

Epidemiology : [application of this study → control health problems]

The study of the **determinants, distribution and frequency** of disease



Important Issues that Epidemiology can address :

- Disease
- Disability
- Mortality
- Quality of life
- Hospitalization
- Health status

Endemic

The habitual presence or usual occurrence of a disease within a given geographic area

Epidemic

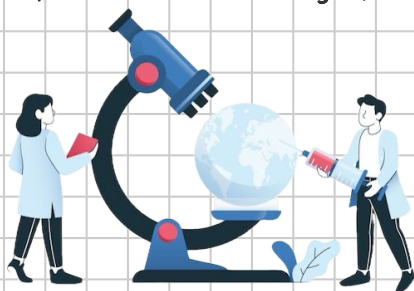
The occurrence of an infectious disease clearly in excess of normal expectancy and generated from a common or propagated source

Pandemic

A worldwide epidemic affecting an exceptionally high proportion of the global population

Purpose of Epidemiology

To provide a basis for developing disease control and prevention measure for groups at risk



I am an Epidemiologist
I assume that illness doesn't occur randomly in a population, but happens only when accumulation of risk factors or determinants exist in an individual

I also use Rates

$$\frac{\text{events}}{\text{Population at risk}}$$

(numerator) → sick died
(denominator) → People at risk

I study
sick

well

to determine the crucial difference between them



Uses of Epidemiology

To study the cause (etiology) of disease or conditions, disorders, disabilities, etc



Determine Primary agent responsible or ascertain causative factors

Determine characteristics of agent or causative factors

Define mode of transmission



Determine contributing factors



Determine geographic patterns

Determine, describe, and report on the natural course of disease, disability, injury and death

Aid in the planning and development of health services and programs

Provide administrative and planning data



Types of Epidemiology:

1 Descriptive Epidemiology

Examining the distribution of disease in population and observing the basic features of its distribution

is Antecedent to
السابق

2 Analytic Epidemiology

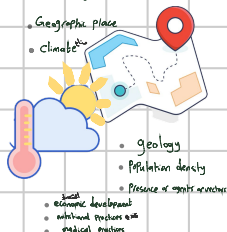
Testing a hypothesis about the cause of disease by studying how exposures relate to the disease
فحص الفرضيات عن أسباب المرض

→ Essential characteristics:

Person



Place



Time



How do we ask questions?

Surveys of

- survivors
- next-of-kin
- other related persons

- Demographic distribution
- Geographic distribution
- Seasonal pattern
- Frequency of disease patterns

Useful for:

- Allocating resources
- Planning Programs
- Hypotheses development

Determinants

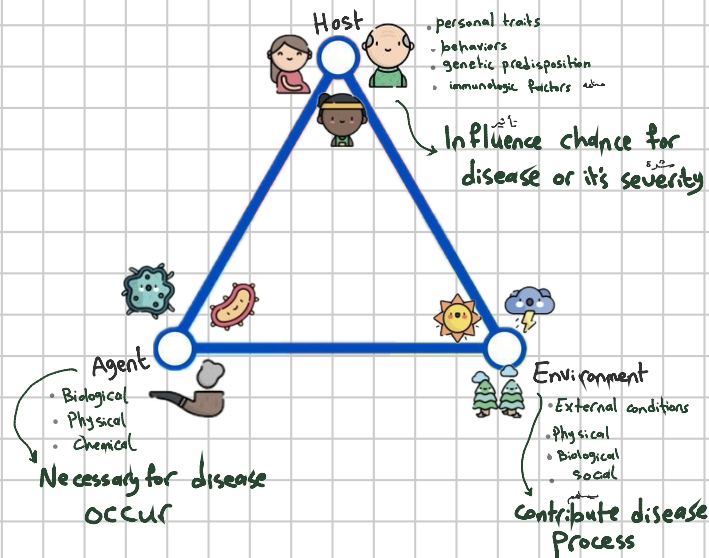
any factor whether event, characteristic or other definable entity that brings about a change (negative, positive) in health condition or other defined characteristic

Epidemiology → also used for determinants which are causes and factors that influence occurrence of diseases and other health-related events

→ Its studies require information to:

- Know where to look
- Know what to control for
- develop viable hypothesis

→ Essential characteristics:



→ The Epidemiologic triangle imbalance
Due to:

- new agent
- change in existing agent (infectivity, pathogenicity, virulence)
- change in number of susceptibles
- environmental changes that affect transmission of agent or growth of agent

- built around analysis of relationship between Exposures → Effects (disease)
- looking for determinants, causes of disease

useful for:

hypothesis testing

Mortality



It's related to your risk of death

Morbidity



refers to your level of health and well being

They are not the same

if illness continues it may increase risk of mortality (death)

Prevalence :

number of existing cases of disease in population

Incidence :

number of new cases of disease that develop in population

Retrospective study

looks backwards and examine exposures to suspected risk or protection factors in relation to an outcome that's established at the start of the study

Prospective study

Watches for outcomes such as development of disease during the study and relate this to other factors. It usually involves taking cohort (group) and watching it over long period.

suspected risk
protection factor

In the above studies we need to know

- Relationship between an outcome and certain factors
- Relative risk
- odds ratio

Case-control studies

(select subjects based on their disease status)

نوع الدراسة ↓

Retrospective Study

الحساب منها ↓

Odd ratio

$OR = 1$ No association

$OR > 1$ Positively associated

$OR < 1$ negatively associated

Cohort studies

(select subjects based on their exposure status)

نوعها ↓

Prospective Study

حساب منها ↓

Relative risk

$RR = 1$ No association

$RR > 1$ Increased risk أكثر عرضة للإصابة

$RR < 1$ Decreased risk (protective effect)