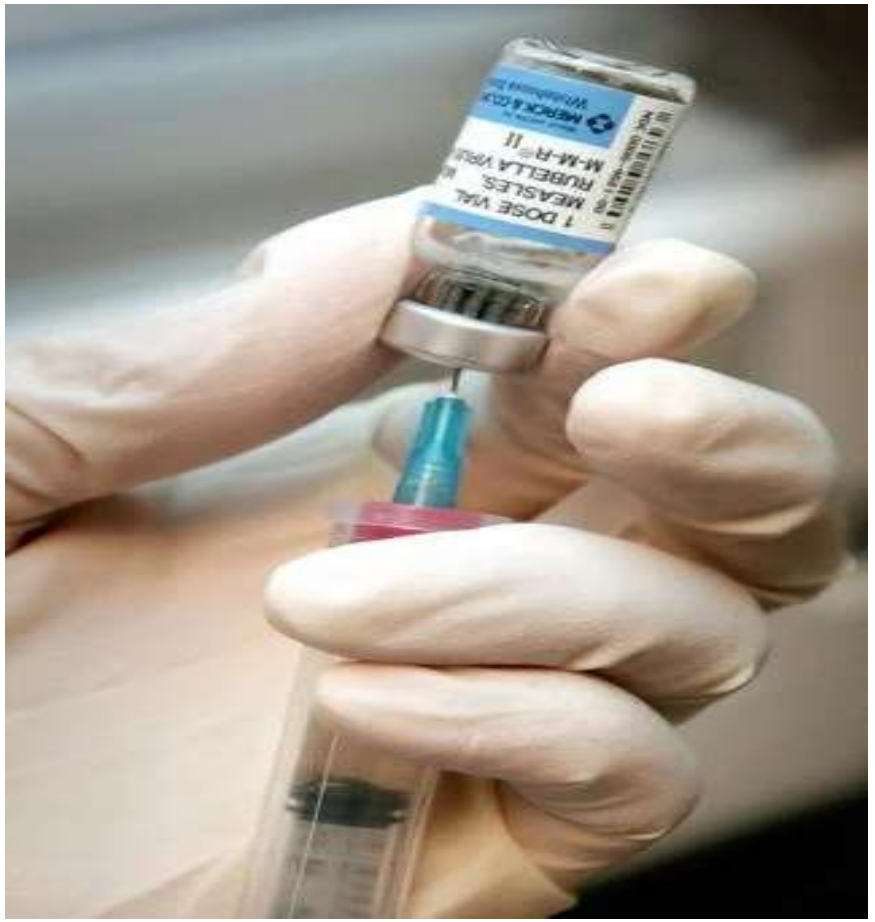
VACCINE-PREVENTABLE DISEASES

1.DIPHTHERIA



Introduction

- Diphtheria is highly contagious infection disease caused by bacterium called **Corynebacterium diphtheriae**. It causes serious breathing and swallowing problems but may also infect the skin. Bacterium releases a toxin that causes a build-up of gray tissue in throat, and over the tonsils.

Source of Infection

- Case or carrier more than 95% disease transmission is through carriers. There are nasal and throat carriers. Nasal carriers are very dangerous because of frequent shading of organism into environment. Immunization does not prevent carrier stage.

Incubation Period

- 2-6 days.

Host Factors

- Children of 1-5 years of age
- Common in both sexes
- Non immunized person can get diphtheria at any age
- Mostly occurs in winter months otherwise all season's disease.

Mode of Transmission

- Droplet infection (Mainly), also from Cutaneous lesions and fomites.

❖Screening and Diagnosis

-Shick Test(Immunity or Susceptibility test)

- An intradermal test of previously acquired immunity status and hypersensitivity to Diphtheria toxin.
- A skin test where a small amount of diluted toxin is injected. A red bump (positive) means the person lacks immunity and is susceptible; no bump (negative) means they are immune.

-Laboratory Tests (for active infection)

Culture & Toxin Tests: A sample from the throat (or skin wound for cutaneous diphtheria) is grown in the lab. Tests confirm if the bacteria produce the harmful diphtheria toxin (toxigenicity) using methods like the **Elek test** (immunodiffusion) or **PCR** (Polymerase Chain Reaction).

Prevention and Control

- Early detection through swab from nasal and throat for culture.
- Isolation of all cases suspected as well as carriers for at least 14 days.
- Vaccination against diphtheria in infants such as DPT vaccine or Pentavalent Vaccines.

WHOOPING COUGH/PERTUSSIS

- Whooping cough also called pertussis, is a highly contagious bacterial infection of the lungs and airways. It is the one of the six killer diseases of young children. Also known as “100 day cough”. It is known as “whooping cough” due to “whoop” noise created when gasping for air after bout of coughing.

Epidemiology

- **Causative agent:** Bordetella pertussis
- **Incubation period:** 7-14 days
- **Sources of infection:** Cases
- There is no subclinical or chronic carrier state.

Signs and Symptoms

- Mild at first and resemble those of common cold: like runny nose, nasal congestion, red, watery eyes, fever, cough. After 2-3 weeks worsen. Like thick mucus accumulation in airway causing uncontrollable coughing, excessive coughing may lead to vomiting, red and blue face, extreme fatigue end with a high-pitched “Whoop” sound.

Laboratory Tests

- **Polymerase Chain Reaction (PCR) Test:** A molecular test that detects the genetic material of the Bordetella pertussis bacterium in respiratory samples, such as throat swabs. PCR is highly sensitive and specific.
- **Cultures:** Respiratory samples, such as nasopharyngeal swabs, may be cultured to isolate the bacterium. Culture results take longer compared to PCR.
- **Serological Tests:** Blood tests to detect specific antibodies produced in response to pertussis infection. These tests may be used in certain cases.

Primary Management

- **Erythromycin (40 mg/kg × 10 days):** 4 divided doses
- Other possible alternatives are ampicillin, septran and tetracycline.
- **Prophylactic treatment for known contacts:** Erythromycin or ampicillin for 10 days.
- **Vaccine:** DPT is a combined Vaccine given to prevent thrice disease.

TETANUS

- A serious bacterial infection that causes painful muscle spasms and can lead to death. It effects the nerves. The disease causes muscle contractions, particularly of your jaw and neck muscles.

Epidemiology

- ***Causative Agent***
- **Clostridium tetani**—It can be destroyed by using steam under pressure.
- Soil and dust are the natural reservoir of Infection

Host Factors

- Occurs when spores of *Cl. tetani* enters the wound or Umbilical stump of newborn Can affects all ages person but seriously effects new born babies
- Rural area person > urban Community.
- Females > Male

Signs and Symptoms

- Fever, irritability, heavy sweating.
- Painful muscle spasms and stiff, immovable muscles in jaw.
- Tension of muscles around lips, sometimes producing a persistent grin
- Painful spasms and rigidity in neck muscles
- Rigid abdominal muscles
- Difficulty in Swallowing
- Opisthotonus—Spastic paralysis of the back
- Respiratory Complications

Prevention and Control/Treatment

- **Vaccination for children: (DTaP)** The DTaP is a series of five shots given in arm or thigh to children at ages: 2, 4, 6 months and 15-18 months and then 4–6 years.
- **Vaccination for children ages 7–18** Boosted shot at age 11-12. Called as Tdap vaccine.
- **Vaccine during pregnancy**
- **Antibiotics**

POLIOMYELITIS

- Poliomyelitis is a highly infectious disease caused by virus. The virus is transmitted by person to person spread mainly through the faecal-oral route or less frequently by common vehicle like contaminated water or food. It is a deadly infectious disease. In 1988, the World Health Assembly adopted a resolution for the Worldwide eradication of Polio. Polio mainly affects children under 5 years of age. However, without vaccination anyone can be affected. Infection further leads to Irreversible paralysis (usually in legs).

Symptoms

- Stiffness of neck and back muscles, Constipation.
- Sore throat, fever, tiredness, anorexia, nausea and Vomiting.
- Headache, abdominal pain difficulty in swallowing.
- Week or diminished tendon reflexes before the onset of paralysis, paralysis starts at the hip and descending to the distal parts e.g., away from center, i.e., hands and legs, weakness or loss of voice.
- Death can occur due to respiratory insufficiency

Laboratory Tests

- **Stool sample testing:** Stool samples are collected and tested to detect the presence of the poliovirus. This test is crucial for confirming the diagnosis of polio, particularly in cases where paralysis occurs.
- **Throat swab testing:** Throat swabs may be collected to identify the virus during the acute phase of infection.
- **Serological tests:** Blood tests can detect antibodies against the poliovirus, indicating exposure or vaccination history. These tests can provide valuable epidemiological data.

Preventive Measures

- Immunization
- Inactivated polio vaccine
- Oral polio vaccine

MEASLES (RUBEOLA)/10-DAY MEASLES/RED MEASLES

- Rubeola meaning red sports. It is a highly communicable viral disease. It is a highly contagious illness. Once quite common, can now almost preventable. It can be fatal for small children. Symptoms occurs after 8- 12 days of exposure. These symptoms can last up to 10-14 days. It is not the same as German measles or Rubella. The virus that causes measles is different than the Virus that causes German Measles. German Measles are very serious for pregnant women.

Mode of Transmission

- Droplet nuclei from Infected person to person. Infective period is 4 days before and 4 days after the development of rashes.
- **Incubation Period**
- 10 days from exposure to onset of fever. Rashes occurs at about 14 days after exposure.

Clinical Features

- **This occurs in three stages:**
- **Prodromal stage:** Sign and symptoms are cough, coryza and conjunctivitis, photophobia, Koplik spots (Bluish red sports on white base in the mouth), fever.
- **Eruptive stage:** Behind the ear, red rash begins to appear and then spread to all over the body within 2-3 days.
- **Post measles stage:** Weakness, weight loss, diarrhea, pyogenic infections, reactivation of pulmonary tuberculosis.

Laboratory Testing

- **Serological tests:** Blood tests that detect antibodies against the measles virus can confirm recent infection or immunity due to vaccination or prior infection.
- **PCR testing:** Molecular tests that detect the genetic material of the measles virus can confirm active infection. This is especially important during outbreaks or in individuals with atypical symptoms.
- **Public health reporting:** Healthcare providers are often required to report suspected and confirmed measles cases to public health authorities for surveillance and control measures.

Prevention and Control Measures

- Measles vaccine at the age of 9 months. It is alive-attenuated virus. Dose is 0.5 mL/subcutaneously.
- **Combined vaccine:** MMR (0.5 mL) in two shots. 1st— Age of 12-15 months. 2nd—4-5 years of age.
- **Other methods** Isolation for 7 days
- Immunize contacts
- Measures to prevention air borne transmission

VIRAL HEPATITIS

- **Introduction**
  - Hepatitis is an infection of liver, which can be caused due to various reasons like, virus attack, consumption of alcohol, diseases targeting self immune system, and certain types of drugs.
  - The most prominent infection is caused due to virus attack. Viral hepatitis is an extensive infection which infects the liver who is already inflamed with the primary infection.

Classification of Viral Hepatitis

Hepatitis A Viral (HAV)

- Hepatitis A is a contagious infection which effects the liver to a greater extent and need to be treated as soon as possible. It is caused by hepatitis A virus (HAV).
- **Prevention and Control Measures**
- Hepatitis A vaccine
- Prohibit from any sexual contact with an infected person
- Food and health hygiene.
- Proper rest
- Adequate dietary supplements.

Hepatitis B

- One of most dangerous and common infectious disease of the liver. It is the consequence of persistent hepatitis B Virus infection which consists of various diseases like liver cirrhosis Jaundice, carcinoma of Hepatocytes, chronic Hepatitis disease.
- It is a double-stranded circular DNA virus and belongs to hepadna virus family.
- **Prevention and Control Measures**
- Vaccination (recombinant)
- Hepatitis B immunoglobulin (HBIG) should be given to the client who has an incident and exposed within 48 hours.
- Immunoglobulins should be administered to neonates whose mothers are HBsAg positive.

- **Hepatitis C**
  - This is an infectious disease which is caused by hepatitis C Virus. Chronic Hepatitis can lead to scar formation in Liver and also causes cirrhosis of liver. In India is too prevalent and mainly affected 12.5 million cases.
  - Hepatitis C belongs to Hepatic virus germs and a family Flaviviridae. This virus is linear, single-stranded RNA Genome. This Virus though replicate in Liver but can also multiply in lymphocytes.
- **Prevention and Control Measures**
  - Screening of blood or liver can be done to identify the prevalence of antigen of hepatitis C virus no other immunization is available.

- **Hepatitis D**
  - Hepatitis D also known as “delta Hepatitis” is a disease which is caused by a small circular enveloped RNA virus. It mostly occurs into the presence of the Hepatitis B virus (HBV) and hence be a subviral Satellite. It is a liver infection which is spread through an infected blood or body fluids of an infected person enters the body of noninfected person.
- **Prevention and Control Measures of Hepatitis D**
- Proper screening of blood donor for Hepatitis B virus antigen.
- Giving prophylaxis for pre- and postexposure.
- Practicing safe sex.
- Avoid using infected equipment.

Hepatitis E

- It is like other a liver disease which is caused by Hepatitis E virus. This Virus is a positive sense single-stranded RNA, which is icosahedral Virus. The first Virus outbreak in India was reported in 1955, New Delhi.
- **Prevention and Control Measures**
  - Maintaining Water standards
  - Self Hygiene
  - Proper disposal of Sanitary Waste
- Uncooked food should not be consumed.

THANK YOU