

Epidemiology

Components of epidemiology :

- Population(public health) → all not one
- Distribution
 - Parten→ when , where , who
 - Frequency → measured by morbidity and mortality
 - Epidemiology is a quantitative science
 - Health related conditions → conditions that directly or indirectly affect or influence health .
 - Determinants (cause and risk factor)
 - Application (info for action)
 - Promotion of health
 - Prevention and control of health problems.
 - Whole aim of all the components is to **identify effective prevention and control strategies**
- Principles of epidemiology :
 - Disease don't occur randomly
 - Diseases have causal and preventive factors
 - Diseases have distribution
 - Epidemiology cares about population rather than individual(all not one)
 - Art of epidemiology is to draw conclusions from imperfect data
- **Central science** of PH and preventive medicine → epidemiology
- Epidemiology provides preventive medicine practitioners with several info :
 - Info about **state of health**
 - Methods for identifying possible **determinants of both health and disease .**
 - Appropriate population groups for interventions
 - **Understanding the origins of public health recommendations**
- **EpidemiC transition**
 - ↓ overall death rate
 - ↑ life expectancy
 - Shift in major causes of death
 - Changes in lifestyles
- Chronic disease : خصائصه
 - Long course of illness
 - Multifactorial
 - Long latency period
 - Non contagious origin
 - Causation → uncertain etiology
 - Disability
 - Incurable
- The 3 essential components of epidemiology are :

- Disease:
 - Distribution
 - Determinants
 - **Frequency** : (y3ni el disease based on frequency bykon wa7d mn hadol)
 - Expected levels
 - Endemic
 - Epidemic
 - Pandemic
- Natural history of disease → **progression** over time in **absence of intervention**
 - The four stages are :
 - **Susceptibility**
 - **Presymptomatic(subclinical)**
 - No manifestations but pathologic changes have already started in the body
 - **Clinical stage**
 - Differs in term of disease **duration**, **severity** and outcome
 - **QResult** → **recovery / disability/ death .**
- Aims (health status , disease causation, frequency, distribution , prevention and control)
- Uses :
 - Community diagnosis → identify and describe health problems in community
 - Monitoring changes of health over a period of time continuously
 - To practice surveillance → to act quickly and cut short any outbreak .
 - Investigate an outbreak of a communicable disease
 - Plan effective health services and interventions
- Epidemiologic triad
 - Host (Demographic, biological, socioeconomic)
 - Agent
 - Environment(social , biological , physical)
- Chain of disease(infection)
 - Agent → reservoir → portal of exit → MOT → portal of entry → human host
- Epidemiology
 - Descriptive
 - Analytical (control , preventive , test of hypothesis)
- Reservoir → can be of the following types
 - Human
 - Symptomatic → **smallpox**
 - Asymptomatic → HIV
 - Animals (zoonoses)

- **Brucellosis**
 - **Plague**
 - **Environmental** (plants and any other inanimate objects)
 - **Histoplasmosis**
- **HUMAN reservoirs :**
 - **Case :** (a person in study group **having the particular disease , health disorder of the condition under investigation**)
 - **Primary** (index) , secondary cases
 - **Based on spectrum of the disease :**
 - **Clinical** → mild , sever (typical) , atypical .
 - **Subclinical**
 - **Latent infection**
 - **Carrier :** (**infected person or animal having specific infectious agent in absence if discernible clinical disease** and serves as **potential source of infection for others**)
 - **Carrier state results from several things :**
 - **Inadequate treatment or immune response**
 - **Incomplete elimination of disease agent**
 - **Carrier based on Types :**
 - **Incubatory**
 - **Convalescent** (في فترة النقاهة)
 - **Healthy**
 - **Carrier based on duration :**
 - **Temporary**
 - **Chronic**
 - **Carrier features**
 - **Having the infectious agent in the body**
 - **Absence of recognizable symptoms or signs**
 - **Shedding of disease agent in excretions**
 - **QPotential source of infection to others**
- **Portal of exit** → how the agent **leaves the reservoir**
- **Most bacterial and viral infection like** → STIs , HIV , **measles , typhoid** → **with human reservoir**
- **No symptoms(clinical manifestations)+having the infectious agent** → carrier person (ex, HIV carrier)
- **Zoonoses** (animal→ human) ex, **rabies anthrax**
- **MOT :**
 - **Direct**

- Contact → Rabies , STIs , AIDS
 - Projection → common cold
 - Transplacental → Syphilis / AIDS
- Indirect
 - Vehicle borne (indirect contact with inanimate fomites
 - Airborne (dust / droplet nuclei- aerosols) → TB
 - Nasal mucosa → entry for common cold
 - Conjunctiva → for trachoma
 - Injury site → tetanus
 - Vector borne (arthropod → host)
 - Vector :
 - Mechanical (no multiplication) ex flies transmitting trachoma
 - Biological (if the agent multiplies in it before being transmitted) ex anopheles mosquito (malaria)
- Final link in infectious process is → susceptible host
- Herd immunity → host resistance at the community level .
- So host resistance is seen at 2 levels
 - Individual level.
 - Community level → herd immunity
- Incidence(rate) of disease →
 - # of new cases within specific period / total #of susceptible individuals in population
- Prevalence (proportion) of disease →
 - #of total existing cases / total #of population
- Disease levels (based on frequency)
 - Sporadic → occasionally
 - Endemic → constantly present in population
 - EpidemiC → many get it in a short period of time.(in excess of expected occurrence)
 - Pandemic→ worldwide epidemic
- EpidemiC → affect large proportion of population
- Exotic → imported into a country
- Sporadic disease:
 - Irregular occurrence
 - Infrequent occurrence
 - Little or no connection between cases
 - No recognizable common cause between the cases
 - Could be at the beginning of EpidemiC disease
- Primary(index) case → infect population

- **2ndary case** → who subsequent contract the infection from the primary
- **Waves/generations** → further spread of the infection
- **Nosocomial infection** →
 - **UTIs**
 - **HBV**
 - Infections of surgical wounds
- **Host** → susceptible / immune/ infected
- **Case fertility rate of infectious disease** : proportion of infected individuals who die of the infection
- **Gap in time between the onset of primary cases and secondary cases** → serial interval
- **Length of time the person can transmit disease** → infectious period
- **Time from exposure to development of disease** → incubation period
- **The period between the exposure and the onset of infectiousness** → latent period
- **Elimination Vs Eradication**
- **Elimination** → termination of infection transmitting by extermination of the infectious agent
- **Eradication** → absolute process (all or none) → termination of infection from the whole world .
- **Diseases that are amenable to elimination in the meantime :**
 - **Polio**
 - **Measles**
 - **Diphtheria**