

LEVELS OF PREVENTION

The goals of medicine are to promote health, to preserve health and restore health when it is impaired, and to minimize suffering and distress.

Successful prevention depends upon knowledge of causation, dynamics of transmission, identification of risk factors and risk groups, availability of prophylactic or early detection and treatment measures.

Levels of prevention

- 1) Primordial prevention
- 2) Primary prevention
- 3) Secondary prevention
- 4) Tertiary prevention

1) Primordial prevention

A new concept is receiving special attention in the prevention of chronic diseases.

This is primary prevention in its purest sense, that is, prevention of the emergence or development of risk factors in countries or population groups in which they have not yet appeared.

The efforts are directed towards discouraging children from adopting harmful lifestyles.

The main intervention in primordial prevention is through individual and mass education

2) Primary prevention

Definition

Action taken prior to the onset of disease, which removes the possibility that a disease will ever occur.”

Primary prevention is accomplished by:

- - General health promotion activities
- - Specific protective measures

General health promotion activities

- ✓ Health education.
- ✓ Environmental modifications (safe water, sanitary latrines, control of rodents and pesticides, improvement of housing)
- ✓ Nutritional interventions (for vulnerable groups – feeding programmes, food fortification)
- ✓ Lifestyle and behavior changes

Specific protective measures

- Immunization
- Chemoprophylaxis
- Protection from accidents
- Use of specific nutrients
- Protection from carcinogens
- Avoidance of allergens
- Protection against occupational hazards

Primary prevention - Approaches

Population (mass) strategy: This is directed at the whole population irrespective of individual at risk. Also towards the socio economic, behavioural and life style changes.

High- risk strategy: The high risk strategy aims to bring preventive care to individuals at high risk. This requires detection of individuals at high risk by optimum use of clinical methods. To have an impact on population, all the above three approaches should be implemented as they are usually complementary.

3) Secondary prevention

Definition

- ✓ “Action which halts the progress of a disease at its incipient stage and prevents complications.”
- ✓ The specific interventions are early diagnosis (e.g., screening tests, case finding program) and adequate treatment. This help to arrest the disease process restore health by seeking out unrecognized disease and treating it before it get worse and reverse communicability of infectious disease.
- ✓ It is largely the domain of clinical medicine. The health programme initiated by governments are usually at the level of secondary prevention.
- ✓ A large portion of secondary level preventive intervention is taken at home, hospital or skilled nursing facility to prevent complication.

Secondary prevention is accomplished by:

- - Early Diagnosis and treatment

Early Diagnosis and treatment

Case finding measures: individual and mass

Screening surveys

Selective examinations

4) Tertiary Prevention

Definition

“All measures available to reduce or limit impairments and disabilities, minimize suffering caused by existing departures from good health and to promote the patients adjustment to irremediable conditions.”

Tertiary prevention is accomplished by:

- - **Disability limitation**
- - **Rehabilitation**

Disability limitation

The sequence of events leading to disability and handicap have been stated as follows:



Impairment: “ any loss or abnormality of psychological, physiological or anatomical structure of function” Eg: Loss of foot

Disability: “any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being” Eg: Cannot walk

Handicap: “a disadvantage for a given individual, resulting from an impairment or a disability, that limits or prevents the fulfillment of a role that is normal (depending on age, sex, and social and cultural factors) for that individual.” Eg: Unemployed

Rehabilitation

“The combined and coordinated use of medical, social, educational and vocational measures for training and retraining the individual to the highest possible level of functional ability.”

- ❖ **Medical rehabilitation** – restoration of function
- ❖ **Vocational rehabilitation** - restoration of the capacity to earn a livelihood
- ❖ **Social rehabilitation** - restoration of family and social relationships
- ❖ **Psychological rehabilitation** - restoration of personal dignity and confidence

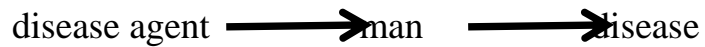
USES OF EPIDEMIOLOGY

- To study historically the rise and fall of disease in human population.
- Community diagnosis.
- Planning and evaluation.
- Evaluation of individuals risk and chances.
- Syndrome identification.
- Completing the natural history of diseases.
- Searching for causes and risk factors.

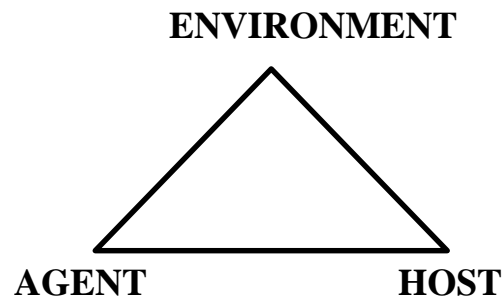
CONCEPTS OF DISEASE CAUSATION

1. Germ theory
2. Epidemiological triad
3. Multifactorial causation
4. Web of causation

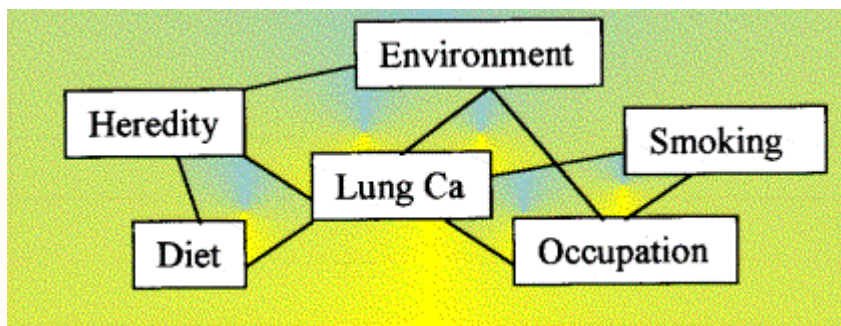
1. Germ theory:



2. Epidemiological triad



3. WEB OF CAUSATION



COHORT STUDY

Cohort is defined as a group of people who share a common characteristics

The distinguishing features:

- Cohorts are identified prior to the appearance of the disease under investigation
- Study groups are observed over a period of time to determine the frequency of disease.
- The study proceeds from cause to effect.

Type of Cohort study:

1. **Prospective:** is the one which outcome has not occurred at the time of investigation.
2. **Retrospective:** is the one which outcome have all occurred before the start of investigation.
3. **Combination of retrospective and prospective studies:** Here the cohorts are identified from past records and is assessed of date for the outcome.

Elements or steps of cohort study

1. Selection of study subjects
2. Obtaining data on exposure
3. Selection of comparison group
4. Follow up
5. Analysis

1) Selection of study subjects

a) General population

- Whole population in an area
- A representative sample

b) Special group of population

❖ Select group

- homogenous group. e.g. occupation group / professional group

❖ Exposure groups

- Person having exposure to some physical, chemical or biological agent e.g. X-ray exposure to radiologists.

2) Obtaining data on exposure

- Personal interviews / mailed questionnaire
- Review of records (Dose of drug, radiation, type of surgery etc)
- Medical examination or special test (Blood pressure, serum cholesterol)
- Environmental surveys

3) Selection of comparison group

❑ Internal comparison

Sub classified and internal comparison done

❑ External comparison

e.g. Cohort of radiologist compared with ophthalmologists

❑ Comparison with general population rates

If no comparison group is available we can compare the rates of study cohort with general population.

4) Follow-up

To obtain data about outcome to be determined (morbidity or death)

- Mailed questionnaire, telephone calls, personal interviews
- Periodic medical examination
- Reviewing records
- Death records

5) ANALYSIS

Calculation of

- Incidence rates among exposed and non exposed groups
- Estimation of risk
 - ✓ Relative risk
 - ✓ Attributable risk
 - ✓ Population attributable risk

Incidence rates of outcome

- Incidence among exposed = $\frac{a}{a+b}$
- Incidence among non-exposed = $\frac{c}{c+d}$

ESTIMATION OF RISK

1) Relative Risk=

$$\frac{\frac{\text{incidence of disease among exposed}}{a/a+b}}{\text{Incidence of disease among non-exposed}} \\ \frac{a/a+b}{c/c+d}$$

2) Attributable Risk =

$$\text{AR} = \frac{\text{Incidence of disease among exposed} - \text{incidence of disease among non exposed}}{\text{Incidence of disease among exposed}} \times 100$$

$$\text{AR} = \frac{\frac{a}{a+b} - \frac{c}{c+d}}{\frac{a}{a+b}} \times 100$$

3) Population Attributable Risk

Incidence of the disease in the total population – Incidence of disease among those who were not exposed to the suspected causal factor.

Advantages of cohort study

- ✓ We can find out incidence rate and risk
- ✓ More than one disease related to single exposure
- ✓ Can establish cause - effect
- ✓ Good when exposure is rare

Disadvantages of cohort study

- ✓ Losses to follow-up
- ✓ Often requires large sample
- ✓ Ineffective for rare diseases
- ✓ Long time to complete
- ✓ Expensive
- ✓ Ethical issues