

CONCEPTS OF DISEASE



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INTRODUCTION

- The concept of disease has been the subject of a vast, vivid and versatile debate.
- Disease is a central notion to modern health care, it effects society and is important to the process of discovering and identifying disease entities.



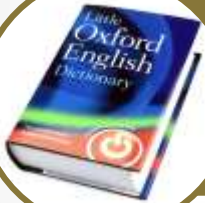
CONCEPTS OF DISEASE

DEFINITIONS



Merriam-Webster

“A condition in which body function is impaired, departure from a state of health, an alteration of the human body interrupting the performance of the vital functions.”



“The condition of body or some part of organ of body in which its functions are disrupted or deranged.”



“Disease is considered a social phenomenon, occurring in all societies and defined and fought in terms of the particular cultural forces prevalent in the society.”



‘a maladjustment of human organism to the environment’

TO KEEP IT SIMPLE

Simplest definition – OPPOSITE TO HEALTH .



Any deviation from normal functioning or state of complete physical or mental well-being.

DISEASE



DISEASE is a physiological/psychological dysfunction.

Susser

ILLNESS



ILLNESS

is a subjective state of the person who feels aware of not being well.

SICKNESS



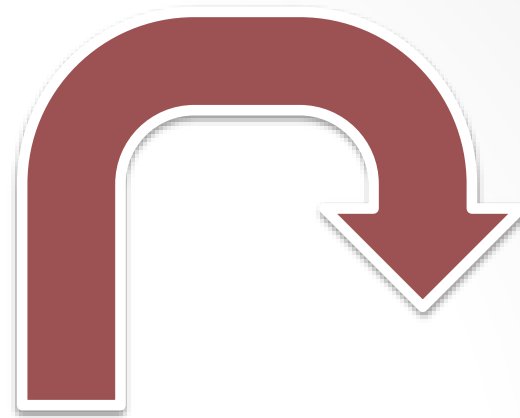
SICKNESS

is a state of social dysfunction i.e. a role that the individual assumes when ill (sickness role).

CONCEPT OF CAUSATION

EARLIER THEORIES

- Supernatural theory
- Theory of Humors
- Concept of contagion
- Miasmatic theory
- Theory of spontaneous generation



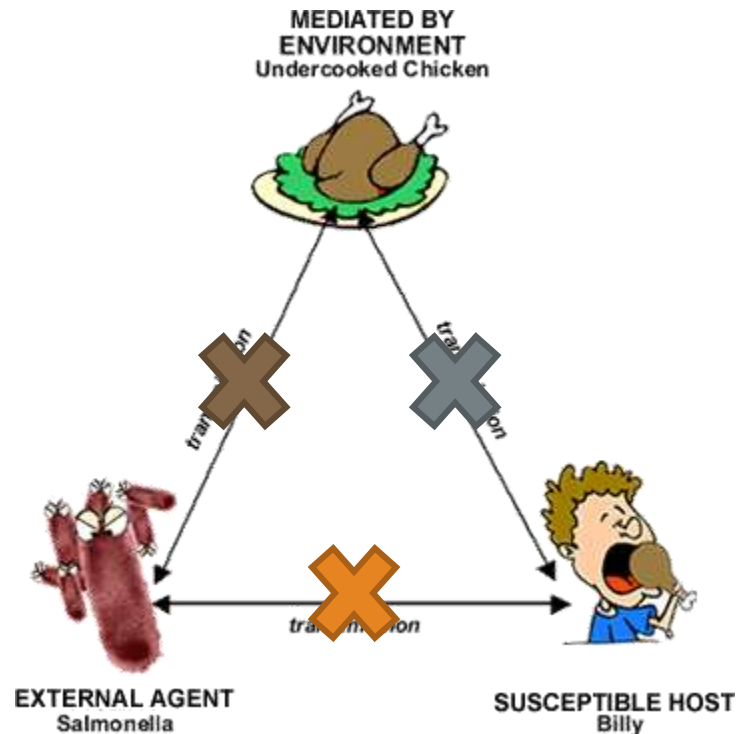
Discovery of microbiology - turningpoint

- GERM THEORY OF DISEASE
- Microbes as sole cause of disease



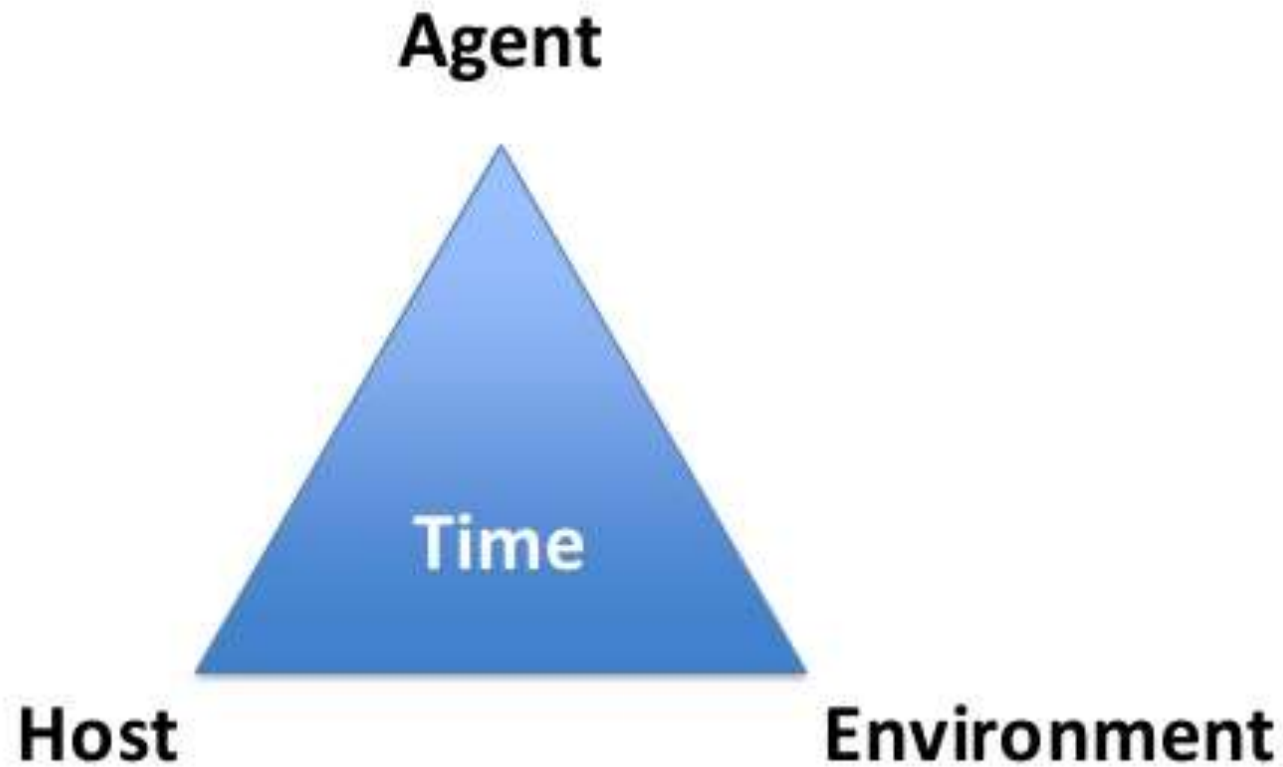
EPIDEMIOLOGICAL TRIAD

- Factors relating host and environment



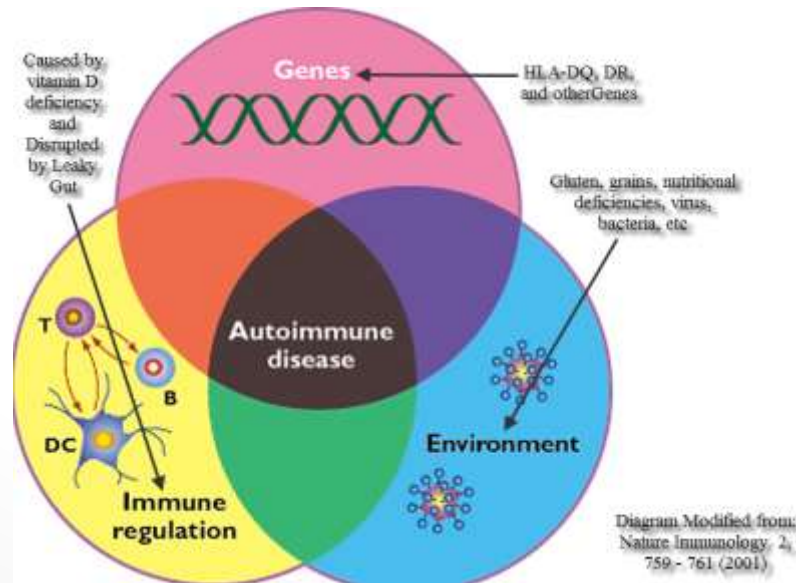
- **Mission of epidemiology** – break one of the legs of triangle and disrupt the connection between these and thereby stopping outbreak.

THE TETRAD OF EPIDEMIOLOGY



MULTIFACTORIAL CAUSATION

- **CONCEPT-** disease is due to multiple factors and not a single one.
- **PETTENKOFER OF MUNICH(1819-1901)**-early proponent of this concept. "Germ theory of disease" or "single cause idea" in late 19 century overshadowed the multiple cause theory.



ADVANCED MODEL OF THE TRIANGLE OF EPIDEMIOLOGY

Causative Factors



TIME

**Groups or
populations and
their
characteristics**

**Environment
behaviour, culture
physiological
factors ecological
elements**

WEB OF CAUSATION

- Suggested by- Mac Mahon and Pugh
- Considers all the predisposing factors of any type and their complex interaction with each other.



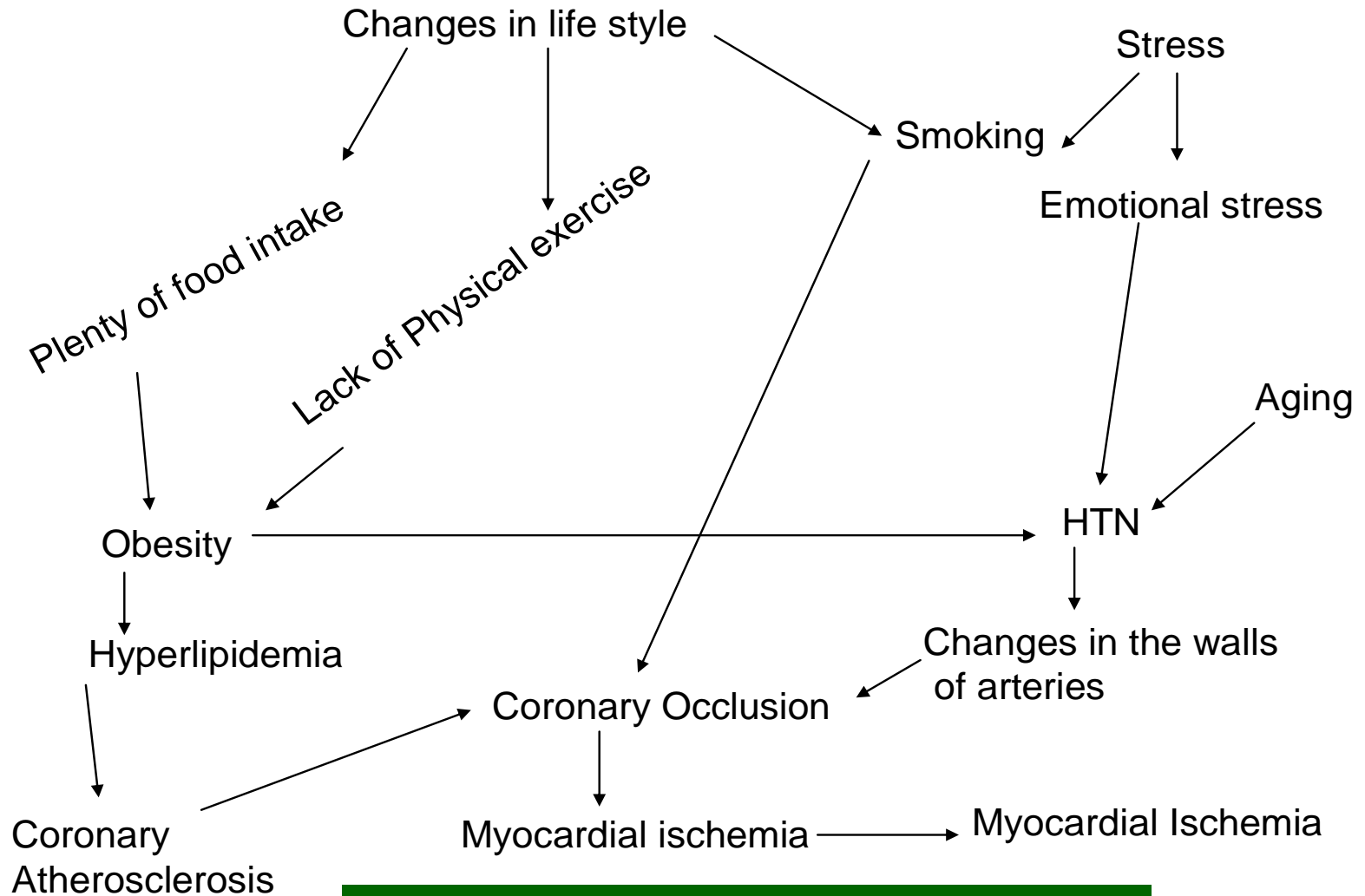
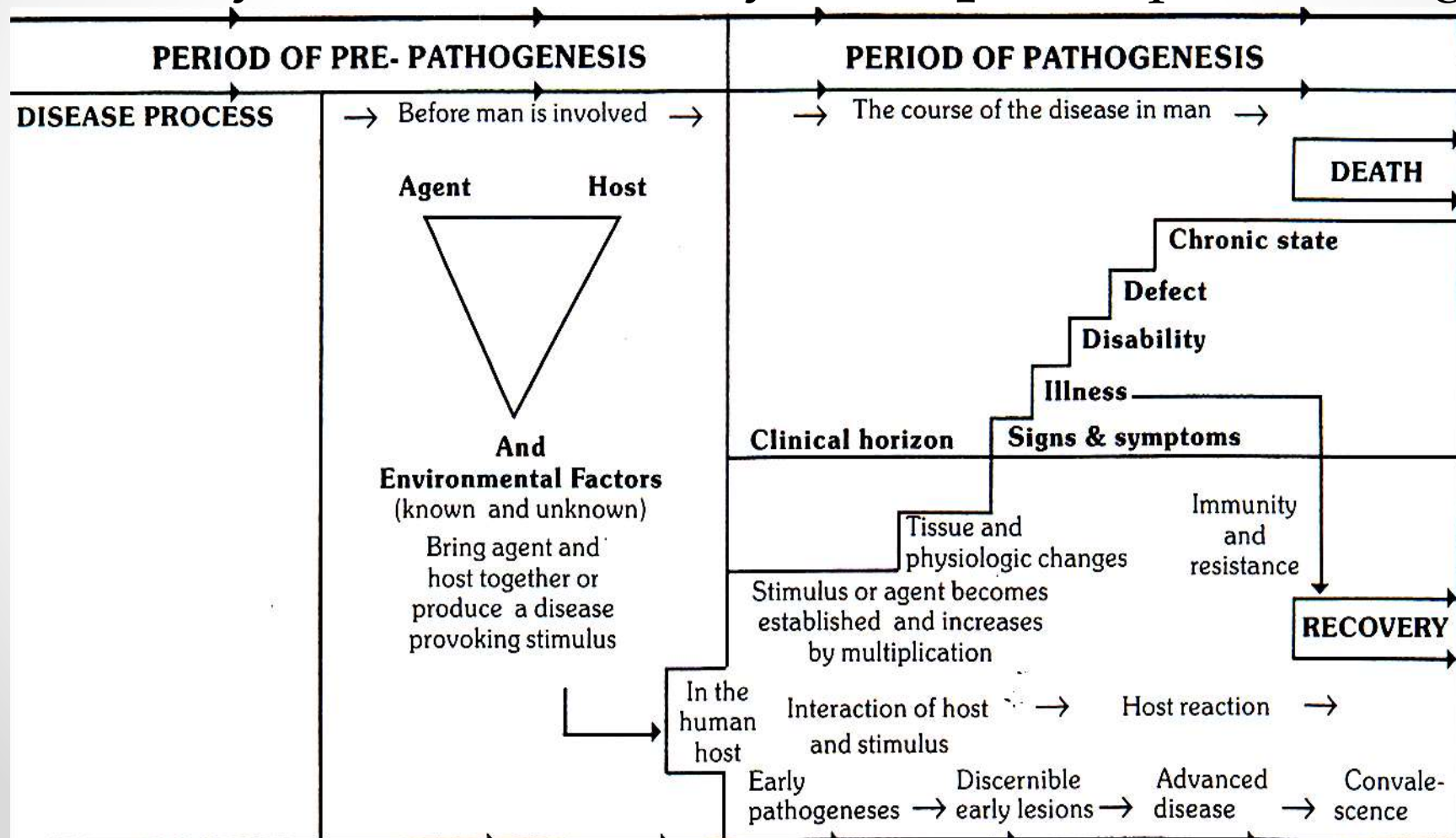


Fig: Web of causation of MI

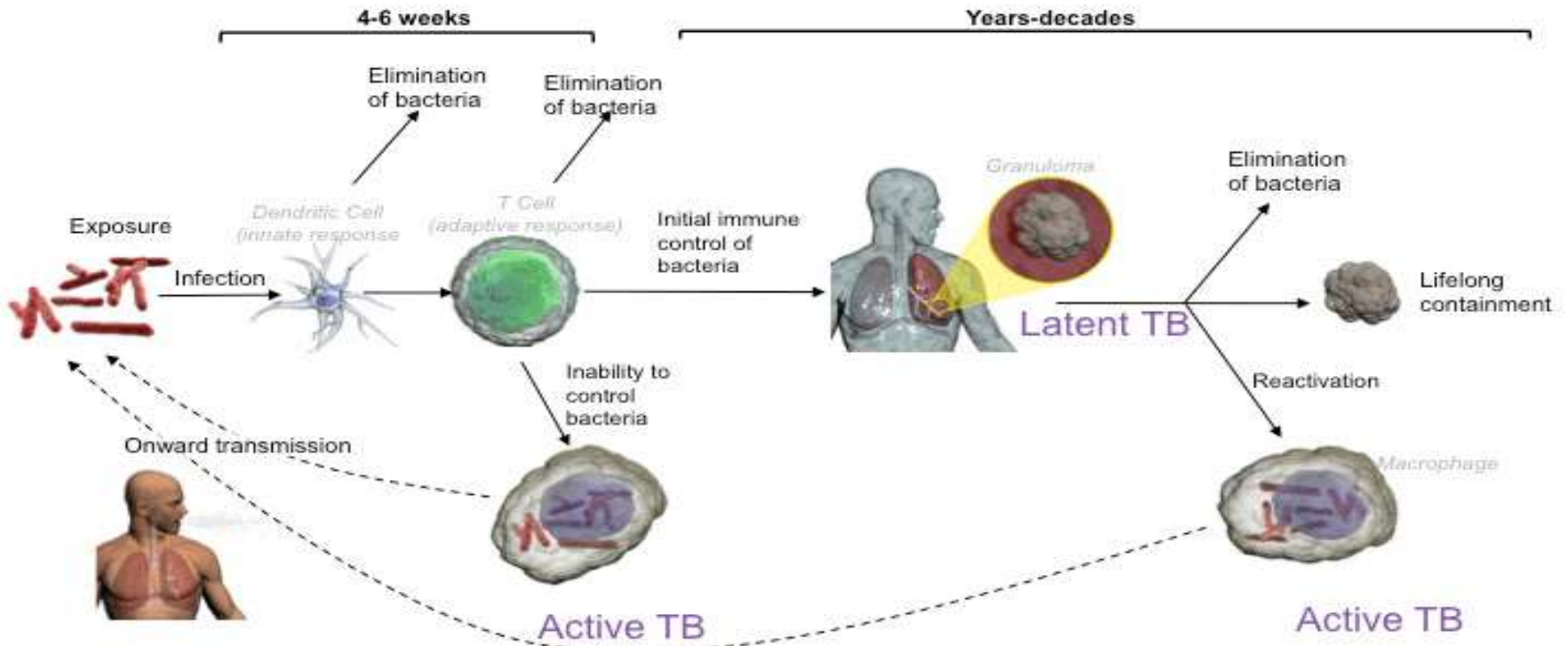
NATURAL HISTORY OF DISEASE

It refers to the progress of a disease process in an individual over time, in the absence of intervention.

- History of disease is a key **concept** in epidemiology.

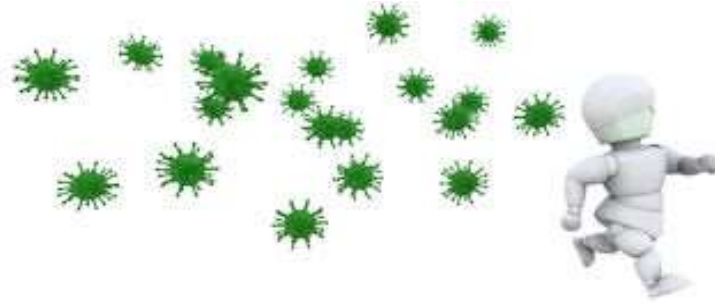


Natural history of TB infection

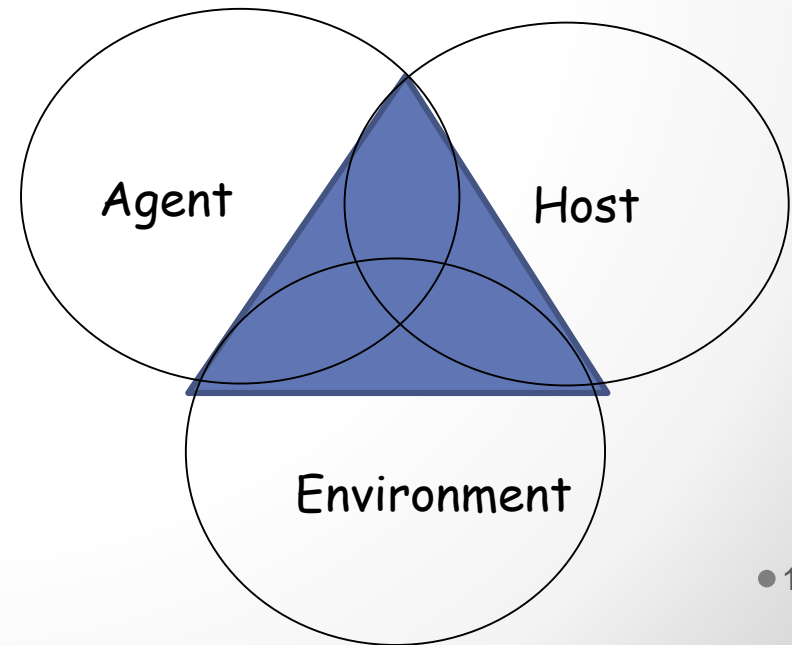


PRE PATHOGENESIS PHASE

- Disease agent has not entered man, but factors favouring disease exist in the environment.

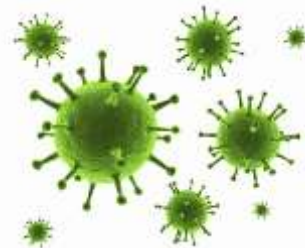
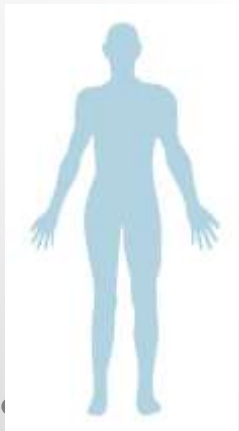


- What required is an interaction of these factors to initiate the disease process.



PATHOGENESIS PHASE

- Entry of disease agent in susceptible human host.
- Disease agent multiplies and induces tissue and physiological changes.
- final outcome- recovery, disability or death.
- This phase may be modified by intervention measures such as immunization, chemotherapy



AGENT FACTORS

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.

1. Biological Agents – Infectivity Pathogenicity Virulence
2. Nutrient
3. Physical
4. Chemical
5. Mechanical
6. Absence or insufficiency of a factor
7. Social

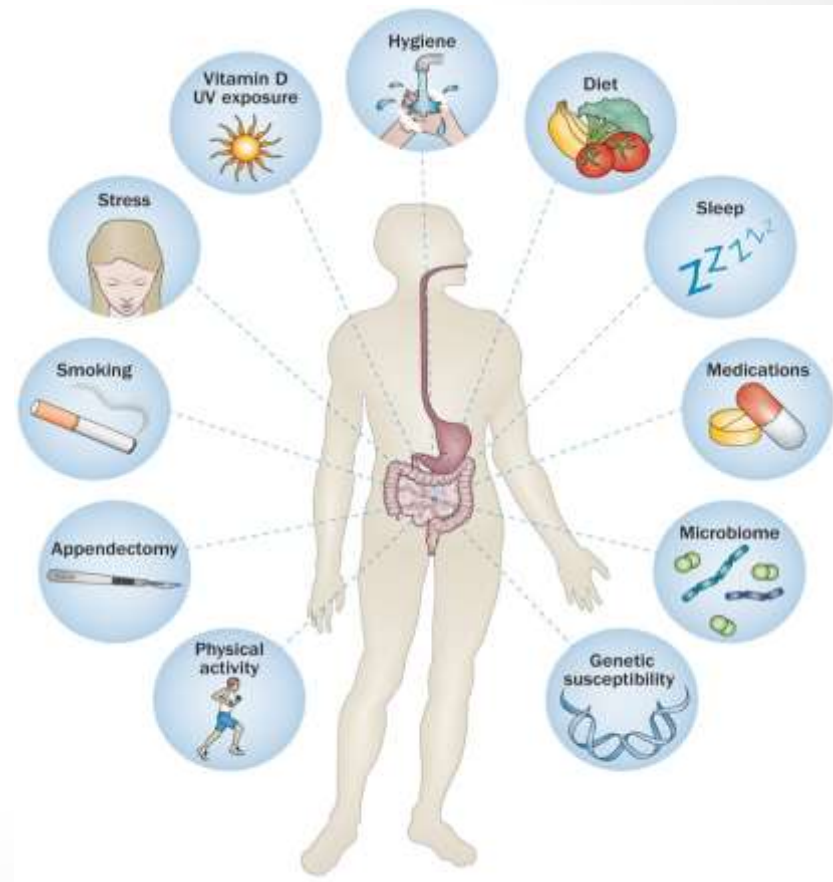


HOST FACTORS

- Host - **SOIL** Disease agent –
SEED

Classified as

- **Demographic characteristics**
- **Biologic**
- **Social & Economic**
- **Lifestyle factors**
-



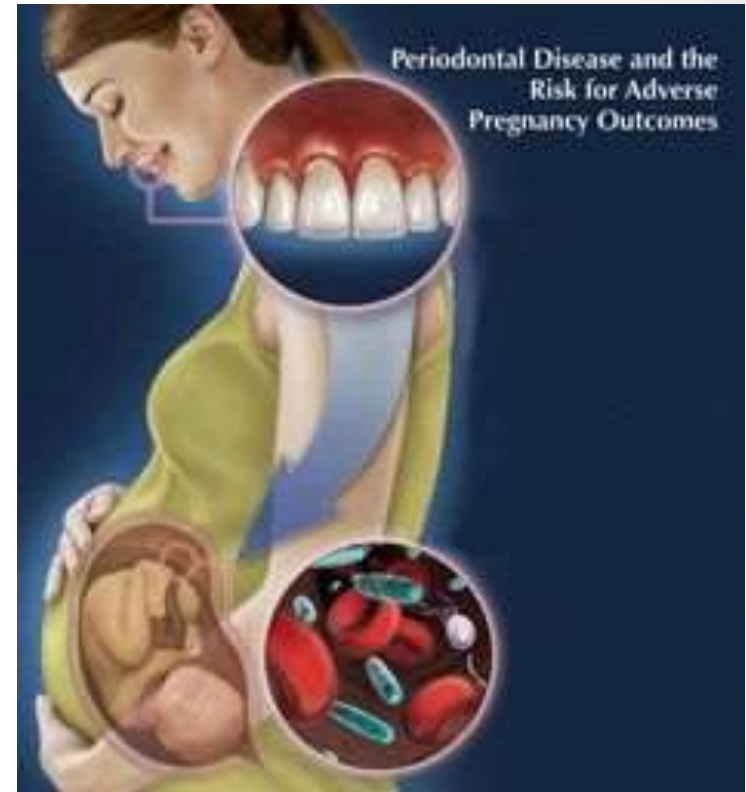
ENVIRONMENTAL FACTORS

- All that which is external to the individual human host, living and non-living, and with which he is in constant interaction.
 - Macro-environment (external)
- Physical
- Biological
- Psycho social



RISK FACTORS

- Where the disease agent is not firmly established, the aetiology is generally discussed in terms of risk factors.
- The term risk factor is used by different authors with at least two meanings-
 - An attribute or exposure that is significantly associated with development of disease.
 - A determinant that can be modified by intervention, thereby reducing the possibility of occurrence of disease or other specified outcomes.



RISK GROUPS

- Something for all but more for those in need- in proportion to the need.
- Another approach developed and promoted by WHO is to identify precisely the **risk groups** or **target groups** in population by certain defined criteria and direct appropriate action to them first- **risk approach**.



SPECTRUM OF DISEASE

- Graphic representation of variations in the manifestations of disease.
- Infectious disease – gradient of infection

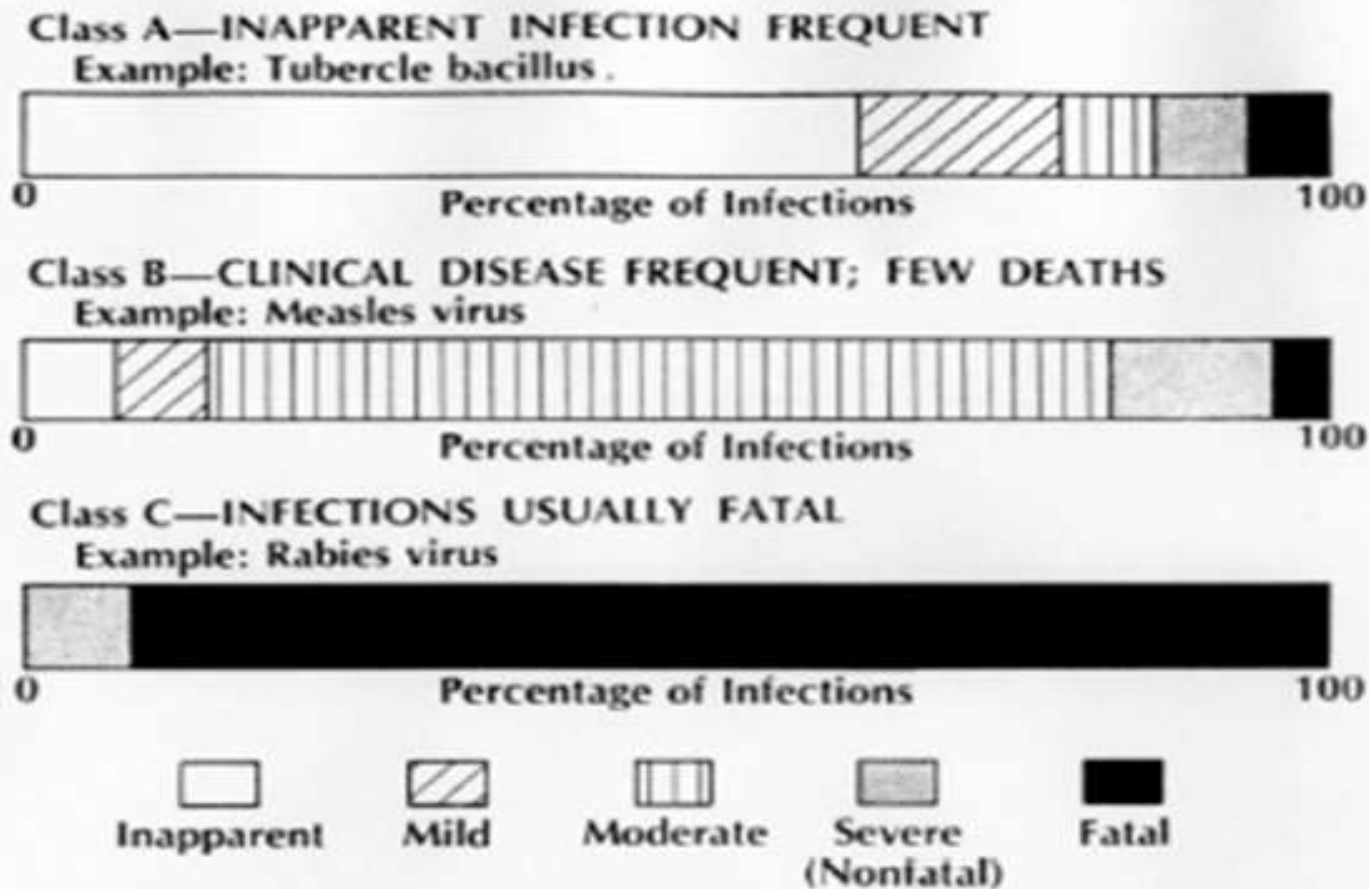
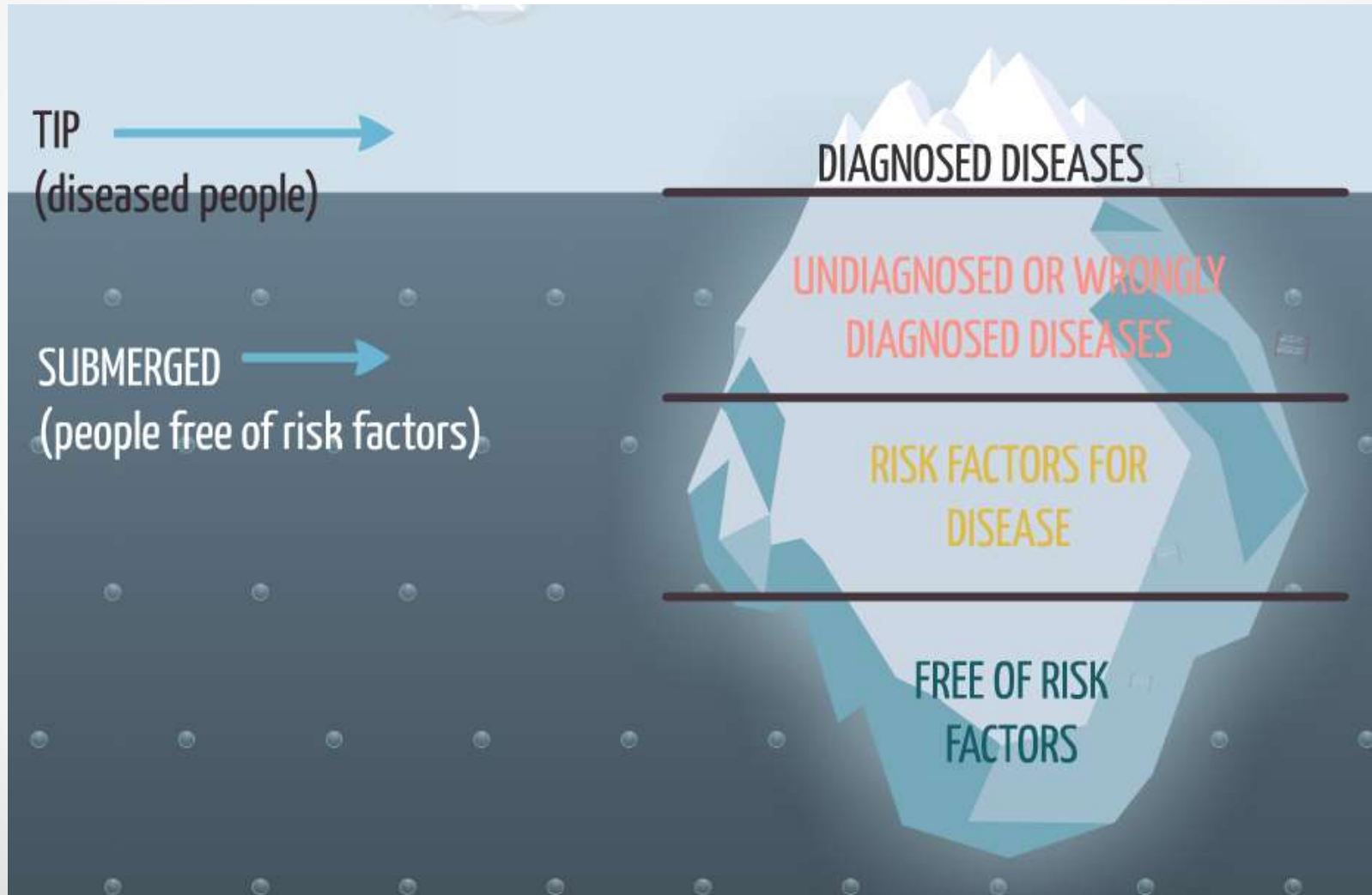


Figure 11-1 Distribution of clinical severity for three classes of infections (not drawn to scale).

ICEBERG OF DISEASE

- Disease in a community is compared to an iceberg.



CONCEPTS OF CONTROL

The term disease control refers ongoing operation aimed at reducing:

- **The incidence of disease.**
- **The duration of disease and the consequently the risk of transmission.**
- **The effect of infection including physical and psychological complication.**
- **The financial burden to the community.**

Disease control includes . . .

Extinction

The specific infectious agent no longer exists in **nature or in the laboratory**

Eradication

Termination of all transmission of infections by **extermination** of infectious agents

Elimination

Reduction to zero of the incidence of a specified disease in a **defined geographical area** as a result of deliberate efforts

Control

public policy intervention that **restricts** the circulation of an infectious agent beyond the level that would result from spontaneous, individual behaviors to protect against infection

- **DISEASE MONITORING:**

- Defined as “the performance and analysis of routine measurement aimed at detecting changes in the environment or health status of population.” e.g. growth monitoring of child, Monitoring of air pollution, monitoring of water quality etc.

- **DISEASE SURVEILLANCE:**

- Defined as “the continuous scrutiny of the factors that determine the occurrence and distribution of disease and other conditions of ill health.” E.g. Poliomyelitis surveillance programme of WHO.

CONCEPTS OF PREVENTION



The goals of medicine are to

- Promote health,
- To preserve health,
- To restore health when it is impaired
- And to minimize suffering and distress.

These goals are embodied in the word "**prevention**"

- Actions aimed at eradicating, eliminating or minimizing the impact of disease and disability, or if none of these are feasible, retarding the progress of the disease and disability.
- The concept of prevention is best defined in the context of levels, traditionally called primary, secondary and tertiary prevention. A fourth level, called primordial prevention, was later added.



Leavell's Levels of Prevention

Stage of disease	Level of prevention	Type of response
Pre-disease	Primary Prevention	Health promotion and Specific protection
Latent Disease	Secondary prevention	Pre-symptomatic Diagnosis and treatment
Symptomatic Disease	Tertiary prevention	•Disability limitation for early symptomatic disease •Rehabilitation for late Symptomatic disease

PRIMORDIAL PREVENTION

- **DEFINITION**

“It is the prevention of the emergence or development of risk factors in countries or population groups in which they have not yet appeared.”

- **INTERVENTION**

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



PRIMARY PREVENTION

- **Primary prevention can be defined as the action taken prior to the onset of disease, which removes the possibility that the disease will ever occur.**
- **Target population:**
 - Those who are most likely to be exposed and/or could increase their resistance
- **Typical activities:**
 - Remove or reduce source of the risk
 - Educate and make aware of disease risk
 - Include behavioral changes to reduce exposure
 - Improve general health
- **Outcome measure:** incidence of exposure; incidence of disease

SECONDARY PREVENTION

- **Secondary prevention can be defined as the action which halts the progress of a disease at its incipient stage and prevents complications.**
 - By reducing number of exposures and early disease that progress to more severe disease, mortality and morbidity can be reduced
- Target population:
 - Those who have been exposed to the disease-causing agent or have early symptoms of the disease
- Typical activities:
 - Screening for exposure and/or disease
 - Post-exposure prophylaxis
 - Early treatment to reduce impact of disease/reverse course
- Outcome measure: incidence of disease

TERTIARY PREVENTION

- Tertiary prevention can be defined as 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.
- Target population:
 - Those who have disease and need treatment
- Typical activities:
 - Treatment tailored to the patient
 - Rehabilitation to promote recovery
- Outcome measure: incidence of death and long-term disability

MODES OF INTERVENTION

- Intervention is any attempt to intervene or interrupt the usual sequence in the development of disease.
- Five modes of intervention corresponding to the natural history of any disease are:
 - Health Promotion
 - Specific Protection
 - Early Diagnosis and Adequate Treatment
 - Disability Limitation
 - Rehabilitation

HEALTH PROMOTION

- It is the process of enabling people to increase control over diseases, and to improve their health. It is not directed against any particular disease but is intended to strengthen the host through a variety of approaches(interventions):
 - Health Education
 - Environmental Modifications
 - Nutritional Interventions
 - Lifestyle and Behavioral Change

SPECIFIC PROTECTION

- Some of the currently available interventions aimed at specific protection are:
 - immunization,
 - use of specific nutrients,
 - chemoprophylaxis,
 - protection against accidents,
 - protection from carcinogens,
 - avoidance of allergens,
 - control of specific hazards in general environment .eg air pollution , noise control
 - Control of consumer product quality and safety of foods,drugs etc

EARLY DIAGNOSIS AND TREATMENT

- A **WHO** defined early detection of health impairment as “the detection of disturbances of homeostatic and compensatory mechanism while biochemical, morphological, and functional changes are still reversible.”
- Early detection and treatment are the main interventions of disease control.
- Earlier a disease is diagnosed and treated the better it is from the point of view of prognosis and preventing the occurrence of further cases or any long-term disability.
- Ex – essential hypertension, cancer of cervix and Breast cancer

DISABILITY LIMITATION

- Objective- is to prevent or halt the transition of the disease process from impairment to handicap.

Sequence of events leading to disability & handicap:

- Disease → Impairment → Disability → Handicap.

WHO defined these terms-

- **Impairment:** Loss or abnormality of psychological, physiological/anatomical structure or function.
- **Disability:** Any restriction or lack of ability to perform an activity in a manner considered normal for one's age, sex, etc.
- **Handicap:** Any disadvantage that prevents one from fulfilling his role considered normal.

REHABILITATION

“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”.

- Areas of concern in rehabilitation:
 - 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).



CHANGING PATTERN OF DISEASE

- Although diseases have not changed significantly through human history, their patterns have.
- Every decade produces its own patterns of disease.



NOTICE.

PREVENTIVES OF CHOLERA!

Published by order of the Sanitary Committee, under the sanction of the Medical Council.

BE TEMPERATE IN EATING & DRINKING!

Avoid Raw Vegetables and Unripe Fruit!

Abstain from **COLD WATER**, when heated, and above all from *Ardent Spirits*, and if habit have rendered them indispensable, take much less than usual.

SLEEP AND CLOTHE WARM!

DO NOT SLEEP OR SIT IN A DRAUGHT OF AIR.
Avoid getting Wet!

Attend immediately to all disorders of the **Bowels.**

TAKE NO MEDICINE WITHOUT ADVICE.

The black death



Spanish flu



EPIDEMIOLOGICAL TRANSITION.

- A characteristic shift in the disease pattern of a population as mortality falls during the demographic transition: acute, infectious diseases are reduced, while chronic, degenerative diseases increase in prominence, causing a gradual shift in the age pattern of mortality from younger to older ages. (Omran 1970)

DEVELOPED COUNTRIES

- Causes of diseases and deaths have shifted from infectious to chronic diseases.

Common disease- **HEART DISEASE** - 23.81%

CANCER-22.95%

CVS- 5.16% .

These 3 together- constitutes about 51.92% of deaths in US.

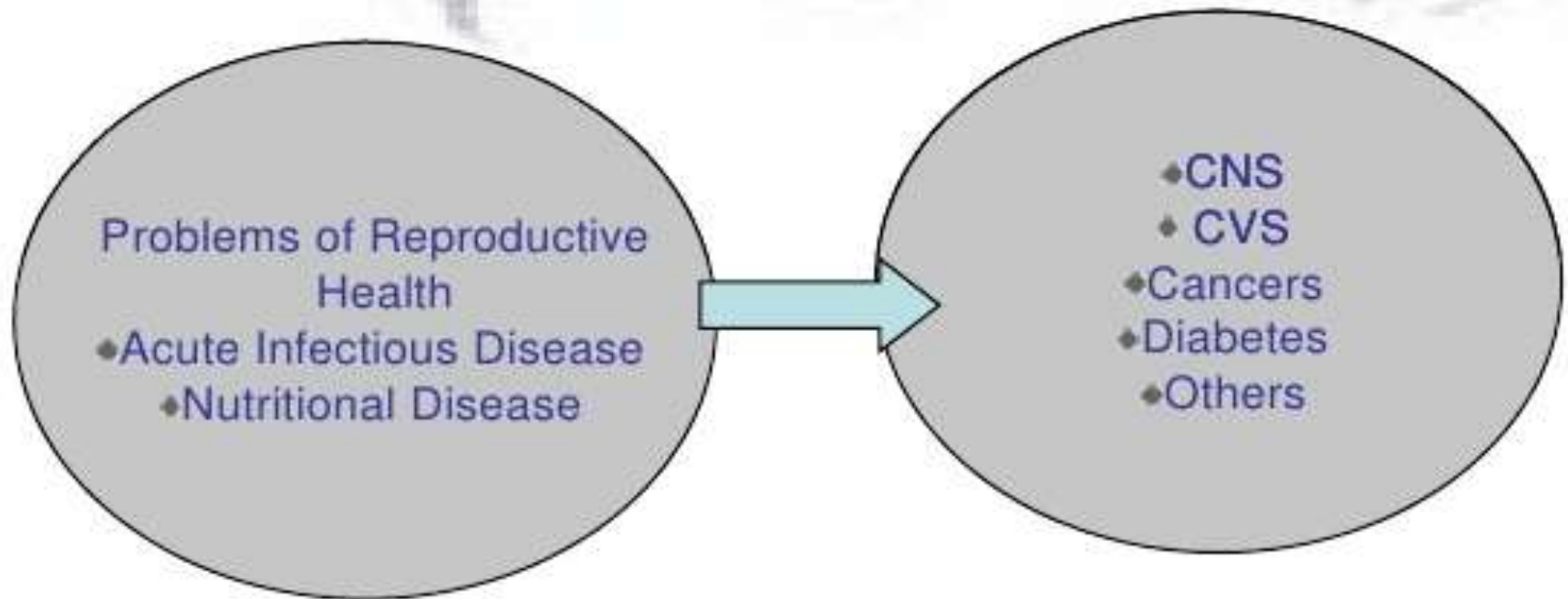
OTHERS- Alzheimer's disease, lung cancer, environmental health problems, and microbial diseases

• DEVELOPING COUNTRIES

- Nation with a low level of material well-being.
- In a typical developing country about 40% of death are from infectious, parasite, and respiratory diseases compared with about 8% in developed countries.
- In India, as in other developing countries, most death result from infectious and parasite disease, abetted by malnutrition.



Changing Disease Patterns



What is the deadliest disease in the world?

[Share](#)

Ask an expert
16 May 2012

Q: What is the deadliest disease in the world?

A: The results of a 2008 study ranked the top causes of death by the cause category.

According to the study, the top causes of death in 2008 were: ischaemic heart disease, cerebrovascular diseases, maternal, neonatal and nutritional conditions, lower respiratory infections, chronic obstructive pulmonary disease, diarrhoeal diseases, HIV/AIDS, trachea, bronchus, lung cancers, tuberculosis, diabetes mellitus, road traffic accidents, hypertensive heart disease and prematurity and low birth weight.

The following are the top 12 causes of death in 2008:

No.	Cause	Estimated number of deaths (in millions)	Percent of all deaths
1	Ischaemic heart disease	7.25	12.8
2	Cerebrovascular disease	6.15	10.8
3	Lower respiratory infections	3.46	6.1
4	Chronic obstructive pulmonary disease	3.28	5.8
5	Diarrhoeal diseases	2.46	4.3
6	HIV/AIDS	1.78	3.1
7	Trachea, bronchus, lung cancers	1.39	2.4
8	Tuberculosis	1.34	2.4
9	Diabetes mellitus	1.26	2.2
10	Road traffic accidents	1.21	2.1
11	Hypertensive heart disease	1.15	2.0
12	Prematurity and low birth weight	1.00	1.8

Source: *Causes of death 2008 update*

DISEASE CLASSIFICATION

- A system of classification was needed whereby diseases could be grouped according to certain common characteristics, that would facilitate the statistical study of disease phenomena.
- JOHN GRAUNT in 17th century- in his study of Bills of mortality – arranged diseases in an alphabetic order.


 A general Bill for this present yeere,
 ending the 18. of *December 1634.* according to
 the report made to the Kings most excellent Ma^{ty}
 By the Company of Parish Clerks of London, &c.
 

The Diseases and Casualties this yeere.

A Borriue and Stilborne	475	Falling Sicknesse	5	Plague	1
Aged	612	Fever	1179	Planner	4
Ague	11	Fistula	11	Plurisie and Spleene	31
Appoplexian & Meagrome	35	Flocks and small Pox	1354	Poyfoned	2
Bit with a mad dogge	1	French Pox	17	Purples and spotted Fever	125
Bleeding	2	Gangrene	10	Quinsie	4
Bloody flux leucising & flux	512	Goute	5	Rickets	14
Burnt and scalded	3	Greene sicknes	2	Rising of the lights and Mothor	84
Cancer and Canker	9	Griete	15	Rupture	3
Childbed	141	Hanged themselves	3	Scurvey, Swine Pox and Bleach	9
Chrixfomes and Infams	2315	laundies and Yellowes	45	Sores, broken and bristled Limbes	19
Cold and Cough	54	lawfloe	10	Suddenly	63
Collicke Stone & Strangury	49	Impoftume	62	Surfet	114
Consumption	1955	Killd by severall accidents,	41	Teeth	454
Convulsion and Cramp	386	Kings Evill	20	Thrush and Sore mouth	31
Cut of the Stone	5	Livergrowne	77	Timpany	17
Dead in the streete & fields, and flayed	8	Lunatique	2	Tiffike	15
Droopie and Swelling	233	Meades	33	Vomiting	5
Drowned	32	Murthred	6	Wormes	28
Executed	13	Over-laid & starved at nurse	14		
		Palfe	21		
		Piles	1		

♂ Males	5057	♂ Males	56763	Whereof, of the Plague	1
♀ Females	4820	♀ Females	5224		
In all	9855	In all	10900		

Increased in the Burials in the 122 Parishes & at the Pesthouse this yeere. — 2508
 Increased of the Plague in the 122 Parishes and at the Pesthouse this yeere. — 1.

ICD CLASSIFICATION

- **International classification of disease (ICD) by WHO** - accepted for national and international use.
- Revised once in 10 years.
- The ICD is a classification system developed collaboratively between the World Health Organization (WHO) and 10 international centers so that the medical terms reported by physicians, medical examiners, and coroners on death certificates can be grouped together for statistical purposes

ICD-10 ARRANGED IN 21 DIFFERENT CHAPTERS

Table 3-1. Major Categories of the International Classification of Diseases and Related Health Problems (10th Revision)

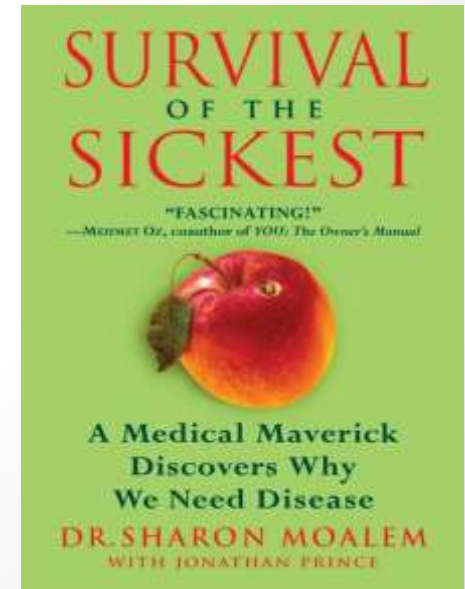
Chapter	Title
I	Certain infectious and parasitic diseases
II	Neoplasms
III	Diseases of the blood
IV	Endocrine, nutritional, and metabolic disorders
V	Mental and behavioral disorders
VI	Diseases of the nervous system
VII	Diseases of the eye and adnexa
VIII	Diseases of the ear and mastoid process
IX	Diseases of the circulatory system
X	Diseases of the respiratory system
XI	Diseases of the digestive system
XII	Diseases of the skin and subcutaneous tissue
XIII	Diseases of the musculoskeletal system and connective tissue
XIV	Diseases of the genitourinary system
XV	Pregnancy, childbirth, and the puerperium
XVI	Certain conditions originating in the perinatal period
XVII	Congenital malformations, deformations, and chromosomal abnormalities
XVIII	Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified
XIX	Injury, poisoning, and certain other consequences of external causes
XX	External causes of morbidity and mortality
XXI	Factors influencing health status and contact with health services

Source: World Health Organization. International Statistical Classification of Diseases and Related Health Problems. Tenth Revision. Geneva: World Health Organization, 1992.

Why we need disease???

- HAEMOCHROMATOSIS - BUBONIC PLAGUE
- DIABETES - YOUNGER DRYAS
- FAVISM - MALARIA

Natural selection is maintaining this genetic defect because it had conferred some benefit in the past.



CONCLUSION

- Understanding disease pathology is the first step towards formulating preventive measures.
- As a dentist or public health worker it is our primary responsibility for the prevention of diseases in community as well as individual.

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Thank You !

