diagnosing STDs is by laboratory tests, which are very often unavailable or too expensive.
  - Syndromic Management of STDs has been recommended by WHO since 1990 which is ‘based on symptoms and clinical signs’.

- **Importance of Syndromic Approach:** Through this approach, a health worker at the most peripheral level without using laboratory support, can diagnose reproductive infections and accordingly prescribe treatment or advise referral of the patient.
Syndromic Approach (simplified STD Treatment)

- Main features of Syndromic Approach:
  - Classification of the main causative pathogens by the clinical syndromes they produce
  - Use of flow charts to manage a particular syndrome
  - Treatment for all important causes of the syndrome
  - Notification and treatment of sex partners
  - No expensive laboratory procedures required
Syndromic Approach (simplified STD Treatment)

- Advantages of Syndromic Approach:
  - Permits STD treatment without costly laboratory tests
  - Offers accessibility, immediate, effective and efficient treatment

- Disadvantage of Syndromic Approach:
  Over-treatment in some patients (esp. in vaginal discharge)
Syndromic Approach (simplified STD Treatment)

- Syndromes in Syndromic Approach:
  - Urethral discharge: Is usually due to gonococcal or non-gonococcal (chlamydical) urethritis
  - Vaginal discharge: Is usually due to gonococcal or non-gonococcal cervicitis or vaginitis (trichomoniasis, candidiasis or bacterial vaginosis). Speculum examination for establishing diagnosis
  - Genital ulcer: Due to syphilis, chanchroid, LGV, granuloma inguinale or herpes infection
  - Inguinal swelling (Bubo): Usually due to LGV
  - Lower abdominal pain/PID
Case Detection in a STD Control Programme

- **Screening**
- **Contact tracing:** Sexual partners of diagnosed patients are identified, located, investigated and treated
  - Is one of the best methods of controlling the spread of infection
  - Is relatively expensive (in low prevalence)
  - Key to success is patient himself (who must disclose all sexual contacts voluntarily)

- **Cluster testing:** Screening of all persons of either sex, who move in the same socio-sexual environment of the patient
  - It almost doubles the number of cases found
MISCELLANEOUS (COMMUNICABLE DISEASES)
Zoonoses: An infection or infectious disease transmissible under conditions from vertebrate animals to man

Classification of Zoonoses based on direction of transmission:
- Anthropozoonoses\(^Q\): Infections transmitted from animals (zoo) to man (anthro):
  - Rabies\(^Q\)
  - Anthrax\(^Q\)
  - Trichinosis
- Plague\(^Q\)
- Hydatid disease\(^Q\)
- **Zooanthroponoses** : Infections transmitted from man (anthro) to animals (zoo):
  - Human TB in cattle
- **Amphixenosis**: Infections transmitted in either direction between animals and man:
  - Trypanosoma cruzi
  - Schistosoma japonicum
# Food Poisoning

**Incubation period of food poisoning:**

<table>
<thead>
<tr>
<th>Food poisoning</th>
<th>Incubation period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmonella^Q</td>
<td>12 – 24 hours</td>
</tr>
<tr>
<td>Staphylococcal^Q</td>
<td>1 – 6 hours</td>
</tr>
<tr>
<td>Botulism</td>
<td>12 – 36 hours</td>
</tr>
<tr>
<td>Cl. Perifrengens</td>
<td>6 – 24 hours</td>
</tr>
<tr>
<td>B. cereus (emetic form)</td>
<td>1 – 6 hours</td>
</tr>
<tr>
<td>B. cereus (diarrhoeal form)</td>
<td>12 – 24 hours</td>
</tr>
</tbody>
</table>
Staphylococcal Food Poisoning:

- Agent: Enterotoxins of Staphylococcus aureus
- Toxins formed at 35° – 37° C
- Toxins are relatively heat stable and resist boiling for 30 min or more
- Incubation period: 1 – 6 hours
- IP is short because of ‘preformed toxin’
- Mechanism of food poisoning: Intra-dietetic toxians (ingestion of toxins preformed in food, in which bacteria have grown)
Botulism food poisoning:

- Agent: Clostridium botulinum type A, B, E
- IP: 12 – 36 hours
- Mechanism of food poisoning: Intra-dietetic toxins
Food Poisoning

- Botulism food poisoning:
  - Prominent symptoms: GIT SYMPTOMS ARE SLIGHT
  - Dysphagia
  - Diplopia
  - Dysarthria
  - Prophylaxis: 50,000 – 100,000 units anti-toxin
  - Treatment: Guanidinehydrochloride
Food Poisoning

- Clostridium perfirengens food poisoning:
  - Agent: Clostridium perfirengens (welchii)
  - IP: 6 – 24 hours
  - Rapid recovery with no deaths
Bacillus cereus food poisoning:

- Agent: Bacillus cereus
- IP: 1 – 6 hours (emetic form), 12 – 24 hours (diarrheal form)
Brucellosis

- Also known as: Undulant fever, Malta fever, Mediterranean fever
- Causative agent: Brucella species
  - Brucella melitensis: Most virulent and invasive species
  - Brucella abortus: Less virulent, primarily affect cattle
  - Brucella suis: Intermediate virulence, infects pigs
  - Brucella canis: Parasite of dogs
Brucellosis

- Reservoir: Cattle, sheep, goats, swine, buffaloes, horses dogs

- Modes of transmission:
  - Contact infection: Direct contact with infected tissues, blood, urine, vaginal discharge, aborted fetuses and ESPECIALLY placenta
  - Food-borne infections: Raw milk/ dairy products, fresh raw vegetables, water
  - Air-borne infection: aerosol
Brucellosis

- Incubation period: usually 1 – 3 weeks
- Most striking feature: Severity of illness and absence of clinical illness
- Most rational approach for prevention: Control and eradication of infection from animal reservoirs
Brucellosis

- Only satisfactory solution aimed at eradication:
  - Slaughter of infected animals, with full compensation paid to farmers
- Antibiotic of choice: Tetracycline 500 mg QID X 3 weeks

Q
Crimean Congo Fever (CCF)

- Type of disease: Zoonosis of domestic / wild animals which may affect human beings
- Causative agent: Nairovirus\(^Q\) (Bunyavirus)
- Vector: Hyalomma ticks\(^Q\) (Hard ticks)
- Incubation period: 1-13 days (Median 5-6 days\(^0\))
- Case fatality rate: 30%\(^Q\)
- Drug of choice Ribavirin\(^Q\)
- Situation in India: Exotic-Epidemic in India (Gujarat, December 2010)
Amoebiasis

- Causative agent: Entamoeba histolytica (7 pathogenic + non-pathogenic zymodymes)
- Amoebiasis affects 15% of Indian population
- Source of infection: Cysts (NOT trophozoites)
- Reservoir: Man
Amoebiasis

- Period of communicability: Upto years (till cysts excreted)
- Modes of transmissions: Q
  - Faecal-oral
  - Sexual (Oro-rectal in homosexuals)
  - Vectors (files, Cockroaches, rodents)
Amoebiasis

• Incubation period: 2-4 weeks

• Diagnosis:
  − Readily diagnostic test: Trophozoites containing RBCs in freshly passed mucus per rectum
  − Most sensitive serological test: Indirect hemagglutination test

• Treatment:
  Symptomatic: Metronidazole
  Asymptomatic: Diodohydroxyquin
NIPAH Virus

- Genus: Henapi virus

- Transmission in India:
  - Occurrence: West Bengal
  - Route: Consumption of fruits contaminated with bats (Pteropus: ‘Flying foxes’) secretions
NIPAH Virus

- Clinical presentation: Encephalitis
- Case fatality rate: 50%
- Vaccine: NONE for humans
- Treatment: Intensive supportive care
That's all Folks!