Descriptive epidemiology   **Dr. Lamis Aziz**

Learning Objectives:
**By the end of this lecture students will be able to:**

- Describe Person, Place and Time characteristics of disease occurrence.
- Identify the uses of descriptive epidemiology

- *Descriptive epidemiology* **describes the distribution of health-related events by time, place, and personal characteristics in order to answer:**
- **when (time),**
- **where (place),**
- **who (person).**
- **Variables related to person, place and time not necessarily have causal association with the disease being examined.**
- **The descriptive associations are helpful in hypothesis formulation.**

  Hypothesis: A proposed explanation of a relationship that has to be accepted or refuted and tested by further research

  Testing of hypothesis needs other methods (analytical methods).

To undertake an analytic epidemiologic study you must first:
- Know where to look
- Know what to control for
- Be able to formulate hypotheses

Epidemiological study cycle
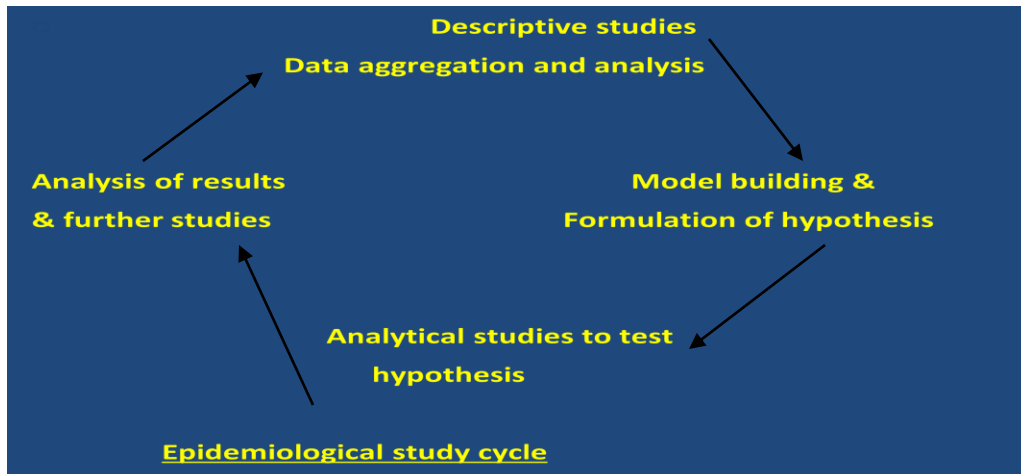
I- Time Variation of disease occurrence
- Annual occurrence, seasonal occurrence, and daily or even hourly occurrence of disease may occur.
- Knowing time trend of a disease will help in establishing control measures.

Time trend include:

Secular trend (long-term)
Periodic (cyclic variation)
Rapid fluctuation (short time)

Secular (long-term) trends:
disease occurrence over a period of years (Decades or centuries)
These trends are useful to suggest or predict the future incidence of a disease.

Secular (Long-term trend)- is influenced by population features *e.g.*
  – Change of degree of susceptibility e.g. by immunization
  – Socioeconomic
  – Environmental sanitation and
  – Nutritional status of a population.
  – Thus a secular change in disease incidence may refer to either
  – 1. A real increase in the incidence in response to
    a Massive exposure to disease agents
    b. Change in life style
    OR

2. The rise is artificial due to
  a. Improved diagnosis of disease.
  b. Change in classification of disease.

c. Improved recording of cases.

d. Change   in population at risk.

Changing TB mortality
- In the last century, **decline** in TB mortality was due to:
  - better housing, ventilation
  - improved nutrition
  - better medical care ,vaccination

Periodic (cyclic variation)

Where disease occurrence decrease for a period then increase again in cyclic pattern *e.g. measles prior to* vaccination period occur every 2 – 3 years

Seasonality:

Variation in the occurrence of a disease over the course of a year

Example:
Cases of **influenza** increase in winter.
Food poisoning and **diarrhea** increase in summer

Seasonal patterns may suggest hypotheses about:
- *how* the infection is transmitted
- what behavioral factors increase risk
- environmental and other possible contributors to disease occurrence.

Rapid fluctuation (short time)

Usually occur in the form of epidemics that appear abruptly and ends abruptly e.g. food poisoning

Day of week and time of day:

Analysis at shorter time periods is especially important for :
Conditions that are potentially related to occupational or environmental exposures.

II- Place characteristics

Analyzing data by place can give an idea of where the agent that causes a disease lives and multiplies,
what may carry or transmit it, and

- **how it spreads.**
- **Use spot map to locate the possible source or risk factors.**

- Disease variation by Place may be due to:

Geography
- The location of certain place determine its climatic conditions e.g. temperature, humidity, wind,… which favor certain agents and vectors.
- e.g. malaria, Yellow fever,..

Geology
The structure of **soil** affects disease occurrence e.g.

- Radioactive materials ------ leukemia

Chemical and physical environment
- Iodine deficiency in the soil ---goiter
- Sulfur dioxide ------- chronic bronchitis

Availability of Health Services
- Vaccination ---prevent infectious diseases
- Health Education ---- healthy behavior
- Detection and treatment of infectious diseases ------- limit spread.

- 5 Criteria of Place are essential to demonstrate an association of disease distribution with place:
  ↑ Rate observed in all ethnic groups in the area
- ↑ Rate NOT observed in persons of similar groups inhabiting other areas
- Healthy persons entering area get ill at same frequency
- People who leave do NOT show similar levels
- Similar levels of infestation in other species (if zoonotic disease)

- **III- Person characteristics:**

Age:
Age is the single most important "person" attribute
Age affects:

Type of disease: e.g.

Neonates ----- birth trauma

Elderly ------ Degenerative diseases

- **Severity of disease:**
  – Whooping cough is severe under one year
  – Pneumonia is fatal in early 2 months
  – Fracture is severe in old age

Clinical form of disease:

Thyroxine deficiency ---- cretinism in young

                                     ----Myxodema in adults

Explanation of disease variation by age may be explained by

- exposure to risk factors or
- degree of immunity or susceptibility
- response to a causative agent.

Sex:

Some diseases are sex-linked due to:

- anatomic differences e.g. cancer cervix , cancer prostate or,
- genetic differences between the sexes e.g. Hemophilia.
- Other diseases are related to occupations and environmental exposure which differ in both sexes. e.g. accidents and lung diseases
- **Ethnic and racial groups:**
- Some races are susceptible to specific diseases e.g. sickle cell anaemia in Negros due to genetic predisposition

Religion

Prohibition of alcohol ----- liver disease

Socioeconomic status:

- Education ---- health behaviour
- Occupation ----- income

Marital Status

- – Mental illnesses are more likely to affect single individuals.
- – Breast cancer affects more females who remain single or marry late,
- – Cancer cervix is more common among early married females.