



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Epidemiology

L I NEW
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السلام عليكم ورحمة الله وبركاته

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**Principles of Epidemiology
and
Epidemiologic Methods or Studies**

Epidemiology is derived from the word Epidemic
epi=among,
demos = people,
Logos= study),

which is a very old word dating back to **the**
3rd century B.C

many definitions



There appears to be almost as **many definitions** of epidemiology as there are authors who have written on the subject, ranging from **Hippocrates** to those of the present day.

A short list is given below

1. That branch of medical science which treats epidemics (Parkin, 1873).
2. The science of the mass phenomena of **infectious diseases** (Frost, 1927).
3. The study of disease, **any disease**, as a mass **phenomenon** (Greenwood, 1934),
4. The study of the **distribution** and **determinants of disease frequency** in man (MacMahon, 1960).

□ **Epidemiology** has been defined by **John M. Last in 1988** as:-
"The study of the, **Distribution** and **determinants of health-related states** or **events in specified populations**, and the **application** of this study to the **control of health problem**



Epidemiology:

is the basic science of **preventive** and **social medicine**.

Although it is an old science , it made only slow progress **up to the start of 20th century**.

- ❖ Epidemiology has **evolved rapidly** during the **past few decades**.
- ❖ Its ramifications (consequence result) cover **not only study of disease** distribution and causation and thereby prevention , **but** also **health and health-related events** occurring in human population.

Therefore modern epidemiology 

- ❖ Modern epidemiology has entered the **most exciting phase of its evolution**.
- ❖ By identifying risk factors of chronic disease,
- ❖ evaluating treatment modalities and
- ❖ health services

- **it has provided new opportunities for**
 - ❖ prevention,
 - ❖ treatment,
 - ❖ planning

and

- **improving** the **effectiveness** and **efficiency** of **health services**

❑ The **current** interest of **medical sciences** in epidemiology has given rise to newer **branches** such as

- infectious disease epidemiology
- chronic disease epidemiology
- clinical epidemiology
- serological epidemiology
- cancer epidemiology
- malaria epidemiology
- neuro epidemiology
- genetic epidemiology
- Molecular Epidemiology
- Occupational epidemiology
- psychosocial epidemiology, and so on.

❑ **This trend** is bound to increase in view of the increasing importance given to the **pursuit** of epidemiological studies.

❑ **Although** there is no single definition to which all epidemiologists subscribe,

❖ **Three components are common to most of them.**

First, studies of disease frequency

Second, studies of the distribution and

Third, studies of the determinants.

❑ **Each of these components confers (have talks)(يمنح) an important message**


Epidemiology and clinical medicine

The basic difference between epidemiology and clinical medicine is that :


- ❖ **in epidemiology**, the unit of study is a "defined population" or "population at-risk";
- ❖ **in clinical medicine**, the unit of study is a "case" or "cases".
- ❖ **In clinical medicine**, the physician is concerned with disease in the individual patient,
- ❖ **whereas** the **epidemiologist** is concerned with disease patterns in the entire population.
- ❖ **Epidemiology** is thus concerned with both the sick and healthy.



CONT. ...difference between epidemiology and clinical

- ❖ It has been stated that **clinicians** are interested in cases with the disease, the statistician with the population from which the cases are derived, and
- ❖ **the epidemiologist** is interested in the relationship between cases and the population in the form **of a rate**
- ❖ **In clinical medicine**, the physician seeks a diagnosis from which he derives a prognosis and prescribes specific treatment.
- ❖ **In epidemiology**, an analogous (same) situation exists
- ❖ The epidemiologist is 

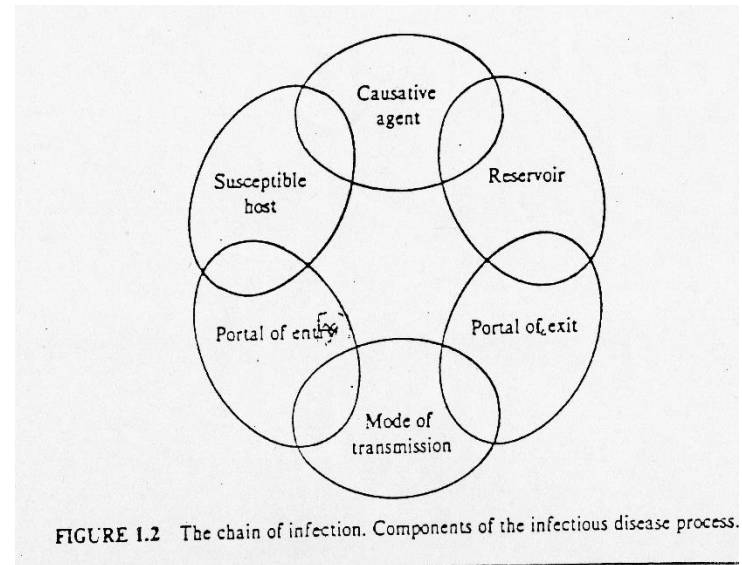
Cont. ...difference between epidemiology and clinical

- ❖ **The epidemiologist** is confronted(challenge) with relevant data derived from a particular epidemiological study.
- ❖ **He seeks to identify**
 - ❖ a particular source of infection,
 - ❖ a mode of spread or
 - ❖ an aetiological factor
- ❖ **in order** to determine a future trend and
- ❖ **recommend** specific control measures
- ❖ **The epidemiologist also** evaluates the outcome of preventive and therapeutic measures instituted which provides the necessary guidance and **feed-back** to the health care administrator for effective management of public health programmes.
- ❖ **In clinical medicine, the**  patient comes to the doctor,

- ❖ In **clinical medicine**, the patient comes to the doctor;
- ❖ **in epidemiology**, **the investigator goes out into the community to find persons who have the disease or experience of the suspected causal factor** in question.
- ❖ **Clinical medicine** is based on **biomedical concepts** with an **ever-increasing concern for refining** the technique of **diagnosis and treatment at the individual level.**
- ❖ **The subject matter of clinical medicine** is easily "**perceived**" by such techniques as clinical and laboratory examinations including post-mortem reports.
- ❖ **In contrast**, the subject matter of **epidemiology** is "**conceptual**" and can only be symbolized in the form of tables and graphs



- ❑ Finally, it may be stated that clinical medicine and epidemiology are not antagonistic.
- ❑ Both are closely related, co-existent and mutually helpful
- ❖ Most epidemiological enquiries (investigations) could never be established without appropriate clinical consideration as to how the disease in question can be identified among individuals comprising the group under scrutiny.
- ❖ Likewise, a knowledge of prevalence, aetiology and prognosis derived from epidemiological research is important to the clinician for the diagnosis and management of individual patients and their families



Infectious process

Contents

- **Definitions related to infectious disease epidemiology**
- **Requisites for Perpetuation of Communicable Diseases**

Diseases

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graph TD; A[Diseases] --> B[Infectious]; A --> C[Non-infectious]; B --- D[Infection, followed by manifestations (signs and symptoms)]; C --- E[Disease not caused by microbiological agent (nutritional, allergic, endocrinal, psychogenic...etc)];
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Infectious

Infection, followed by manifestations (signs and symptoms)

Non-infectious

Disease not caused by microbiological agent (nutritional, allergic, endocrinal, psychogenic...etc)

- ❖ Infectious disease epidemiology is a fundamental part of the whole of epidemiology.

Studying of communicable diseases??

- (a) by the discovery of "new" infections, and
- (b) changes in the pattern of communicable diseases,
- (c) some chronic diseases may have an infective origin.??

- ❖ The development of vaccines and /or antibiotics was not followed, by the virtual (practical, functional), disappearance of infectious disease.

- ❖ Therefore it's prevention and control needs epidemiological knowledge and experience .

■ Definitions related to infectious disease epidemiology

- ✓ Health
- ✓ *Infection*
- ✓ Pathogenesis:
- ✓ *Contamination*
- ✓ Infestation
- ✓ Communicable Disease:
(CD)
- ✓ Non- Communicable
Disease (NCD)
- ✓ Contagious Disease
- ✓ *Host*

- ✓ *Epidemic*
- ✓ "Outbreak *Sporadic*
- ✓ *Endemic*
- ✓ *Pandemic*
- ✓ *Nosocomial Infection*
- ✓ *Opportunistic Infection*
- ✓ *Iatrogenic (Physician-
induced) Disease*
- ✓ *Eradication*

Health

Health
Infection
Pathogenesis:
Contamination
Infestation
CD
NCD
Contagious Disease
Host

(WHO definition)

It is the state of **complete** physical, mental and social well being, and not merely the absence of disease or infirmity. Any deviation from normal health is called **Disease**

Infection

- ❖ The **entry** and **development** and/or **multiplication** of an **infectious agent** in the body of **man or animals**. Also
- ❖ It is the **body responds** to
- ❖ **defend itself against the invader**, either in the form of an
 - **immune response** or
 - **disease**.
- ❖ An infection does not always cause illness.



The outcome of infection depends on:

1. Host resistance (immunity)
2. Microbiological agent characters (**invasiveness, toxicity & Virulence**)

Health
Infection
Pathogenesis:
Contamination
Infestation
CD
NCD
Contagious Disease
Host

□ There are several levels of infection :

- Colonization (e.g., *S. aureus* in skin and normal nasopharynx)
- Subclinical or clinically **inapparent infection** (e.g. polio)
- Latent infection (e.g. TB)
- Clinical infection or manifest

□ Pathogenesis is:

❖ End result of agent host interaction:

- Agent **fails to lodge**(inhabit) resulting in **⇒ No Infection**
- Agent lodges **without causing illness** resulting in **⇒ subclinical infection** (silent or latent)
- Agent lodges with **frank illness** resulting in **⇒ Disease**

Thank You

Thank You

Contamination

- ❖ The presence, multiplication and development
- ❖ of an **infectious agent** on a **body surface**; or an
- ❖ **inanimate article**. clothes, beddings, toys, surgical instruments or **water, milk and food**.

Infestation

- ❖ **Lodgement, development and reproduction** of **arthropods** on the surface of the body of **persons** or **animals** or in the **clothing**, e.g., lice, itch mite.
- ❖ Also to describe **invasion of the gut by parasitic worms**, e.g., ascariasis.