AIR BORN INFECTIONS (INFECTIONS (ACQUIRED THROUGH THE RESPIRATORY TRACT)

Definition: These are infections which involve part of the respiratory system and caused by a variety of viruses, bacteria and mycoplasma.

They represent, together with malnutrition and diarrhoeal diseases the three major causes of morbidity and mortality in developing countries. The main risky individuals are children aged under five years.

Importance: Evidence based on many sources indicates that these infections:

1. **Account for 30-50% of outpatient consultations in paediatric hospitals.**
2. **They are responsible for 25-30% of paediatric mortality.**
3. **Acount for 10-30% of admissions to paediatric wards.**
4. **Each child has on average 3-8 episodes each year accounting at global level for about 238 million attacks per year.**
5. **They consume substantial portion of antibiotics.**
6. **The incidence of acute respiratory infection is almost the same in developed and developing countries but the incidence of severe forms such as pneumonia, severe complications and fatal outcomes is more frequent among children in developing countries.**

Age specific death rate per 100 000

Population	Infants	1-4	5-14
Europe	390	15	2
Developing countries	1243	204	23

Causes:

There are more than 300 organisms causing acute respiratory infection.

Clinical varieties:

Influenza, measles, diphtheria, pertusses, sinusitis, acute otitis media, nasopharyngitis, tonsilitis, epiglottitis, laryngitis, tracheitis, acute bronchitis, the pneumonias, and bronchiolitis.

Classification

1. **Anatomical classification: Upper and lower respiratory infections.**
2. **Aetiological classification:Bacterial, viral, chlamydial, rickettsial, fungal, metazoal (Lofflers syndrome related to Ascaris) and protozoal.**

3. **Clinical classification: A recently advocated classification by the World Health Organization (WHO). It is a management oriented classification and is very promising within the primary health care approach. Cases are grouped into:**

cough &cold,

pneumonia,

severe pneumonia and

very severe pneumonia

Risk factors

1. **Malnutrition: Acute respiratory infection is common where malnutrition is common. However, the causal association between the two is not clear. Both may be a reflection to low standard of living and poor living environment.**

2. **Lack of breast feeding: It is evident that breast feeding may play a protective role against ARI.**

3. Low birth weight and prematurity.

4. Household air pollution: This is related to the fuel used in cooking and or heating.

5. Tobaco smoking and smoking habits of parents. It is evident from hospital and population based studies that parental smoking carries higher risk of ARI among children of such parents.

6. Presence of siblings with ARI.

7. Socioeconomic factors such as income, education, family size and crowding, maternal employment

8. Day care centres and nurseries. This is probably related to the presence of many children in a confined space which facilitates the transmission of infection.

9. Seasonal variation: although it is not easy to identify an aetiological link between ARI and low temperature, the incidence of ARI is greater in cold season.

Prevention and Control

A. Difficulties with ARI control

1. Mutation of the microorganism.

2. Change in the immunological structure.

3.Short lived immunity following natural infection.

4. Lack of effective immunization against most ARI infections.

5. Infection is regarded as trivial by people and they continue their daily activities and spread infection to others.

B.Requirements for effective prevention and control measures

1. Knowledge of the natural history with special emphasis on risk groups.

2. Community surveys to determine incidence and actions taken by people in response to illness.

3. Studies of risk factors and causes of different types of diseases.

4. Studies on the frequency of severe forms of ARI.

C. Objectives of prevention and control

1. To reduce mortality which result from severe forms of ARI.

2. To facilitate the management of cases by doctors as well as medical assistants

3. To rationalize the use of antibiotics in the treatment of ARI for economic reasons and to minimize the development of drug resistance.

4. To involve parents in the control efforts against ARI.

D. Prevention strategies

1. Immunization against tuberculosis, measles, diphtheria and pertusses.

2. Encouragement of breast feeding which is considered as a contributory factor in the reduction of ARI in infants.

3. Health education which aims at:

-Educating the community regarding supportive treatment

-Promoting timely immunization.

-Reducing parental smoking and other domestic air pollution.

- Increasing mother abilities to recognize severe cases of ARI and to take proper and immediate action.

4. Case management: This is based on two stages:

First is to assess the case to classify it according to severity. The assessment is based on full history and physical examination. The following are important to consider in clinical assessment of a child with ARI

a. Count the breaths in one minute: Fast breathing is when the respiratory rate exceeds

60 bpm for children aged <2 months

50 bpm for children aged 2-12 months

40 bpm for children aged 1-5 years

b. Look for chest indrawing

c. Look and listen for strider

d. Look for wheeze

e. See if the child is sleepy or drowsy

f. Feel for high or low temperature

g. Check for severe malnutrition

h. Look for cyanosis as a sign of hypoxia

Second is to treat the case according to specific plan.

Cough and cold

Characterized by cough but no difficult breathing, chest indrawing or other danger signs. The treatment consists of reassurance of the parents, antipyretics if fever exists and fluids. NO antibiotics.

Mild or moderate pneumonia

Typically, such a case is characterized by cough and rapid respiratory rate, difficult breathing but no chest indrawing or other danger signs. The treatment consists of supportive treatment plus antibiotics and sent home. No referral to hospital but the mother is asked to come back after two days for re-evaluation.

Severe pneumonia

Cough and difficulty in breathing, chest indrawing but no other danger sign. The child is managed with first dose of antibiotic and referred to hospital immediately.

Very severe pneumonia (Very severe disease)

Cough or difficult breathing and any of the following danger signs

*** Inability to drink**

*** Convulsions**

*** Abnormal sleep, difficult to wake, convulsions**

*** Malnutrition**

*** Strider on rest**

The treatment include first dose of antibiotics, immediate referral to hospital(you may start iv fluid if referral is not immediate)

Critical indications for referral

*** age less than two months**

*** presence of danger signs**

*** failure to improve with appropriate therapy after 2-4 days**

*** history of cystic fibrosis or severe asthma**

*** immuno-compromised children**

Sore throat

The main varieties are pharyngitis and tonsillitis. They account for up to 70% of all cases of upper respiratory tract infection among patents attending primary health care centres.

Common causes of sore throat

1.Infectious causes:

Virus	**50-80%**
Group A B strep.	**5-35%**
Infectious mononucleosis	**1 –10%**
Chlamydia or mycoplasma	**5%**
Haemophilus influenzae B	**1 – 2%**
Other infectious agents	**1%.**

2. Non-infectious causes:

- Gasteroesophageal reflux

-Postnasal drainage secondary to allergic rhinitis

-Acute thyroiditis

-Persistent cough

Group A ß streptococcal infection

- **More common in young school children than any other age group.**
- **Usually rapid onset of symptoms over 24 hours or less.**
- **Sore throat and pain on swallowing is most common feature. Some children may complain of malaise, abdominal pain or back pain.**
- **Usually very few associated respiratory symptoms such as cough or runny nose.**
- **Look for four key symptoms and signs:**

A.Fever above 38.5C.

B.Tender enlarged cervical lymph nodes.

C.Purulent exudates on tonsils.

D.Absence of cough.

The likelihood of Group AB strept. Infection with these features

Number of features	**Probability of Strep infection**
1 .	**5-9%**
2 .	**12-15%**
3 .	**27-40%**
4 .	**55-65%**

Treatment of high probability Strep. Infection

1-Confirm with culture.

2-Treatment with antibiotics reduces symptoms by 1-2 days but reduces transmission of infection and the risk of rheumatic heart disease.

3-Antibiotic treatment does not reduce the risk of glumeriolonephritis

1.Use Penicillin G(250 x 4) for 10 days or Benzathine penicillin 1.2 million units as a single dose. In children allergic to penicillin, use erythromycin (400 mg x 3) for 10 days. Cephalosporines can also be used.

2.One dose of dexamethasone(10 mg IM or orally) for severe sore throat pain. Not effective in immunosupressed cases.

3.More fluids.

4.A child with sore throat who is on antibiotics at home must return to the doctor immediately if:

- **There is difficulty in breathing, opening of the mouth or swallowing.**
- **Persistent fever after two days of antibiotics use.**
- **Rash is noted.**

Persistent fatigue or weakness is noted

- ■
- ■
- ■
- ■ *Mycobacterium leprae:*the organism has not been grown in bacteriologic media or cell cultures . *occurrence:* the world prevalence in 1997 was estimated by WHO to be 1.15 million cases

prevalence rates of more than 5/1,000 are common in the rural tropics and subtropics ; sociocconomic conditions may be more important than climate it self . the chief endemic areas are in south and southeast asia

reservoir: humans are the only *reservoir* of proven significance

Mode of transmission: millions of bacilli are liberated daily in the nasal discharges of untreated lepromatous patient ,and bacilli have been shown to remain viable for at least 7days in dried nasal secretions.cutaneous ulcers in lepromatous paients may also shed large numbers of bacilli .

. *incubation period:* the range is from 9 months to 20 years. The averange is probably 4 years for tuberculoid and twice that for lepromatous leprosy.

Period of communicability:infectiousness is lost in most instances within 3 months of continuous and and regular treatment with dapsone(DDS) or clofazimine, or within 3days of treatment with rifampin.

*Methods of control:*the availability of drugs effective in treatment and in rapid elimination of infectiousness, such as rifampin, has changed the management of the patient with leprosy from, societal isolation with attendant despair to one of ambulatory treatment. Hospitalization is reserved only for managing reactions,surgical correction of deformities and treatment of ulcers resulting from anesthesia of the extremities.

*A.*preventive measures:

- *1)* health education should stress the availability of effective multidrug therapy.

2) detect cases, particulary infectious multibacillary cases,early and administer multidrug therapy on a regular outpatient basis whenever possible.

- *Control of patient,contacts and the immediate environment:*
- 1: report to local health authority
- 2: *Isolation*: none for cases of tuberculoid leprosy contact isotlation for cases of lepromatous leprosy until multidrug therapy for cases of lempromatous leprosy has been established.
- 3:*concurrent disinfection*: of nasal discharges of infectious patients.

7:*specific treatment:* with the widespread prevalence of dapsone resistance and the emergence of resistance to rifampin, combined chemotherapy by WHO for multibacillary leprosy is rifampin 600 mg once monthly ; dapsone (DDS) 100 mg/day; and clofazimine,300mg once monthly and 50mg/day.

. The minimum duration of therapy for multibacillary leprosy can be shorted to 12 months from the previously recommended 24 months. For early paucibacillary (tuberculoid) leprosy, or patients with a single skin lesion,a single does of multidrug therapy(600 mg rifampin,400mg ofloxacin and 100mg minocyclone) in paucibacillary, lepresy, patient with more than one skin lesion the recommended regimen (600 mg rifampin once a month(supervised) and 100 mg dapsone daily) should b given for 6 monts.

- **Pertussis**
  (Whooping Cough)

Identification: an cute bacterial disease involving the respiratory tract. the initial catarrhal stage has an insidious onset with an irritating cough that gradually becomes paroxysmal, usually within 1-2weeks,and lasts for 1-2months or longer,paroxysm,are characterized by repeated violent coughs each series of paroxysms has many coughs without intervening inhalation and can be followed by a characteristic crowing or high-pitched inspiratory whoop .

paroxysms frequently end with the expulsionof clear tenacious mucus,often followed by vomiting .infants less than 6months old,adolescents and adults often do not have the typical whoop or cough paroxysm.

parapertussis is a similar but usually milder disease. it usually occurs in school age children and is relatively

infrequent. differentiation between bordetella parapertussis and pertussis is based on culture, biochemical and immunologic differences.

infectious agents- B.pertussis ,the pertussis bacillus; B.parapertussis causes parapertussis.

Occurrence- an endemic disease common to children(*especially young children*) everywhere,regardless of ethnicity.climate or geographic location- outbreaks occur periodically.A marked decline has occurred in communities with active immuniztion programs and where good nutrition and medical care are available .

reservoir- humans are believed to be the only host.

Mode of transmission- primarily by direct contact with discharges from respiratory mucous membrances of infected persons by the airborne route, probably by droplets.
Incubation period- commonly 7-20 days.

Period of communicability- highly communicable in the early catarrhal stage before the paroxysmal cough stage thereafter,communicability gradually decreases and becomes negligible in about 3weeks for nonhousehold contacts,despite persisting spasmodic cough with whoop.

When patient treated with erythromycin the period of infectiousness usually is 5 days or less after onset of therapy

Susceptibility and resistance- susceptibility of nonimmunized individuals is universal ,transplacental immunity in infants has not been demonstrated .it is predominantly a childhood disease.incidence rates of reportedisease are highest in children under 5 years of age, milder and missed atypical cases occur in all age groups.one attack usually confers prolonged immunity although second attacks(some of which may be due to B.parapertussis) can occasionally occur.

prevention1- educate the public,particulary parents of infants,about the dangers of whooping cough and on the advantages of initiating immunization at 2months of age and adhering to the immunization schedule.

2- active primary immunization against.B pertussis infection is recommended with 3 doses of a vaccine consisting of a suspension of killed bacteria,usually in combination with diphtheria and tetanus toxoids.

- DtaP is recommended to be given at 2,4 and 6 months of age, booster doses are recommended at 15-18 months of age and at school entry. vaccines containing pertussis are not recommend after the 7th birthday.
- the efficacy of the vaccine in children who have received at least 3doses is estimated to be 80percent

when an outbreak occurs. consider protection of health workers who have been exposed to pertussis cases by using a 14-days course of erythromycin.

- control of patient,contacts and the immediate environment:
- 1/ report to local health authority.

2/ Isolation: respiratory isolation for known cases, suspected case should be removed from the presence of young children and infants, especially no immunized infants, until the patients have received at least 5 days of minimum 14-days course of antibiotics. suspected case who do not received antibiotics should be isolated for 3 weeks

3/ concurrent disinfection: discharge from nose and throat and articles soiled by them

- 4/ quarantine: inadequately immunized household contacts less than 7 years of age should be excluded from school, day care centers and public gatherings for 21-days after last exposure or until the cases and contacts have received 5-days of a minimum 14-days course of appropriate antibiotics.

5/protection of contacts:

passive immunization is not effective and the initiation of active immunization to protect against infection following recent exposure is also not effective. close contacts under 7 years of age who have not received 4 DtaP/DTP doses or have not received a DtaP/DTP doses within 3 years should be given a doses as soon after exposure as possible.

A 14-days course of erythromycin for household and other close cotacts,regardless of immunization status and age ,is recommended.

6/specific treatment: erythromycin shortens the period of communicability, but dose not reduce symptoms except when given during the incubation period, in the catarrhal stage or early in the paroxysmal stage of the disease.

Q/ What are the impotant complications of pertussis?

Mumps

1-identification- an acute viral disease characterized by fever,swelling and

tenderness of one or more salivary glands,usually the parotid and sometimes the sublingual or submaxillary glands.

orchitis most commonly unilateral occurs in 20%-30% of postpubertal males,and mastitis occurs in up to 31% of females older than 15 years ,sterility is an extremely rare sequel.as many as 40%-50% of mumps infection have been associated with respiratory symptoms, particularly in children less than 5 years.

Infectious agent

mumps virus a mumber of the family paramyxoviridae genus paramyxovirus, is antigenic ally relate to the parainfluenza viruses.

Occurrence: mumps is recognized less regularly than other common communicable diseases of childhood such as measles and chickenpox ,although serologic studies show than 85% or more of people have had mumps infection by adult life in the absence of immunization ,about 1/3 of exposed

susceptible people have inapparent infections ,most infection in children less than 2 years of age are sub clinical, winter and spring are seasons of greatest incidence.

- *Reservoir-* humans.
- *Incubation period-* about 15-18 days .
- *Period of communicability-* virus has been isolated from saliva from 6-7 days before overt parotitis to 9days after onset of illness maximum infectiousness occurs between 2 days before to 4 days after onset of illness

Susceptibility and resistance- immunity is generally lifelong and develops after either inapparent or clinical infection. most adults are likely to have been infected naturally and may be considered to be immune, even if they did not have recognized disease.

- *Preventive measures-*
- *1/ public education by health care providers should encourage mumps immunization for all susceptible individuals over 1 year of age*
- *2/ alive attenuated mumps virus vaccine. in combination with rubella and measles live virus vaccines(MMR) .which is given at age of 12-15 months*
- *Vaccine is contraindicated in the immunosuppressd.*
- *Pregnant females or females trying to get pregnant in the next 3 months should not receive mumps vaccine.*
- *control of patient ,contacts and the immediate environment:*
- 1*/ report to local health authority*. 2/ *Isolation: respiratory isolation and private room for 9-days from onset of swelling, exclusion from school or workplace until 9-days after onset of parotitis .*
- 3/*concurrent disinfection: of articles solid with nose and throat secretions*.
- 4/quarantine: exclusion of susceptible from school or the workplace from the 12th through the 25th day after exposure if other susceptible are present.
- 5/*immunization of contacts:* although immunization after exposure to natural mumps may not prevent disease in contacts ,those who do not develop disease would be protected against infection from subsequent exposures. IG is not effective and not recommended .
- 6/*investigation of contacts and source of infection*: susceptible contacts should be immunized
- 7/*specific treatment: none*.
- **Q/ What are other complications of mumps?**

- **Q/How can you diagnose mumps clinically?**
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- **DIPHTHERIA**
- . Identification-An acute bacterial disease that primarily involves the tonsils, pharynx, larynx, nose, occasionally other mucous membranes or skin and sometimes the conjunctivae or vagina.
- The characteristic lesion, caused by liberation of a specific cytotoxin which is an asymmetrical
- adherent grayish white membrane with surrounding inflammation

Infectious agent – Corynebacterium diphtberiae of gravis, mitis or intermedius biotype. Toxin production

- results when the bacteria are
- infected by corynebactcriophage containing the diphtheria gene tox.
- Nontoxigenic strains rarely produce local lesions; however, they have been
- increasingly associated with infective endocarditis.
- **Occurrence-** A disease of colder months in temperate zones, that
- primarily involves nonimmunized children under 15 years of age; often
- found among adults'in population groups whose immunization was
- neglected. In_the tropics, seasonal trends are less distinct; inapparent,
- cutaneous and wound diphtheria cases are much more common.
- This epidemic began to decline after
- reaching a peak in 1995; however, it ,was responsible for more than 150,000 reported cases and 5000 deaths between 1990-1997
- **Reservoir-Humans**
- **Mode of transmission**-Contact with, a patient or carrier ,more rarely Contact with articles soiled with discharges from lesions of infected people.
- Raw milk has served as a vehicle

- **Incubation period**-Usually 2-5 days, occasionally longer.
- **Period of communicability**- variable until virulent bacilli have
- disappeared from discharges and lesion; usually 2 weeks or less and
- rarley more than 4 weeks. Effective antibiotic therapy promptly terminates
- shedding. The rare chronic carrier may shed organisms for six months or more

prevention

- 1) Educational measures are important, inform the public and
- particularly the parents of young children, of the hazards of
- Diphtheria and the necessity for active immunization
- 2) the only effective control is
- widespread active immunization
- with Diphtheria toxoid. Immunization should be initiated in
- infancy with a formulation containing diphtheria toxoid
- tetanus toxoid and either acellular pertussis antigens (DtaP) or whole cell pertussis vaccine (DtP)
- a) For children less than 7 years of age
- A primary series of diphtheria toxoid combined with other
- antigens, The first 3 doses are
- Given at 2, 4, 6-months
- a fourth dose is given 6-12 months after the
- third dose.
- A fifth dose is given at 4-6 years of age prior to school entry.
- b) For persons 7 years of age and older
- Because adverse reactions may increase with age, a preparation
- with a reduced concentration of diphtheria toxoid
- (adult Td) is usually used after the 7th birthday for booster

- doses.
- c) Active protection should be maintained by administering a
- dose Of Td every 10 years thereafter.
- 4) Special efforts should be made to ensure that those who are,at
- higher risk of patient exposure, such as health workers, are
- fully Immunized and receive a booster dose of Td every 10
- years.
- 5) For children and adults who are severely immunocompromised
- or infected with HIV, diphtheria immunization is
- indicated. Use the same schedule and dose as for immunocompetent
- persons,

Control of patient, contacts and the immediate environment

1) Report to the local health authority.

- 2) Isolation: Strict isolation for pharyngeal diphtheria, contact
- isolation for cutaneous diphtheria, until two cultures from both throat and nose (and skin lesions in cutaneous diphtheria),
- taken not less than 24 hours apart, and not less than 24
- hours after cessation of antimicrobial therapy, fail to show
- Diphtheria bacilli
- 3) concurrent disinfection: Of all articles in contact with patient
- 4) Quarantine: Adult contacts whose occupations involve handling
- food (especially milk) or close
- association with nonimmunized
- children should be excluded from that work until they
- have been treated
- 5) Management of contacts: All close contacts should have

- cultures taken from the nose and throat and should be kept
- under surveillance for 7 days. A single dose Of benzathine
- penicillin or a 7-10 day course of
- erythromycin is recommended for all persons
- household exposure to diphtheria. regardless of their immunization status
- 6) specific treatment: If diphtheria is strongly suspected on the
- basis of clinical findings, antitoxin should be given immediately after bacterio-
- logic specimens are Taken,
- Antibiotics are not a substi-
- tute for antitoxin.
- Procaine penicillin G (IM) or parenteral erythromycin has been recommended until the
- patient can swallow comfortably, at which point erythromycin
- in 4 divided doses or penicillin V PO (orally)may be substituted for a recommended total
- treatment period of 14 days
- Prophylactic treatment of carriers: A single dose of benza-
- thine penicillin or a 7-10 day course of
- erythromycin (PO) has been recommended
- **Q/What are the local and systemic effects of diphtheria?.**
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- **Rubella** (Commonly known as German measles or 3 day measles). "Rubella mean little red". It's an infection that primarily affects the skin and lymph nodes.

- It's a mild disease in children and adults, but can cause devastating problems if it infects the fetus, especially if infection is in the first few weeks of pregnancy.
- **Causative agent of Rubella**: is Rubella virus which is a member of the Rubri virus genius of the Toga virus family.
- **Mode of Transmission:** The rubella virus passes from person to person through tiny drops of fluid from the nose and throat. Also it can pass through a pregnant woman's blood stream to infect her unborn child. Which may cause congenital rubella syndrome in developing babies
- **Incubation period:** 14 – 23 days.
- **Period of communicability:** people who have rubella are most contagious from 1 week before to 1 week after the rash appears. Infant who have congenital rubella syndrome can shed the virus in urine and fluid from the nose and throat for a year or more and may pass the virus to people who have not been immunized.

Epidemiology of Rubella: Before a vaccine against rubella became available in 1969, rubella epidemics occurred every 6 to 9 years,

children at age of 5 to 9 were primarily affected, and many cases of congenital rubella occurred as well, now due to immunization of children, there are much fewer cases of rubella and congenital rubella.

Most rubella infections today appear in young non – immunized adults rather than children.

- **Complications:**
- Rubella is generally a mild infection, so any one had the disease, he was usually permanently immune.
- About 70% of adult women with rubella experience arthritis that lasts for about one month.
- In rare cases, rubella can cause an ear infection (otitis media) or inflammation of brain (encephalitis).
- The most important complication or rubella occur when women contract rubella during pregnancy, the consequences for her unborn child may be sever. The risk to a fetus is highest in the first few weeks of pregnancy and then declines in terms of both frequency and severity, although there is still some risk in second trimester.
- If non – immune mothers are infected in the first – trimester, up to 80% of neonates may have congenital rubella syndrome

The sequelae of congenital rubella syndrome are:

1. Hearing loss.

2. Congenital heart defects such as ductus arteriosis and others.

3. Neurologic problems (psychomotor retardation, mental retardation, microcephaly).

4. Opthalmic problems (Cataract, glaucoma, retinopathy, micropthalmia).

5. Intrauterine growth retardation.

6. Thrombocytopenic purpura.

7. Hepatomegaly.

8. Splenomegaly.

There may also be variety of other problems including bone lesions, pheumonitis etc.

Prevention:

- The only way to prevent rubella is by receiving
- MMR vaccine which recommended for all children at age of 12 – 15 months and again between 4 and 6 years of age (before entering school).
- Also the vaccine should be given to high risk
- groups which include those who are:
    - Non pregnant woman of child bearing age.
    - Attend college, trade school or postsecondary school.
    - Work in a hospital, medical facility, child care center or school.
    - Plan to travel.

Control:

1. Reporting of the case to the local health authorities.

2. Contact isolation.

3. Exclusion of children for 7 days after onset of rash.

4. Investigation of contact and source of infection.

5. Immunization of the content is not recommended.

- **Q/How you can mange pregnant women with Rubella?**

- **Chicken pox**
- **Is a common illness among children,**
- **particularly those under the age of 12. An**
- **itchy rash of spots that look like blisters can**
- **appear all over the body and may a**
- **companied by flu – like symptoms.**
- **Causative agent**
- **Human herpes virus 3 (Varicella – Zoster virus) (VZV) which is a member of Herpes virus group.**
- **- A person usually has only one episode of chicken pox, but (VZV) can lie dormant within the body and cause different type of skin eruption later in life called shingles (herpes zoster).**
- **Mode of Transmission**
- **From person to person by direct contact.**
- **Droplet or airborne spread of vesicle fluid or secretions of the respiratory tract.**
- **Indirectly through articles freshly solid by discharges from vesicles.**
- **Incubation period**: from 2 to 3 weeks.

- **Period of communicability**

Chicken pox is contagious from about 2 days

before the rash appears and lasts until all the

blisters are crusted over

- **Complication**
- **Chicken pox is mild Illness, but can affect some infant, teens, adults and people with weak immune systems more severely. Some people can develop serious bacterial infection involving:**
- **Skin.**
- **Lung.**
- **Bone and joint.**

- **Brain (encephalitis).**
- **Even children with normal immune systems**
- **can occasionally develop complications,**
- **most commonly a skin infection near the**
- **blisters.**
- **Chicken pox and pregnancy**
- **If a pregnant woman who hasn't had chicken pox in the past contract it (especially in the 1st 20 weeks of pregnancy), the fetus is at risk for birth defects and she is at risk for health complication than if she had been infected when she was not pregnant**
- **If she develops chicken pox just before or after the child is born, the newborn is at risk for serious health complication. There is no risk to developing baby if the woman develops shingles during pregnancy.**
- **A pregnant woman who has had chicken pox before pregnancy, her baby will be protected from infection for the first few months of life.**
- **Prevention**
- **Immunization against chicken pox by giving live attenuated varicella virus vaccine 0.5 ml (SC) dose of age 12-15 months old and booster shot at 4-6 years old.**
- **The vaccine is about 70% to 85% effective at preventing mild infection and more than 95% effective in preventing moderate to sever forms of the infection**
- **Although the vaccine works pretty well, some children who are immunized still will get chicken pox, but will have much milder symptoms.**
- **Healthy children who have had chicken pox usually develop life long protection.**
- **Control**
- **1.Report to local health authority.**
- **2.Isolation: exclude children from school until vesicles become dry, usually after 5 days.**
- **3.Concurrent disinfection of articles soiled by discharge from nose, throat.**
- **4.Protection of contacts: vaccine is recommended for use in susceptible person following exposure to varicella.**

- **Viricella Zoster immuno-globulin (VZIG) given within 96 hours of exposure may prevent or modify the disease in susceptible close contacts of cases.**
- **VZIG indicates for certain high risk person exposed to chicken pox including:**
- **New borns of mothers who develop chicken pox within 5 days prior to or within 48 hours after delivery.**
- **Children who are receiving drugs that suppress the immune system.**
- **People with leukemia or immune deficiencies**
- **5.Investigation of contact and source of infection.**
- **6.Treatment of the cases.**

Q/ Describe the lesion of chickenpox from starting until its become crusted

Q/ How you can differentiate chickenpox from smallpox clinically?

Q/ What are the criteria that help in eradicate smallpox?

MENINGITIS

Definition of meningitis

1. Viral meningitis: Relatively common but rarely serious clinical condition. It is caused by a variety of infectious agents, many of which are associated with other specific diseases. In about 50%, the aetiology can not be identified.

Important viruses are:

a. Mumps virus responsible for most of epidemics (more than 25%) in nonimmunized populations.

b. Enteroviruses.

c. Coxsackievirus group B

d. Echovirus.

e. Other viruses (poliovirus, measles virus)

2. Bacterial meningitis. This is more serious disease and the main causes are:

a. Neisseria meningitides causing meningococcal meningitis.

b. Pneumococcal pneumoniae causing pneumococcal meningitis

c. Haemophilus influenzae serotype B causing haemophilus meningitis.

Bacterial Meningitis Facts

There are 1.2 million cases annually worldwide, approximately 135,000 deaths.

Bacterial meningitis is 1 of the top 10 infectious causes of death worldwide, according to the CDC.

Half of survivors suffer neurological damage, and/or other permanent side effects.

Symptoms

Most Common

Fever

Headache

Stiff Neck

Nausea & vomiting

Sensitivity to light

Confusion

Sleepiness

In Infants

Inactivity

Irritability

Vomiting

Poor feeding

Advanced Disease

Bruises develop under skin & spread rapidly

Advanced Disease can lead to:

Brain Damage

Coma

Death

Common epidemiological and biological features:

1. All these three organisms posses a capsule which is important in determining of virulence.

2. There are many serotypes particularly for N. meningitides and Streptococcus pneumoniae.

3. Most episodes of acute bacterial meningitis occur in previously health persons, special higher risk groups are:

A. **People with fractured skull.**

B. **People with primary antibody or complement deficiency.**

C. **People with sickle cell disease.**

D. **Neonates.**

4. **H. influenzae meningitis is associated with genetic predisposition.**

5. **Spread of infection is usually be droplets (respiratory droplets) favoured by overcrowding. It may follow blood borne spread from upper or lower respiratory tract. S. pneumoniae and H. influenzae are usually secondary to infection elsewhere in the body.**

6. **Septicaemia may produce pyogenic lesions.**

7. **Two main barriers protect the meninges from being infected.**

A surface defense mechanism of the nasopharynx (IgA) and a bactericidal substance in the plasma.

Comparative epidemiology

	M. menigitis	S. menigitis	H. influenzae
Reservoir	**man**	**man**	**man**
IP	**2-10 days**	**?**	**2-4 days**
Transmission	**airborne**	**airborne**	**airborne**
Communicability	**As long as microorganisms are present in the secretions of patients. When antibiotic therapy starts, patients are usually no longer infectious to others within**		
	24 hrs.	**24-48 hrs.**	**24-48 hrs.**
Immunity:	**Exists but**	**May last for**	**Not definite**
	Duration ?	**years**	

Prevention:

a. avoidance of close contact.

b. reduction of overcrowding in living and work places).

C. Immunization is of limited application except for M. meningitis

d. Chemoprophylaxis:(rifampicin, ceftriaxone, ciprofloxacin, sulphdiazine). It helps to:

1. protect susceptible persons.

2. abort early clinical cases.

3. eliminate carriers.

<u>Control measures</u>

1. **Notification.**
2. **Isolation as long as infection is likely to be transmitted to others.**
3. **Chemoprophylaxis for close contacts may be useful in epidemic situation**
4. **Treatment of the case with appropriate antibiotics.**

Measles

Measles is a highly contagious viral disease. In

2006, measles killed 242,000 children worldwide. In most people, the disease produces fever (temperature > 101 F [38.3 C]), a generalized rash that last greater than three days, cough, runny nose (coryza), and red eyes (conjunctivitis). The complications of measles that result in most deaths include pneumonia and inflammation of the brain (encephalitis).

Rubeola **is the scientific name used for measles. It should not be confused with rubella (German measles) which is a different viral illness..**
The causative agent of Measles is the measles virus
(*a paramyxovirus*).

Mode of transmission
Measles is spread through droplet transmission from the nose, throat, and mouth of someone who is infected with the virus. These droplets are sprayed out when the infected person coughs or sneezes. Among unimmunized people exposed to the virus, over 90% will contract the disease.

The infected person is highly contagious for

four days before the rash appears until four

days after the rash appears. The measles

virus can remain in the air (and still be able

to cause disease) for up to two hours after an

infected person has left a room.

How does one become immune to measles?
Anyone who has had measles is believed to be immune for life. People who have received two doses of vaccine after their first birthday have a 98% likelihood of being immune. Infants receive some immunity from their mother. Unfortunately, this immunity is not complete, and infants are at increased risk for infection until they receive the vaccination at 12 to 15 months.

Risk groups for measles
Those people at high risk for measles include:
children less than 1 year of age (although they have some immunity passed from their mother, it is not 100% effective),
people who have not received the proper vaccination series,
people who received immunoglobulin at the time of measles vaccination, and
people immunized from 1963 until 1967 with an older ineffective killed measles vaccine.

Incubation period of measles
. The rash occurs a few days after the initial symptoms (ranges from seven to 18 days from exposure).

Prevention contracting measles

The only way to prevent measles is by
receiving measles immunization: This is commonly given as a shot containing measles, mumps, and rubella vaccine (MMR) or a shot containing measles, mumps, rubella, and varicella vaccine (MMRV).

The MMRV is not recommended for anyone older than age 12 years.

The current recommendation is that everyone receives two doses of the vaccine after 1 year of age. If the vaccine is received before 1 year of age, the person should receive two additional doses.

People who have been appropriately vaccinated (or who have had the disease) and who are

exposed to a patient with measles do not need to do anything. If an unimmunized person is exposed to a patient with measles, they should receive the vaccine as soon as possible.

This may prevent the disease if given within 72 hours of exposure. Immune globulin may have some benefit if given within six days of exposure. The CDC recommends that immune globulin be utilized for household contacts of infected people, immunocompromised people, and pregnant women. It is not recommended that immune globulin be utilized to control a measles outbreak.

Who should not receive measles vaccinations?

The following groups of people should not receive measles vaccinations:
People who have suffered a severe allergic reaction to either the measles vaccine or its components (gelatin or neomycin) should not receive the vaccine.
Women known to be pregnant should not receive the vaccine. Pregnancy should be avoided for four weeks after vaccination.

Severely immunocompromised patients (cancer patients or patients who are receiving large doses of corticosteroids)

should not receive the vaccine.

However, those leukemia patients who have been in remission for three months may receive the MMR.

Patients with severe human
immunodeficiency virus (HIV) infections should not receive the vaccine. However, asymptomatic patients with HIV are considered to be safe for vaccination.

The CDC has issued guidelines for vaccination based on the CD4+ T-lymphocyte counts.

People with a moderate to severe acute illness should wait until their illness resolves before receiving the vaccine.

Patients with history of thrombocytopenic purpura or thrombocytopenia (low platelets) may be at increased risk.

If a child has an egg allergy, can they still receive the vaccine?

Although the measles vaccine is made using chick embryos, there is no evidence of increased reactions in people with an egg allergy. Therefore the CDC recommends giving MMR vaccine to egg-allergic children without any prior skin testing or the use of special protocols.

Adverse reactions can occur with the vaccination:
Adverse reactions to measles vaccination (as part of the MMR) include fever (5%-15%), rash (5%), joint aches (5%), and low platelet count (thrombocytopenia; one instance per 30,000 doses). In

adult women, up to 25% will suffer joint pain that is due to the rubella component of the vaccine. The fever usually occurs seven to 12 days after the vaccination, and the rash occurs seven to 10 days after vaccination.

Q/ What are the effect of measles on the infant during pregnancy?

Q/ What are other complication of measles?

Q/How can you do to control measles during outbreak?