

CONCEPT OF NATURAL HISTORY OF DISEASE AND LEVELS OF PREVENTION

ABHISHEK AGARWAL

JR III

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DEFINITION

3

Natural history of disease:



“ natural history of disease signifies the way in which a disease evolves over time from the earliest stage of its pre-pathogenesis phase to its termination as recovery, disability or death in absence of treatment or prevention”

NATURAL HISTORY OF DISEASE

The process begins with exposure to or accumulation of factors capable of causing disease

Without medical intervention the process ends with

- ▶ Recovery
- ▶ Disability
- ▶ Death

NATURAL HISTORY OF DISEASE



NATURAL HISTORY OF DISEASE

- ▶ Natural history of disease can be well established by cohort study
- ▶ As these studies are costly and laborious, understanding natural history of disease is largely based on other epidemiological studies such as cross sectional and retrospective studies.

Cohort Studies



NATURAL HISTORY OF DISEASE

- ▶ What the physician sees in his clinic is just an episode of natural history of disease
- ▶ The epidemiologist by studying the natural history of disease in the community setting is in a unique position to fill the gaps in the knowledge about the natural history of the disease.

NATURAL HISTORY OF DISEASE

Phase 1

- Pre Pathogenic

Phase 2

- Pathogenic

NATURAL HISTORY OF DISEASE



AGENT

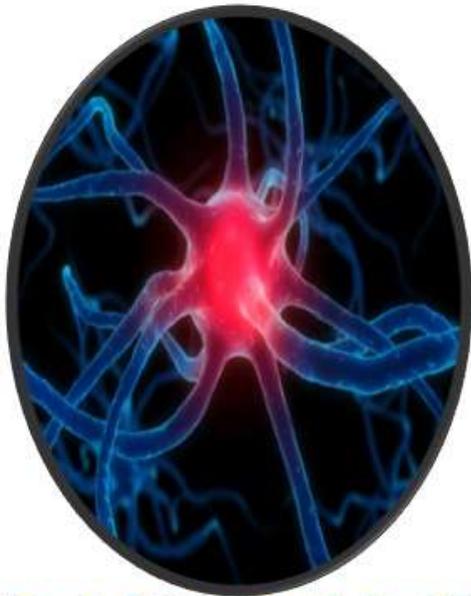
HOST

ENVIRONMENT

Pre Pathogenic Phase

- ▶ Start when the conditions favoring a disease are present but the agent haven't entered the body
- ▶ We all are in pre pathogenesis phase of many communicable and non communicable diseases
- ▶ This situation also referred to as "man exposed to the risk of the disease"

NATURAL HISTORY OF DISEASE

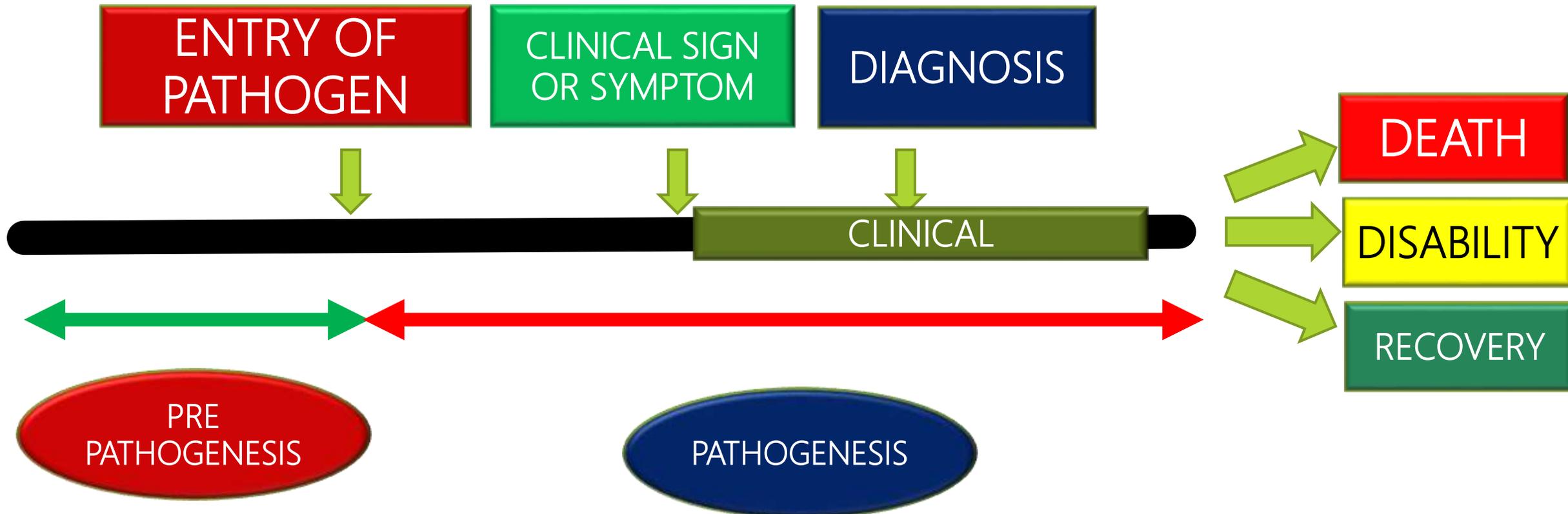


PATHOGENESIS

Pathogenic Phase

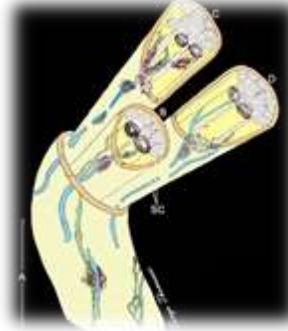
- ▶ **Begin with entry of the organism**
- ▶ **Characterized by presence of cases as clinical or sub clinical.**
- ▶ **Pathogenic phase decides the fate of disease outcome as recovery, disability or death**

NATURAL HISTORY OF DISEASE



NATURAL HISTORY OF DISEASE

SELF
LIMITATION



INCUBATION
PERIOD



EXAMPLE
OF
LEPROSY

DISABILIT
Y

RECOVERY

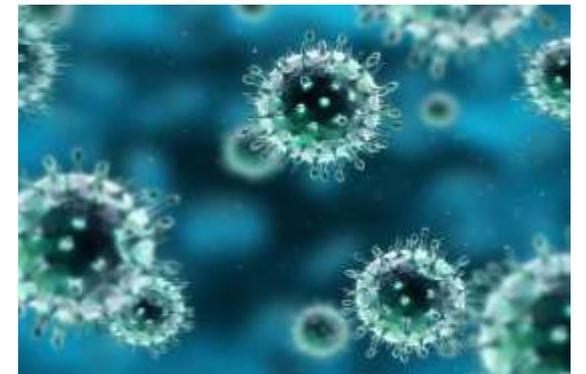


CONCEPT OF DISEASE

Definition:

Diseases have been defined as per Oxford English Dictionary as:

“ A condition of the body or organ of the body in which its function are disrupted or deranged”



MODELS OF DISEASE CAUSATION

MIASMA THEORY

GERM THEORY OF DISEASE

EPIDEMIOLOGICAL TRIAD

BEING'S MODEL

WEB OF CAUSATION THEORY

WHEEL THEORY



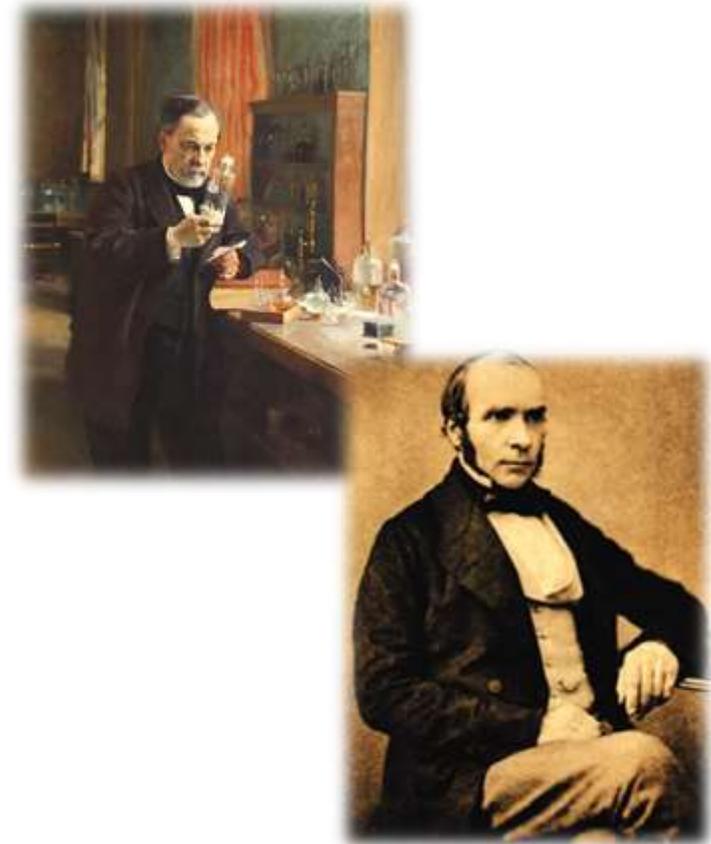
MIASMA THEORY

- ▶ History of disease causation goes back to Miasma theory
- ▶ It says " diseases such as cholera, chlamydia or black death caused by Miasma, means bad air
- ▶ It was most accepted theory till 19th century when it was replaced by Germ theory of disease



GERM THEORY OF DISEASE

- ▶ Germ theory of disease was first proposed in 1546 by Girolamo Fracastro
- ▶ Louis Pasteur proved that the diseases are caused by organisms in 19th century.
- ▶ Supported by John Snow

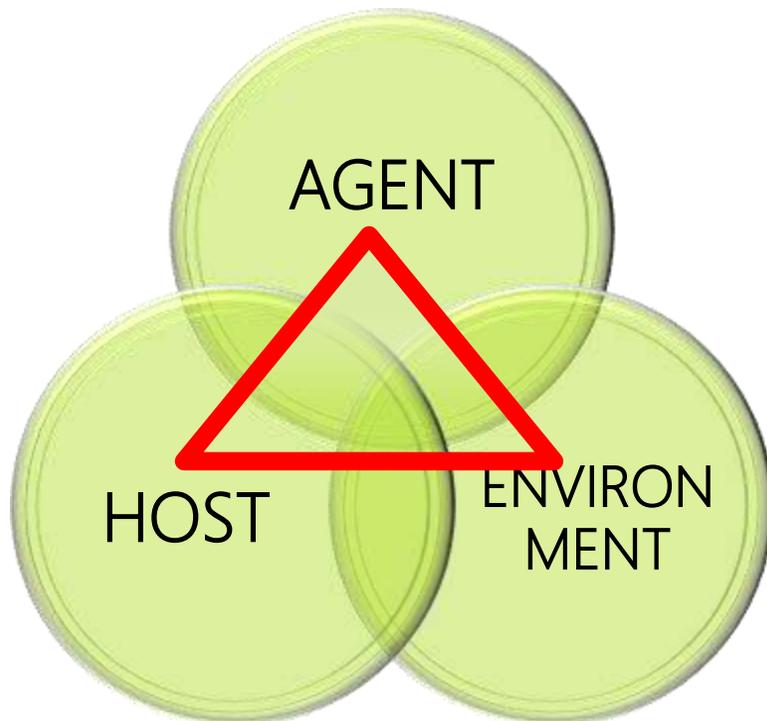


GERM THEORY OF DISEASE

- ▶ According to germ theory of disease
- ▶ "one to one relationship between casual agent and disease"

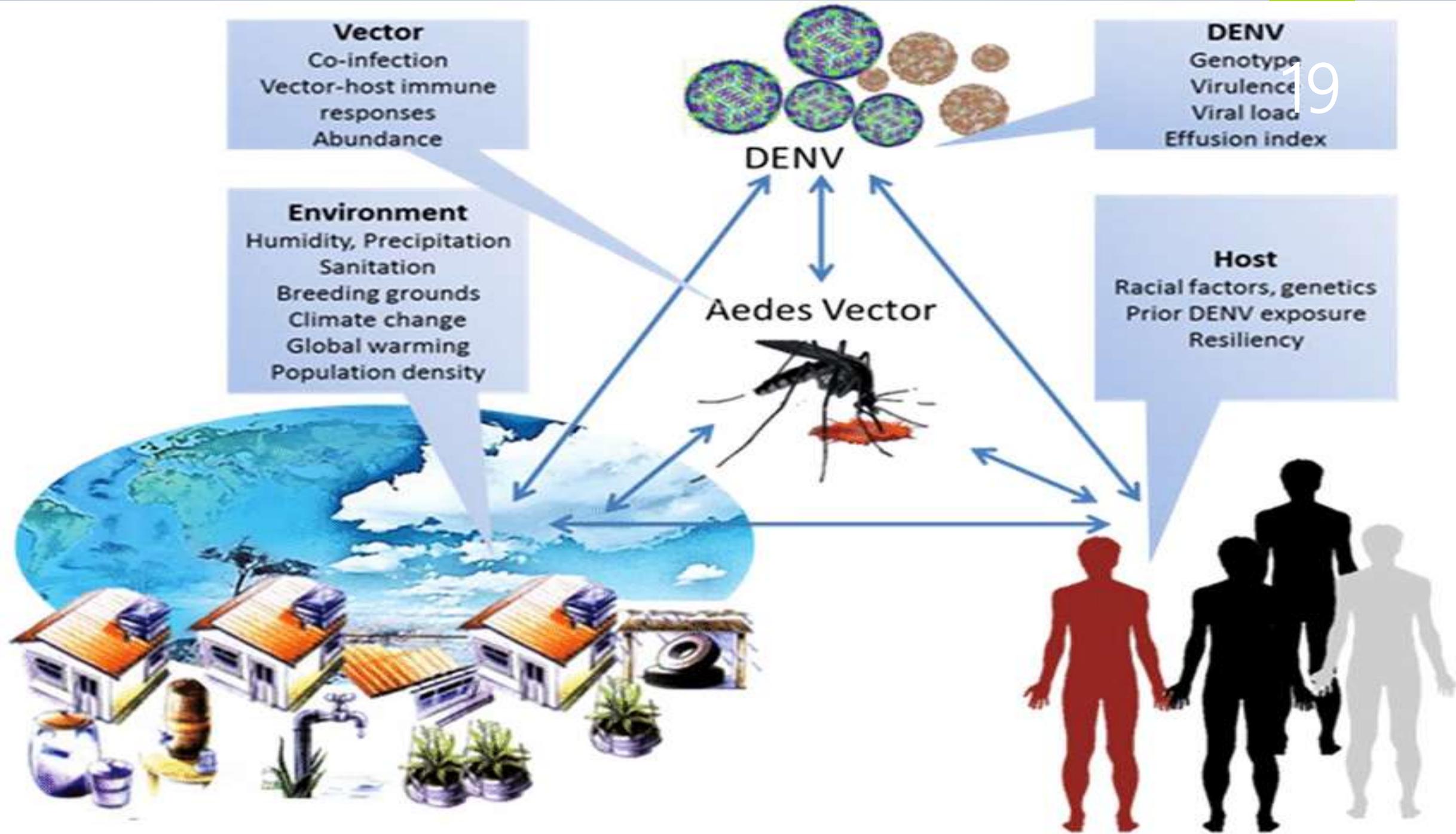


EPIDEMIOLOGICAL TRIAD THEORY



Epidemiological Triad theory states that:

“an external agent can cause diseases on a susceptible host when there is a conducive environment”



AGENT FACTORS

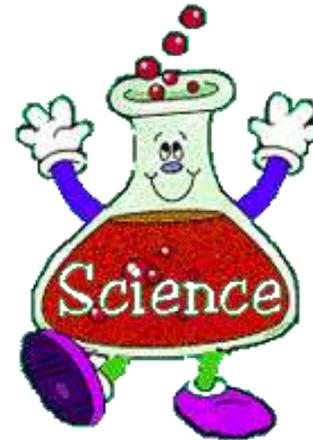
- ▶ ***Disease Agent is defined as a substance living or non living or a force tangible or intangible, the excessive presence or relative lack of which may initiate or perpetuate a disease process***



AGENT FACTORS: CLASSIFICATION

BIOLOGIC AGENT

- ▶ BACTERIA
- ▶ VIRUSES
- ▶ FUNGI



CHEMICAL AGENT

- ▶ SMOKE
- ▶ ALCHOHOL
- ▶ POISON

AGENT FACTORS: CLASSIFICATION

PHYSICAL AGENT

- ▶ TRAUMA
- ▶ RADIATION
- ▶ FIRE



NUTRITIONAL AGENT

- ▶ UNDER NUTRITION
- ▶ OVER NUTRITION

HOST FACTORS



- ▶ *In epidemiological terminology the human host is referred to as soil and the disease agent as seed.*
- ▶ *In some situations host factors plays an important role in determining the outcome of an individual's exposure to infection*

HOST FACTORS : EXAMPLES

AGE

SEX

RACE

CULTURE

OCCUPATION

GENETIC PROFILE

MARITAL STATUS



ENVIRONMENTAL FACTORS

The study of disease is really the study of man and his environment

It is defined as

“ all that which is external to the individual human host living or non living and with which he is in constant interaction”

ENVIRONMENTAL FACTORS

3 TYPES OF ENVIRONMENT

A. PHYSICAL ENVIRONMENT

B. BIOLOGICAL ENVIRONMENT

C. PSYCHOSOCIAL ENVIRONMENT



ENVIRONMENTAL FACTORS

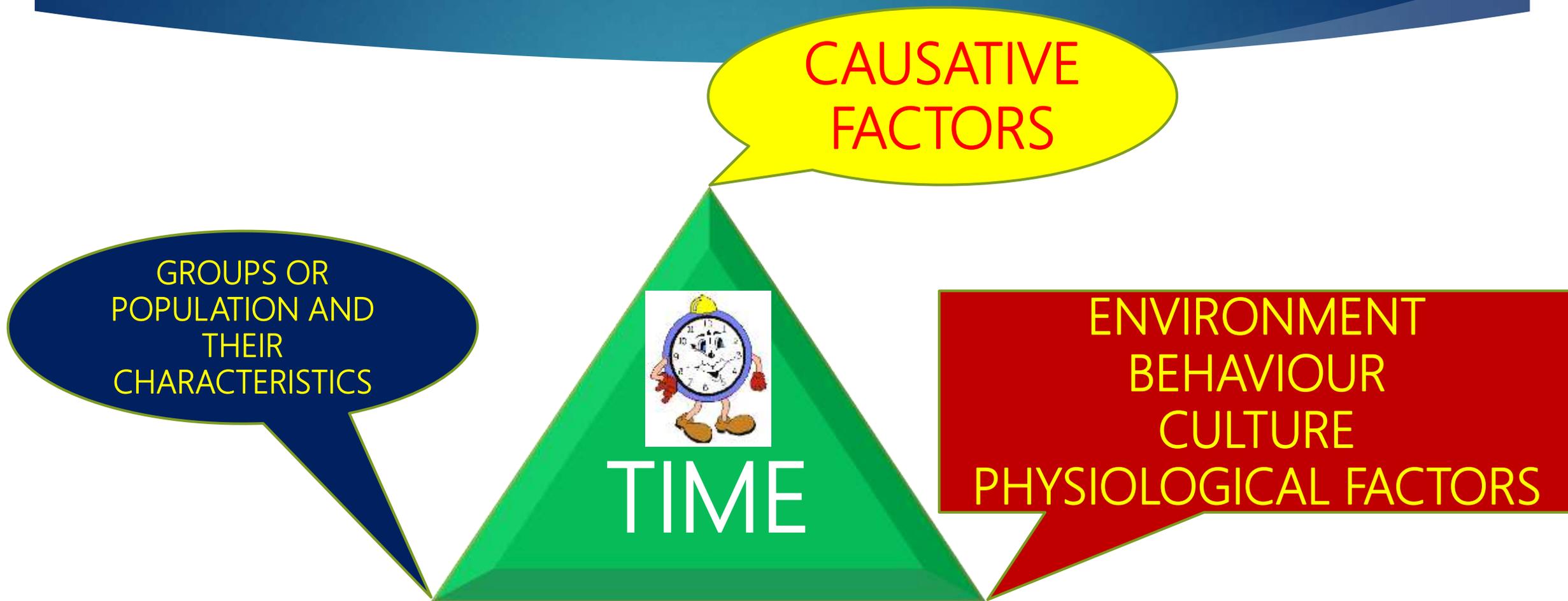




EPIDEMIOLOGICAL TETRAD

- ▶ *As a result of advance in public health, communicable diseases declined and rise of non communicable diseases called modern diseases is seen.*
- ▶ *These diseases could not be explained by single cause idea.*
- ▶ *It is now known that these diseases are due to multiple factors which leads to formation of advanced model of triangle of epidemiology.*

EPIDEMIOLOGICAL TETRAD

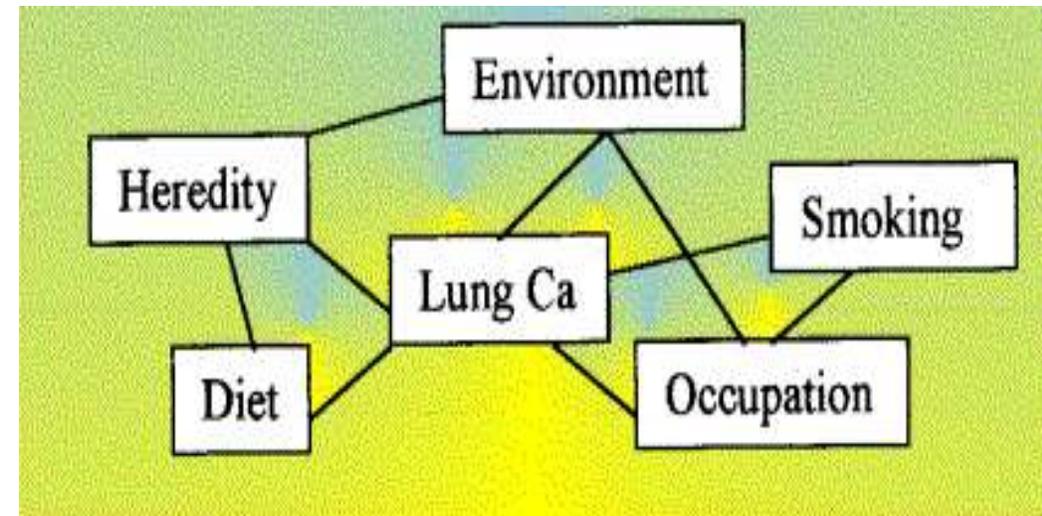


BEINGS MODEL OF DISEASE CAUSATION

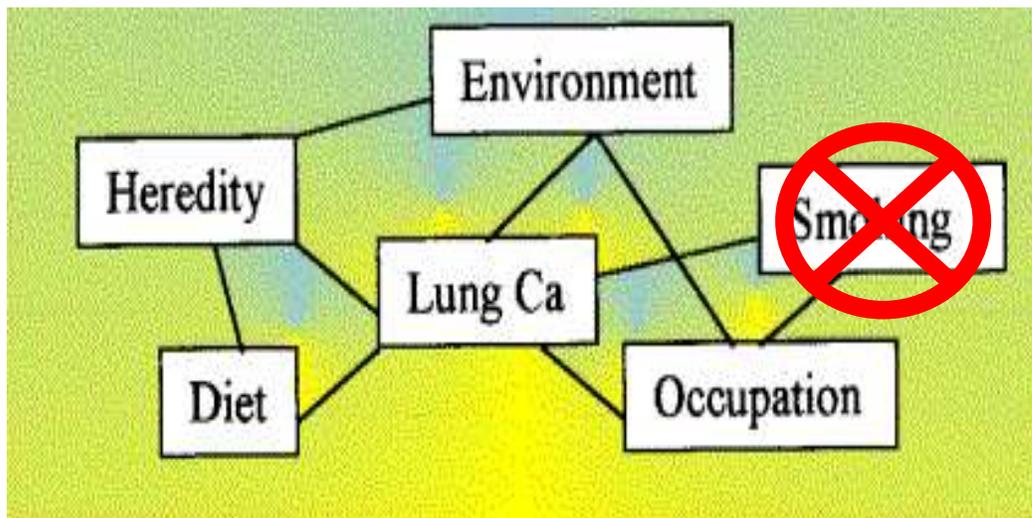
- B BIOLOGICAL FACTORS & BEHAVIOURAL FACTORS
- E ENVIRONMENTAL FACTORS
- I IMMUNOLOGICAL FACTORS
- N NUTRITIONAL FACTORS
- G GENETIC FACTORS
- S SOCIAL, SPRITUAL AND SERVICE FACTORS

WEB OF CAUSATION THEORY

- ▶ Given by Mc Mohan and Pugh
- ▶ Given for chronic diseases where the cause is not known but is outcome of interaction of multiple factors
- ▶ It considers all the predisposing factors of any type and their complex inter-relationship with each other

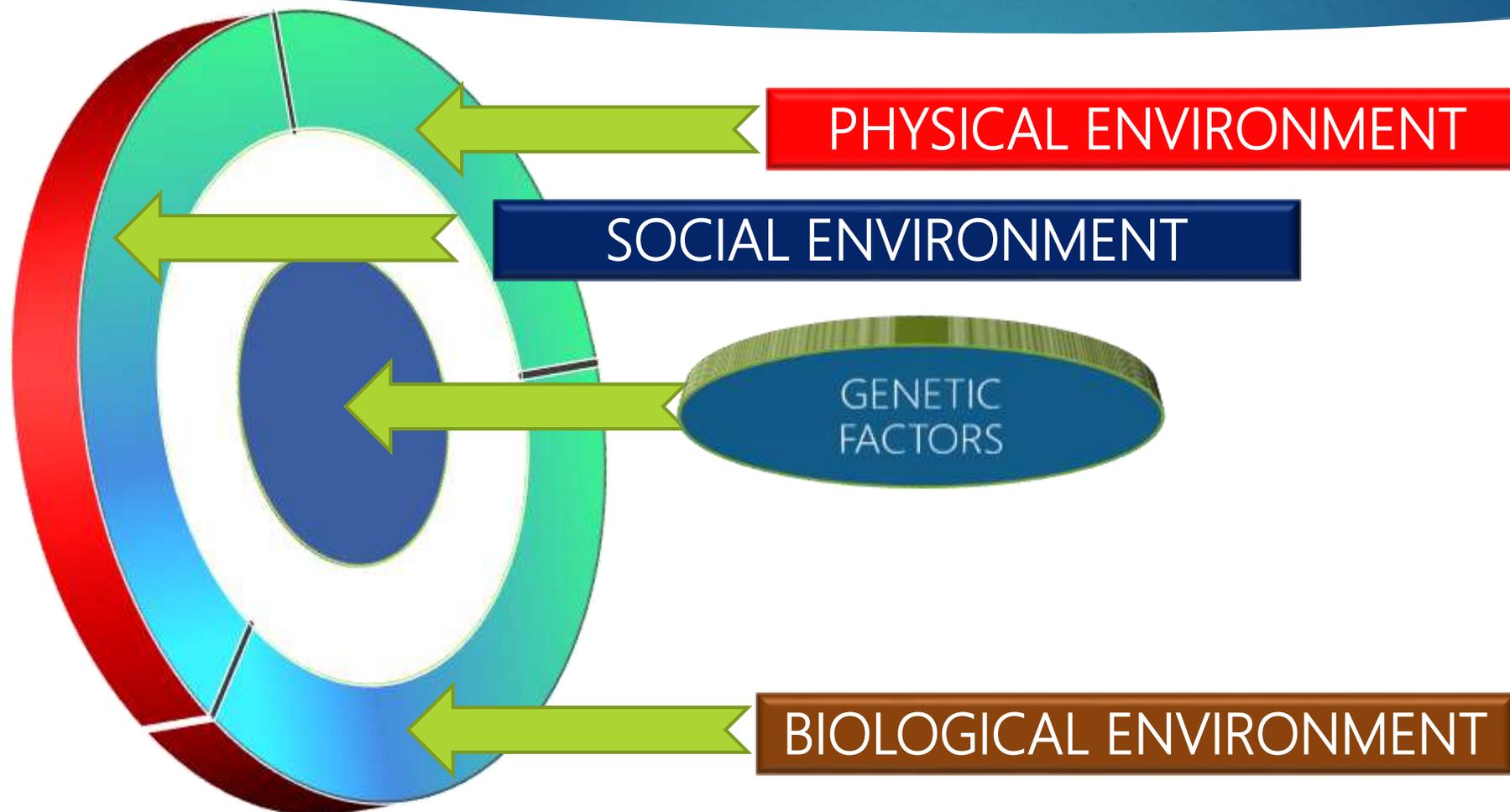


WEB OF CAUSATION THEORY

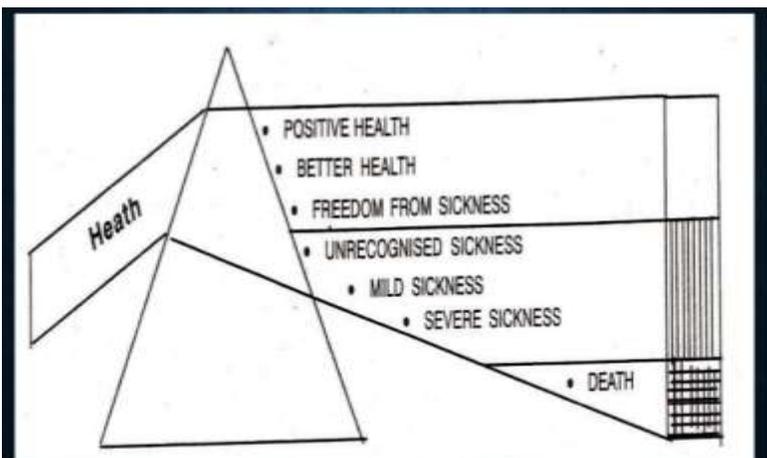


It does not imply that the disease can not be controlled unless all the multiple factors or chains of causation or at-least a number of them are appropriately controlled or removed even a control of just one link or chain is sufficient to control a disease

WHEEL THEORY OF CAUSATION



SPECTRUM OF DISEASES



- ▶ Spectrum of disease is a graphic representation of variations in the manifestations of disease.
- ▶ At one end of the disease spectrum are subclinical infections which are not ordinarily identified and on the other end are fatal illness
- ▶ In the middle of the spectrum lie illness ranging in severity from mild to severe

ICE BERG CONCEPT

SEVERE INFECTION

MILD TO MODERATE
INFECTION

PRE CLINICAL CASES

SUB CLINICAL CASES

EXPOSURE WITHOUT
INFECTION



ICE BERG CONCEPT EXAMPLE

ACTIVE TB CASES

LATENT TB CASES



EXAMPLE
TUBERCULOSI
S

RISK FACTORS

Risk factors are defined as

- ▶ *“ an attribute or exposure that is significantly associated with the development of a disease”*
- ▶ *“A determinant that can be modified by intervention there by reducing the possibility of occurrence of disease or other specified outcomes”*

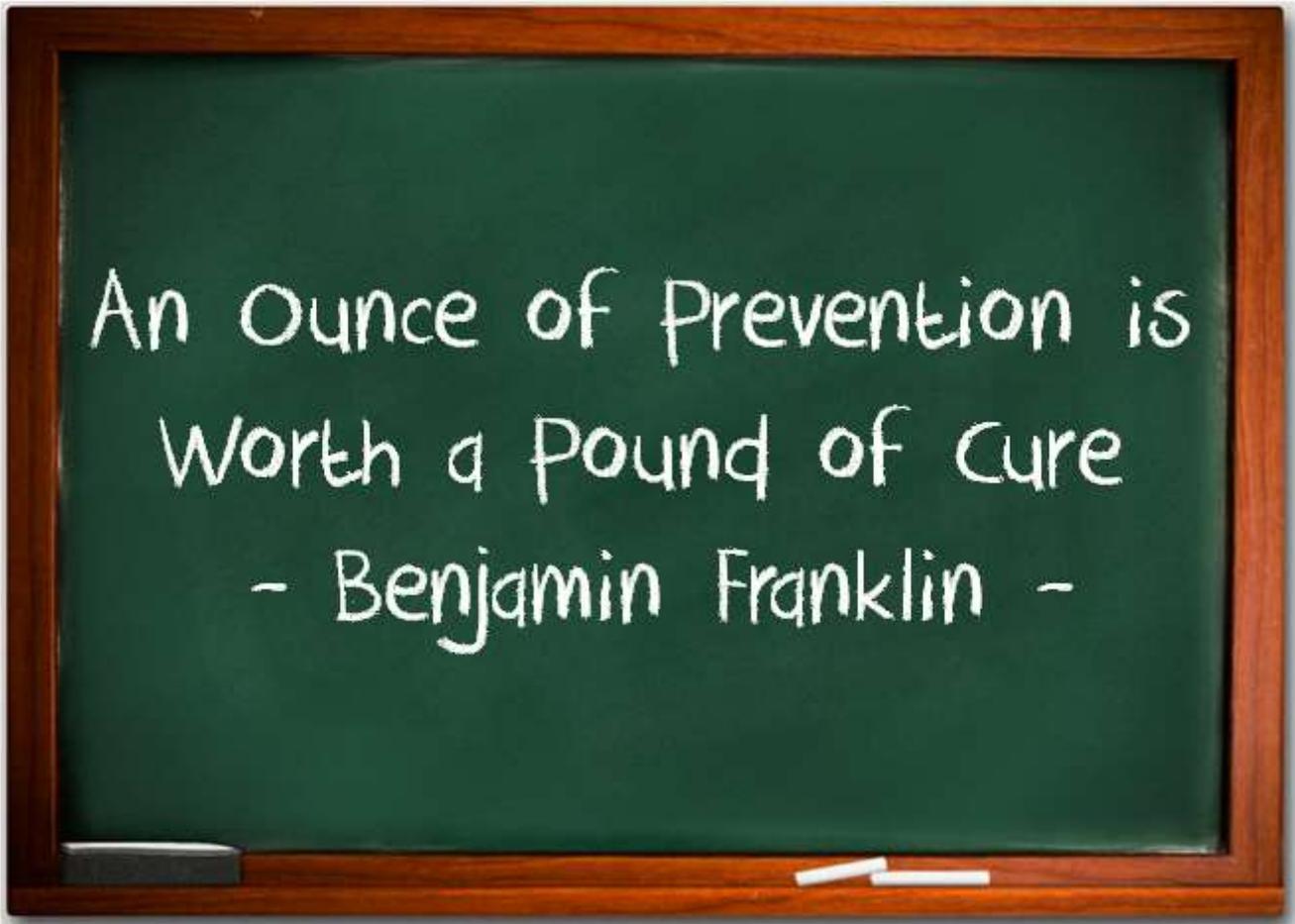


RISK FACTORS

- ▶ Risk factors are often suggestive but absolute proof of cause and effect between a risk factor and disease is usually lacking
- ▶ That is presence of a risk factor does not imply that the disease will occur and in its absence the disease will not occur.

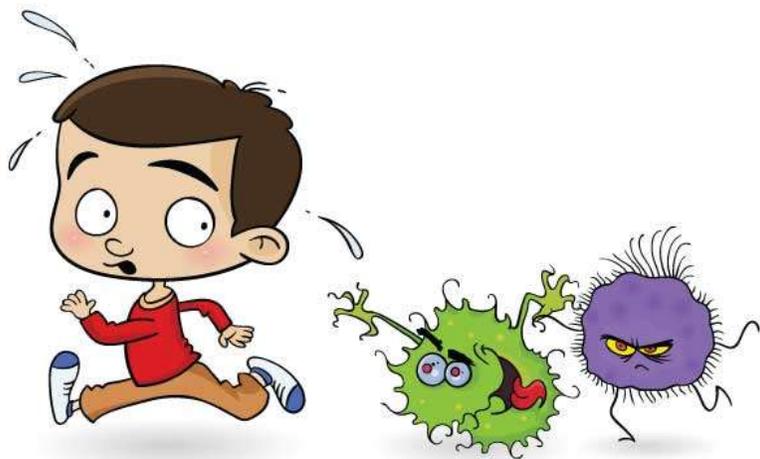


CONCEPT OF PREVENTION



An Ounce of prevention is
Worth a Pound of Cure
- Benjamin Franklin -

WHAT IS PREVENTION ???



- ▶ PREVENTION : the word itself says :

PRE + EVENT + ACTION

- ▶ It has been mentioned by English dictionary as
" the action of stopping something from happening or
arising"

CONCEPT OF PREVENTION :

LEVELS OF PREVENTION

- ▶ *In modern day the concept of prevention has become broad based. It has become customary to define prevention in terms of four levels:*

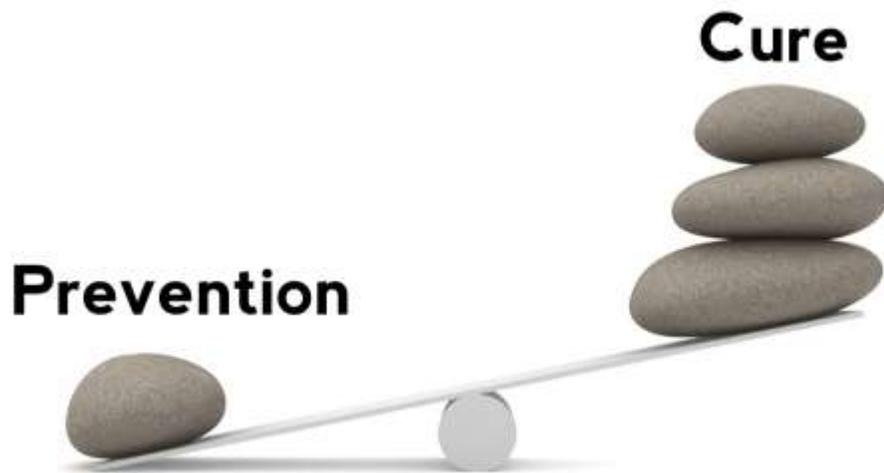
Primordial prevention

Primary prevention

Secondary Prevention

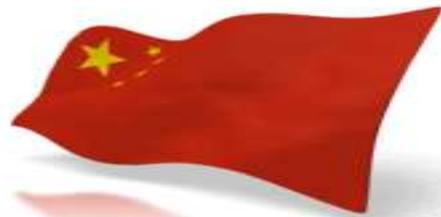
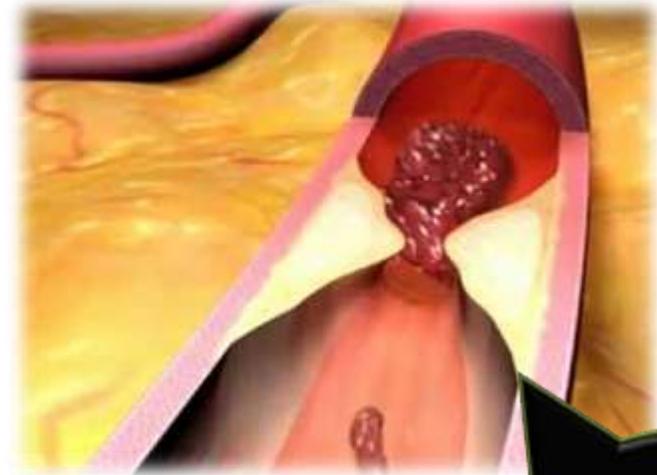
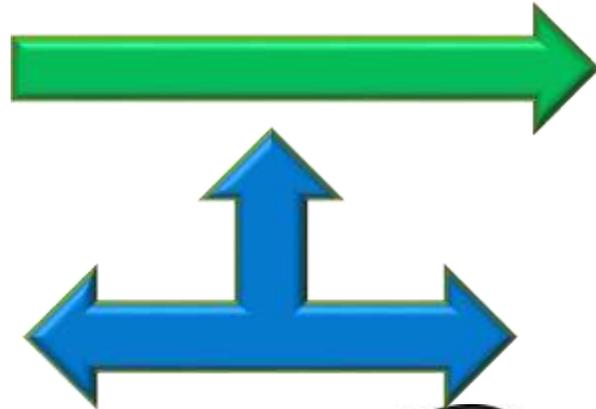
Tertiary Prevention

PRIMORDIAL PREVENTION

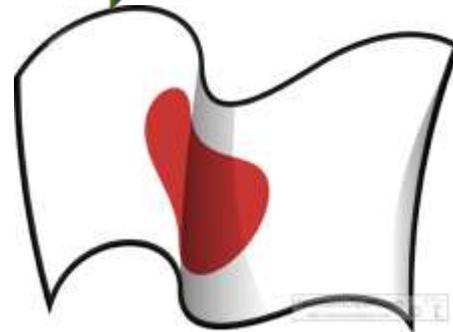


The aim of primordial prevention is to avoid the emergence and establishment of social, economic and cultural patterns of living that are known to contribute to an elevated risk of disease.

PRIMORDIAL PREVENTION



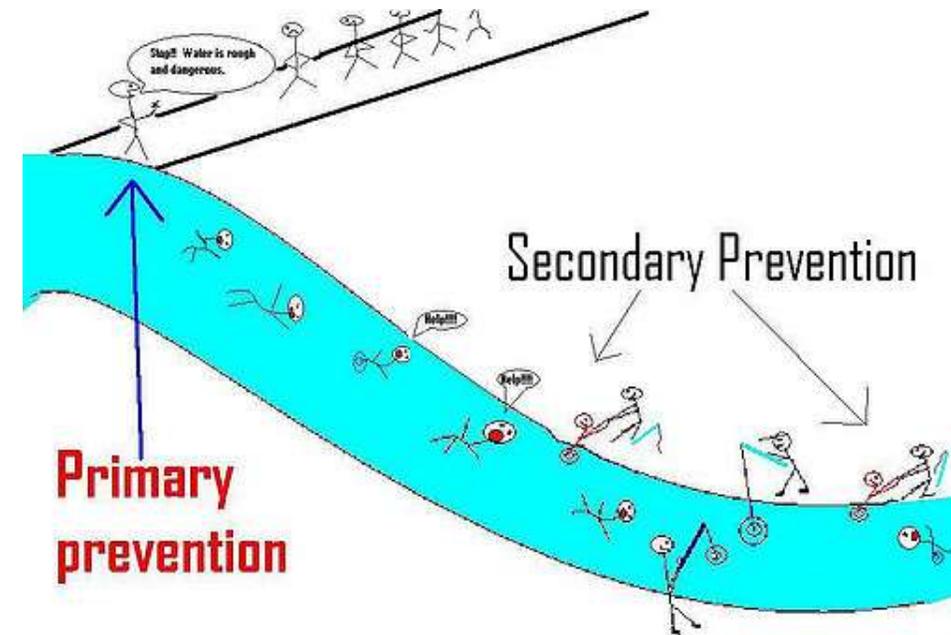
PresenterMedia



REDUCED
MORTALITY

PRIMARY PREVENTION

Primary prevention can be defined as "Action taken prior to the onset of disease which removes the possibility that a disease will ever occur"



PRIMARY PREVENTION



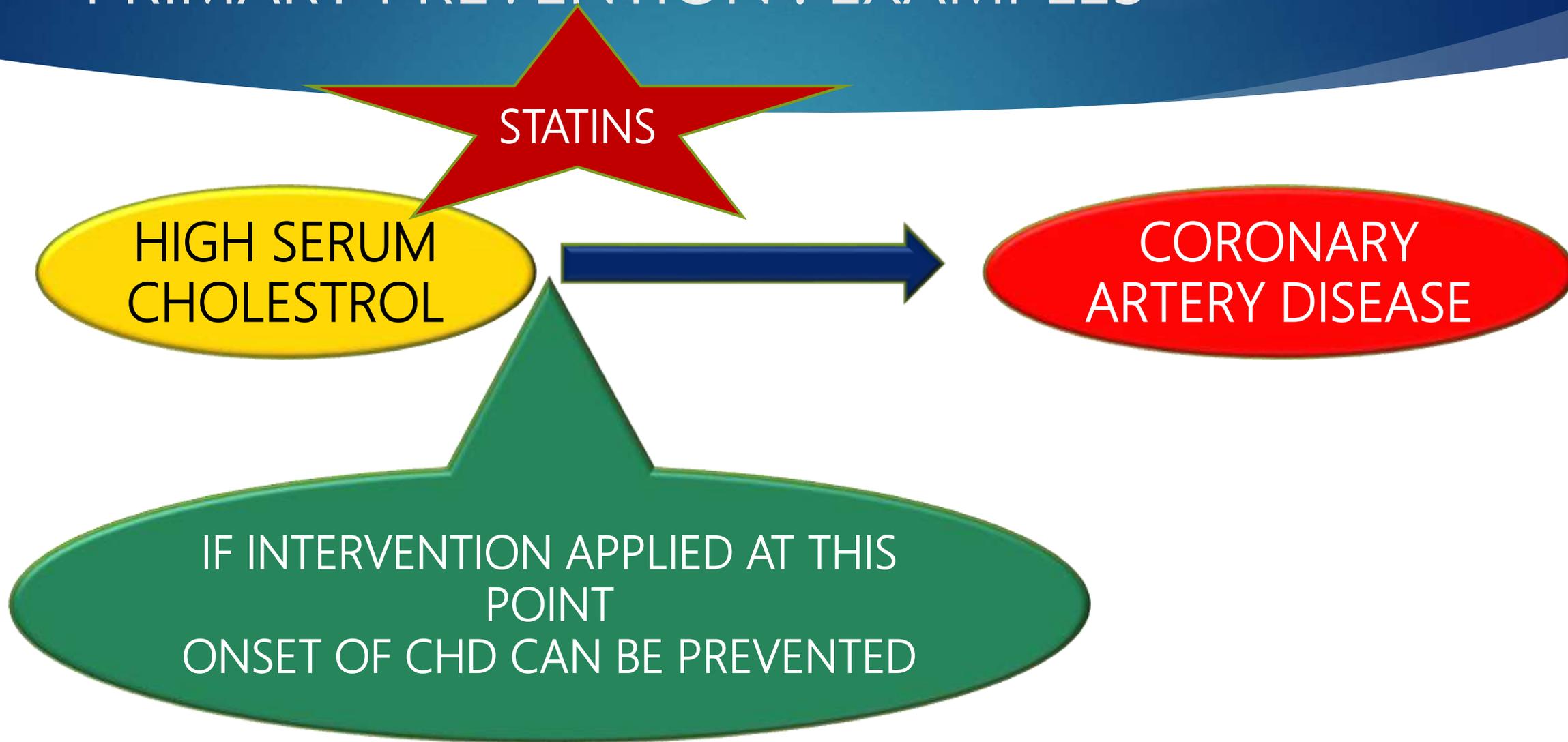
- ▶ *It signifies intervention in the pre pathogenesis phase of a disease or health problem or other departure from health.*
- ▶ *Primary prevention may be accomplished by measures designed to promote general health and well being and quality of life of people or by specific protective measures*

PRIMARY PREVENTION : POSITIVE HEALTH

- ▶ Positive health encourages achievement and maintenance of
- ▶ “ an acceptable level of health that will enable every individual to lead a socially and economically productive life”
- ▶ It concern’s an individual’s attitude towards life and health and the initiative he takes about positive and responsible measures for himself, his family and his community.



PRIMARY PREVENTION : EXAMPLES



PRIMARY PREVENTION : EXAMPLES

CONDOMS



HIV
INFECTION &
STI'S

IMMUNIZATION



VACCINE
PREVENTABLE
DISEASES

PRIMARY PREVENTION : STRATEGIES



POPULATION
APPROACH
(MASS APPROACH)



HIGH RISK STRATEGY

PRIMARY PREVENTION: POPULATION STRATEGY

- ▶ Population strategy is directed towards whole population irrespective of individual risk levels
- ▶ example: a small reduction in average blood pressure or serum cholesterol level of population can produce a large reduction in incidence of coronary heart disease.



PRIMARY PREVENTION: HIGH RISK STRATEGY



- ▶ The high risk strategy aims to bring preventive care to individuals at special risk
- ▶ This requires detection of individuals at high risk by the optimum use of clinical methods
- ▶ Example: smoking cessation programs can be applied to smokers to reduce incidence of lung cancer.

SECONDARY PREVENTION

It is defined as

- ▶ Actions which halts the progress of a disease at its incipient stage and prevent complications
- ▶ Secondary prevention aims to cure patients and reduce the more serious consequences of disease through early diagnosis and treatment.



SECONDARY PREVENTION

- ▶ It can be applied only to diseases in which the natural history includes an early period when it is easily identified and treated so that progress to a more serious stage can be stopped.
- ▶ 2 main requirements
 - ▶ Safe and accurate method of detection
 - ▶ Effective method of intervention



TERTIARY PREVENTION



It is defined as

“ all measures available to reduce or limit impairment and disabilities, minimize suffering caused by existing departures from good health and to promote patient’s adjustment to irremediable conditions”

TERTIARY PREVENTION

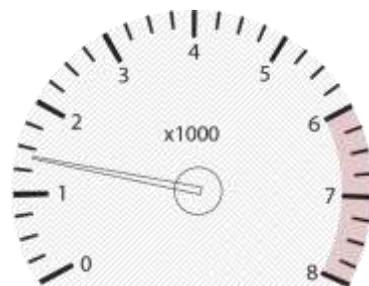


- ▶ The rehabilitation of patients with poliomyelitis, strokes, injuries, blindness is of great importance in enabling them to take part in daily social life

PREVENTION : EXAMPLE



HEALTH
EDUCATION FOR
DRIVING



SPECIFIC
PROTECTION TO
DRIVE SLOW



Road Traffic Accidents

IMMEDIATE
HOSPITALIZATION
EARLY DIAGNOSIS
TREATMENT.

PREVENTION : EXAMPLE

AMPUTATION OF
ONE LIMB



**SOCIAL
REHABILITATION**

**VOCATIONAL
REHABILITATION**

**MEDICAL
REHABILITATION**

MODES OF INTERVENTION

Health promotion

Specific protection

Early diagnosis and treatment

Disability limitation

Rehabilitation

1. HEALTH PROMOTION



HEALTH EDUCATION

ENVIRONMENTAL
MODIFICATIONS

NUTRITIONAL
INTERVENTIONS

LIFESTYLE AND BEHAVIOURAL
CHANGES

HEALTH EDUCATION



It is defined as

- ▶ *“ the extension to all people of the benefits of medical, psychological and related knowledge is essential to the fullest attainment of health”*

ENVIRONMENTAL MODIFICATIONS

A comprehensive approach to health promotion requires environmental modifications such as

- ▶ *Safe water*
- ▶ *Installation of sanitary latrines*
- ▶ *Control of insects and rodents*
- ▶ *Improvement of housing*



NUTRITIONAL INTERVENTIONS



These comprise food distribution and nutrition improvement of vulnerable groups, child feeding programs, food fortification, nutritional education

2. SPECIFIC PROTECTION

1. *Immunization*
2. *Use of specific nutrients*
3. *Chemoprophylaxis*
4. *Protection against occupational hazards*
5. *Protection against accidents*
6. *Protection from carcinogens*
7. *Avoidance of allergens*



3. EARLY DIAGNOSIS AND TREATMENT

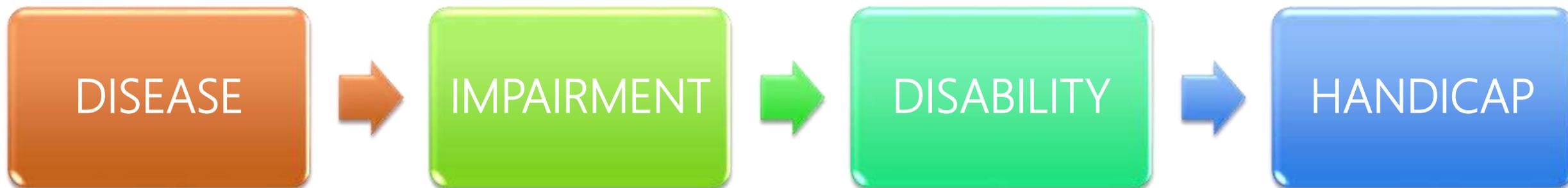


- ▶ The detection of disturbances of homeostatic and compensatory mechanism while biochemical, morphological and functional changes are still reversible”

4. DISABILITY LIMITATIONS

- ▶ When a patient reports late in the pathogenesis phase the mode of intervention is disability limitation.
- ▶ Objective is to prevent or halt the transition of the disease process from impairment to handicap

CONCEPT OF DISABILITY



CONCEPT OF DISABILITY

- ▶ **IMPAIRMENT:** any loss of abnormality of psychosocial or psychological or anatomical structure or function. E.g. loss of foot, defective vision, mental retardation
- ▶ **DISABILITY:** any restriction or lack of ability to perform an activity in the manner or within the range considered normal for his age sex etc. this inability to carry out certain activities is termed as disability.

CONCEPT OF DISABILITY



- ▶ Handicap: as a result of disability the person experiences certain disadvantages in life and is not able to discharge the obligations required of him and play the role expected of him in the society is termed as handicap.

EXAMPLE

FROST BITE

LOST HIS 2
FINGERSCAN NOT DO
SURGERYDIDN'T BECAME
SURGEON

SURGERY



5. 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”
- ▶ It includes all measures aimed at reducing the impact of disabling and handicapping conditions and at enabling the disabled and handicapped to achieve social integration

AREAS OF CONCERN IN REHABILITATION

MEDICAL REHABILITATION:

- restoration of function

VOCATIONAL REHABILITATION:

- restoration of capacity to earn livelihood

SOCIAL REHABILITATION :

- restoration of family and social relationships

PSYCHOLOGICAL REHABILITATION:

- restoration of personal dignity and confidence

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- ▶ IMAGES : VARIOUS INTERNET SOURCES

THANK YOU

ICE BERG CONCEPT

SEVERE INFECTION

MILD TO MODERATE
INFECTION

PRE SYMPTOMATIC
CASES

SUB CLINICAL CASES

LATENT CASES

UN DIAGNOSED
CASES

