Epidemiology . 3

- The starting point of communicable disease is :- Existence of source or reservoir.

Source of infection : The Person, animal, object from which an infection agent passes or disseminated to the host.

Reservoir : any person, animal, arthropod, animal, plant, soil or combination of these in which infectious agent ① live and multiply ② depend on primarily for survival ② reproduce itself (can be transmitted to susceptible host)

(The reservoir is the natural habitat where the organism metabolize and replicate)

* Type of Reservoir :

1 Human Reservoir : (his own enemy)

- the most important source or reservoir of infection is the human
- may be case or carrier

① Cases : Person that having the particular disease or health disorder under investigation.

→ identified by (clinical, biochemical, laboratory) criteria.

* The presence of infection may be
  - clinical → may be mild, moderate, severe, fatal; typical, atypical.
  - subclinical
  - latent

source of infection (the agent is leaving the body by vomiting, coughing, stools, sneezing)

note mild cases more important source of infection than severe because the ambulant and spread the infection while severe is confined to bed

- **Subclinical** : - unapparent, cover, missed, abortive cases
  - the agent multiply in the host but doesn't manifest by signs and symptoms.
  - the agent contaminate the environment (as clinical) (shed)
  - Transmit the infection more than Symptomatic patien (clinical)
  - The person unbe known to them self and others.
    ↳ detect only by laboratory test (organism · Ab response. biochemical)

have a dominant role on maintain the chain of infection (endemicity)

- **Latent infection** : - doesn't shed the infectious agent (lies dormant within the host)
  - without symptoms
  - without demonstrable presence in blood, tissue, body secretion of the host
  - play great role in the perpetuation of certain infection.

  ex: latent infection in herpes simplex.

Primary Cases : 1st case of communicable disease introduce to Population.

Index Cases : 1st case come to the attention of investigator (not always the primary)

Secondary Cases : cases developing from contact with Primary cases.

Suspect cases : individuals who have all the signs and symptoms of the disease, but yet hasn't been diagnosed with disease, or having the suspected Pathogen.

② **Carriers** : - an infected Person or animal that harbours a specific infectious agent in the absence of clinical disease.
- serve as a source of infection
- carriers are less infectious than cases
- but, they are more dangerous than cases

- they escape recognition
- live normally among population → infect susceptible individuals over a wider area and longer period.

* The Element of the Carrier:
1. Presence in the body of disease agent.
2. absence of signs and symptoms.
3. Shedding of disease agent (source of infection)

→ Carrier state result from : incomplete elimination of disease agent due to inadequate treatment or immune response.

Carriers classified according to

- **Type chronologically**
  - incubatory
  - Convalescent
  - Healthy
- **Duration**
  - Temporary
  - Chronic
- **Portal of Exit**
  - urinary
  - intestinal
  - respiratory
  - others

incubatory carriers

- shed the infectious agent during the last few days of incubation period
- infecting others before onset of illness.

ex: 1. mump 2. Polio 3. Pertussis 4. influenza 5. Diphtheria 6. HIV 7. HBV

Convalescent Carriers :

- Shedding continue during the convalescence (period of recovery)
- the clinical recovery doesn't coincide with bacteriological recovery
- a serious threat to the unprotected household members
- This highlights the importance of bacteriological surveillance after clinical recovery.

ex. 1. Typhoid fever (shed to (6–8) weeks) 2. dysentry cholera 3. Diphtheria 4. Whooping Cough

Contact Carrier :

- infected persons like doctor or nurses usually with transient type.
- common in Cholera, Typhoid

Healthy Carriers :

- emerge from subclinical case (subclinical infection without suffering from overt disease)
- Shedding the disease agent

ex. 1. Poliomyelitis 2. meningococcal meningitis 3. Salmonellosis 4. Diphtheria

Note: Subclinical case may or may not be a carrier

- in Polio ⇝ subclinical infection → act as temporary carrier
- in TB → with Positive test → no disseminate tubercle bacilli)

(every healthy carrier is subclinical case, but not every subclinical case is a carrier)

Transient carrier: Persons harbor and excrete the organism up to weeks

Temporary carrier: - shed for short period (<3 months)
- include incubatory, convalescent, healthy carriers.

Chronic Carrier: - excrete the infection for indefinite period (>3m, > year)
- duration of carrier state varries with the disease.
* in typhoid and HBV → last for several years

early detection to limit the spread.

→ The longer the carrier state → the greater risk on community
→ some carriers excrete intermittently and some continuously
* chronic carriers far more important source of infection than Cases

Permanent carrier: For life

Animal reservoir - animal can act as a reservoir wether diseased or carriers. (like: Pigs, ducks)

* zoonosis: infectious agents transmissible under normal condition from vertebrate animal to man.

ex.
1. cattles in Bovine T.B
2. Goats in Brucellosis
3. Dogs in Rabies
4. Rats in Plague
5. Mice, rodents, ducks and cows in Salmonella
6. monkey in Yellow fever

Reservoir in non-living things: - soil and inanimate matters act as reservoir
ex. soil harbor agent of tetanus, anthrax.

⇒ **Portal of exit** → urinary, intestinal, respiratory, nasal
skin eruption (open wound and blood)

* portal of exit and the occupational status → are important epidemiological consideration.

- **in Typhoid fever carriers dangerous because:**
1. They don't show any clinical manifestation.
2. The carrier and his contact are not aware
3. difficult to discover them
4. long period of carriage in some disease.

→ model of exit of reservoir

① **Alimintary canal** - in feces as in (Typhoid, Paratyphoid, cholera)
- in vomitus as in (cholera)

↝ disease where the primary site of infection in bowel → organism will pass in feces (like: HAV, Polio (affect CNS))

② **Respiratory tract** - organism leave the body through mouth and nose (coughing, sneezing, laughing, talking)

ex: 1. Whooping cough 2. Diphtheria
3. Streptococcal sore throat 4. influenza
5. common cold 6. mumps
7. meningiococci

③ **Urinary Tract:** - occur in disease where infection is general and organism are found in Blood.

ex. Typhoid - Bilharziasis - genitourinary tract
Paratyphoid

④ **Discharge from skin and mucous lesions:**
- discharge from mucous membrane as in Purulent conjuctivis and venereal disease.

⑤ **Insect Bites:**
- mosquitoes → malaria
- Lice → Typhus
- Fleas → Plague

⑥ **Syringes and taking blood from donors**
- viral hepatitis - AIDS

⑦ **In-utero Passage (transplacental)**
AIDS, Syphilis, German measles