

Social and Preventive Pharmacy – Introduction

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Introduction – Evolution of the Concept

- Preventive and Social Medicine is comparatively a newcomer among the academic disciplines of medicine
- Medical students learned this as Public health and hygiene – majorly focused on principles of hygiene, sanitation and public health
- The name preventive and social medicine emphasizes the role of:
 - (a) disease prevention in general through immunization, adequate nutrition, etc. in addition to the routine hygiene measures, and
 - (b) social factors in health and disease.
- Past 25 years wider acceptance - because of its broader and more comprehensive outlook on medicine, integrating both prevention and cure
- Today, it implies a system of total health care delivery to individuals, families and communities at the clinic, in the hospital and in the community itself.

History

- **Industrial revolution – 1830 – steam and electric revolution**
- **Social revolution – 1940 – Second world war**
- **Fighting the three enemies of man – poverty, ignorance and ill-health**
- **Health was not possible without improvement in economic condition or education and vice-versa**
- **India – showed remarkable improvement in community development**



History – Public Health, Social & Preventive Medicine

- **Medicine – used to alleviate the suffering of a patient but rarely about the prevention of such suffering (at the level of individual, family and community)**
- **The society needs curative measures– but prevention??**
- **Community was satisfied with curative approach, due to escalation of medical expenses, the focus is shifting to preventive medicine**

PREVENTION IS BETTER THAN CURE



History – Public Health

- Winslow (1851) defined as *“the science and art of preventive disease, prolonging life and promoting health and efficiency through organized community measures such as control of infection, sanitation, health education, health services and legislation etc.”*
- India – during independence – public health dept – sanitation dept
- Curative and preventive departments worked separately as Medical and Public Health Departments.

PREVENTION IS BETTER THAN CURE



History – Preventive Medicine

- **Louis Pasteur – 1873 – germ theory of disease**
- **Discovery of causative agents of typhoid, pneumonia, tuberculosis, cholera and diphtheria**
- **Gained the development on...**
 - **Development of several specific disease preventive measures before the turn of the century (anti-rabies treatment, cholera vaccine, diphtheria antitoxin and anti-typhoid vaccine).**
 - **Discovery and development of antiseptics and disinfectants.**
 - **Discovery of modes of transmission of diseases caused by germs. Transmission of malaria, yellow fever and sleeping sickness had been elucidated before the turn of the century.**
- **Now, the preventive medicine department emphasis on not only preventive of infective disease, but also others including nutritional deficiency diseases.**

History – Social Medicine

- **Defined as** *“the study of the man as a social being in his total environment and is concerned with the health of groups of individuals as well as individuals within groups”*
- **The concept of social medicine is based upon the realization of the following facts: ...**
 - **Suffering of man is not due to pathogens alone and it can be partly considered to be due to social causes (social etiology) [etiology = the cause]**
 - **The consequences of disease are not only physical (pathological alterations due to pathogens) but also social (social pathology) [pathology = causes and effects of disease]**
 - **Comprehensive therapeutics has to include social remedies in addition to medical care (social medicine) [medicine = the science or practice of the diagnosis, treatment, and prevention of disease]**
 - **Social services are often needed along with medical care services**

History – Community Medicine

- Defined as *“the field concerned with the study of health and disease in the population of a defined community or group”*
- Goal: *“to identify the health problems and needs of defined populations (community diagnosis) and to plan, implement and evaluate the extent to which health measures effectively meet these needs”*
- It encompasses the broad scope of preventive and social medicine, but lays special emphasis on providing primary health care
- *Medical Council of India (MCI) – label the discipline as Community Medicine in place of preventive and social medicine AND it is a clinical department*



Why to study – Community Medicine

Concept: Treatment of patients- not the disease

Scenario 1:

- Imagine yourself sitting in your pharmacy – a mother has just brought her child, a boy aged 1 ½ years, who has sunken eyes, wrinkled appearance, wasted muscles, pot belly, bow legs and a skin and bones appearance.
- You scold the mother for her “uncaring attitude” and ignorance and scold her for coming to your pharmacy so late.
- You recommend her to meet the GP or PD
- And the baby was prescribed with a dose of Vitamin A and an anthelmintic
- You dispense the medicine and give cursory advice on nutrition and send her away.

After 6 months, you learn that the boy died some time ago

A case to assess the prevalence of SEVERE MALNUTRITION in community

Why to study – Community Medicine

Concept: Treatment of patients- not the disease

Scenario 2:

- Imagine yourself sitting in your busy pharmacy during day time - A 30-year-old mother of a child presents with cough of three months duration, loss of weight, hemoptysis and continuous fever
- You understood from the discussion that the child may be having severe lung disease and recommend her to meet the GP and she came back to your pharmacy with anti-tubercular medicines
- Hiding your shock, you dispense the medicines and provided detailed information
- The child and mother came to your pharmacy after 6 months with worse condition with the same recurrent problem, your conscience is pricked (you felt something wrong with the system!!!!)

MEDICAL CARE ITSELF IS NOT SUFFICIENT

Individual illness is itself symptomatic of a wider social malady afflicting the individual, the family and the community

A case to assess the prevalence of TB in community

Why to study – Community Medicine

Domain : Social Equity

- India – health care resources are limited (*very much limited???*)
- Resources are equally distributed among the people??
- For the cost of one big hospital – create 50 PHC which are accessible by many
- Give attention to the problem affected to majority not major disease (so called?)
 - many suffering from diarrhea, skin disease, respiratory infection flu, cold, fever and hepatitis
- Give priority to the thousands of unimmunized, malnourished children, pregnant women who have no access to health technology like growth monitoring, ORS, immunization, antenatal care etc.

Why to study – Community Medicine

Domain : Health Services Planning

- India – issue is more complex (service OR business!!)
- Knowledge is power.... But health knowledge... will not cure disease rather wont prevent the disease .. timely consultation (is not done by majority of the population) due to cost ... time.... Self-management etc.
- Population healthcare needs .. is not studied.... (either Govt / NGO/ association is not interested in this!!)- health policy.... ???

Questions:

1. Do we know whether health is a priority for most people?
2. What are the reasons which prevent them from seeking help at designated health facilities?

Answer: Plan for the health services for people

PREVENTION IS BETTER THAN CURE

Why to study – Community Medicine

Domain : Doctors Responsibility

- India – doctors responsibility (to whom???)
- Country economy and social fabric
- Not enough to have only theoretical knowledge & pharmaceutical prescriptions to promote health and manage the disease
- System of health care delivery – which provide feasible solutions and make them available to as many as possible at a cost that the country and the community can afford
- Strive to provide the appropriate solutions

Example: National Programs of malaria, filarial, tuberculosis, AIDs, Iodine Deficiency Diseases, diarrhoeal diseases, anemia, vitamin A deficiency etc.

Why to study – Community Medicine

Domain : Patient Queries

- Patient Worries and Questions – are answered?
- What is the chance that I may get lung disease?
- I am suffering from TB, can I breastfeed my baby?
- My father had heart attack due to high cholesterol; will I have similar problem?

Answer: Well –developed net-working of patient data capturing method at PHC level to tertiary care and be familiar with the natural history of the disease, etiology, and the main risk factors and their interactions.

Why to study – Community Medicine

Domain : Interaction with patients

- Patient interaction with doctors / health care team members / social workers?

Answer: Knowledge of community dynamics, community skills and cultural factors related to health improves the doctor-patient interaction and directly leads to increased patient confidence and improved compliance.



Why to study – Community Medicine

Domain: Health team leadership

- Health Practice is a team effort?

Answer: The varied knowledge encompassed by the health care team for the benefit of the individual patient / community must be applied.



Concept of Community Medicine

Concept: Treat the patient – not the disease



Concept of Health

- Health is one of the most difficult term to define
- To some it may mean freedom from any sickness or disease
- For other it may mean harmonious functioning of all body systems
- Health denotes “a positive quality” or whether it should be understood or defined in terms of the absence of a negative quality, i.e. freedom from disease
- Modern medicine practice view health as “state of absence of all known diseases”
- Doctors are busy in fighting the disease by measuring the number or parameter?
 - Ex: Babies born – parameter chosen to define a baby is in terms of absence of congenital abnormalities and post deleterious effects
- Health screening of adult patient for carcinoma of cervix and breast; hypertension, blood sugar etc., focus is on absence of these morbid conditions.

EMPHASIS OF MODERN MEDICINE IS FREEDOM FROM DISEASE

Concept of Health

- Definition of Health by WHO (1948) - *“a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity”*
- In 1978, it has been added that *“as to lead a socially and economically productive life”*
- This refers to an ideal state which one strives to achieve, though one may not be able to do so.
- According to the definition: only very few would be categorized as healthy
- Everyone of us would have some grade of ill health or abnormality, may be in a clinical, subclinical, pathological or biochemical sense.



Concept of Health

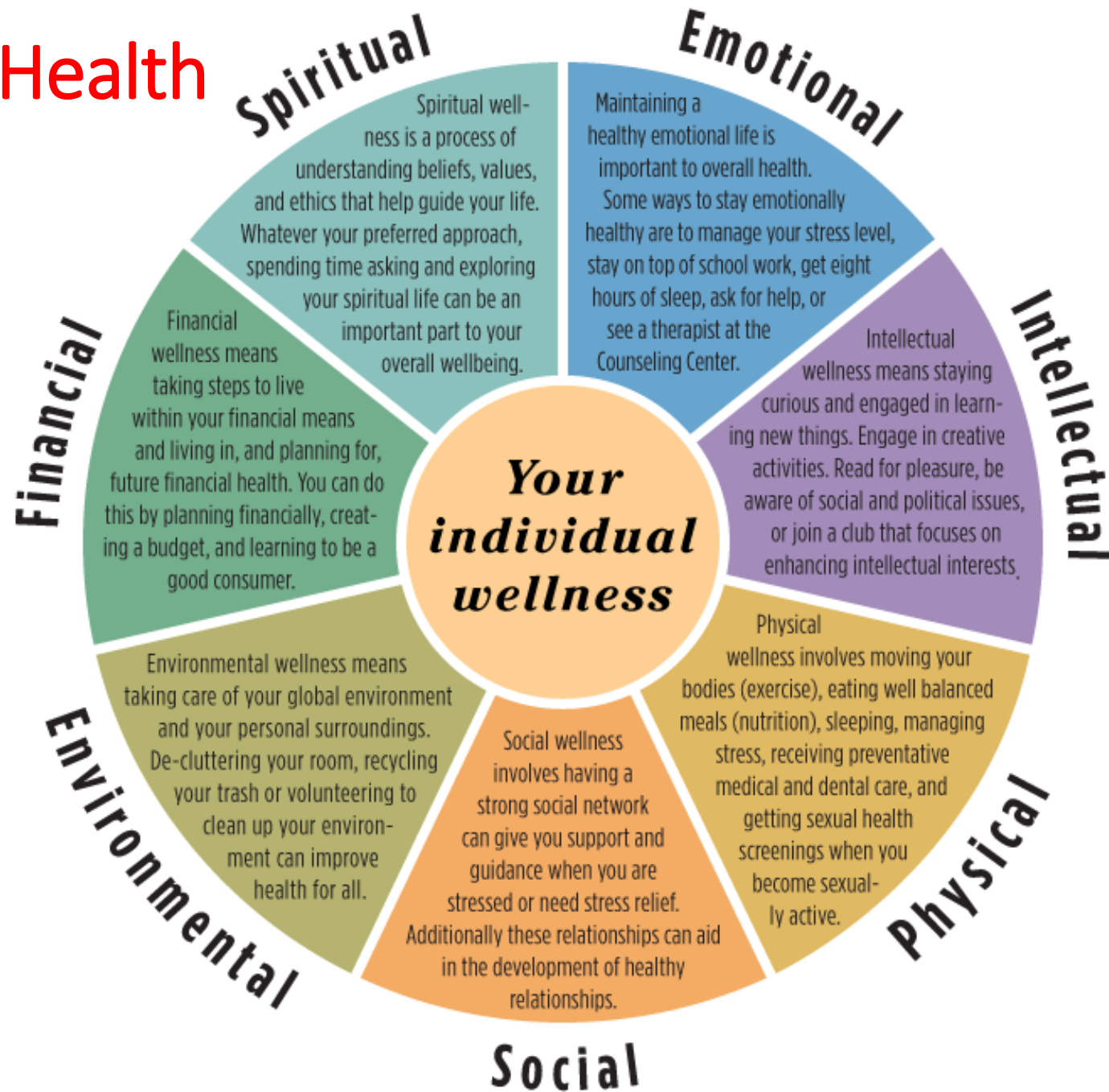
Healthy state
(positive mind)



Disease state
(negative mind)

- **Concept of health permit any individual to talk of health as a dynamic state capable of moving up or down the ladder, rather than a static state in equilibrium.**
- **Health status cannot remain constant for individual, family, community or country over a period of time.**

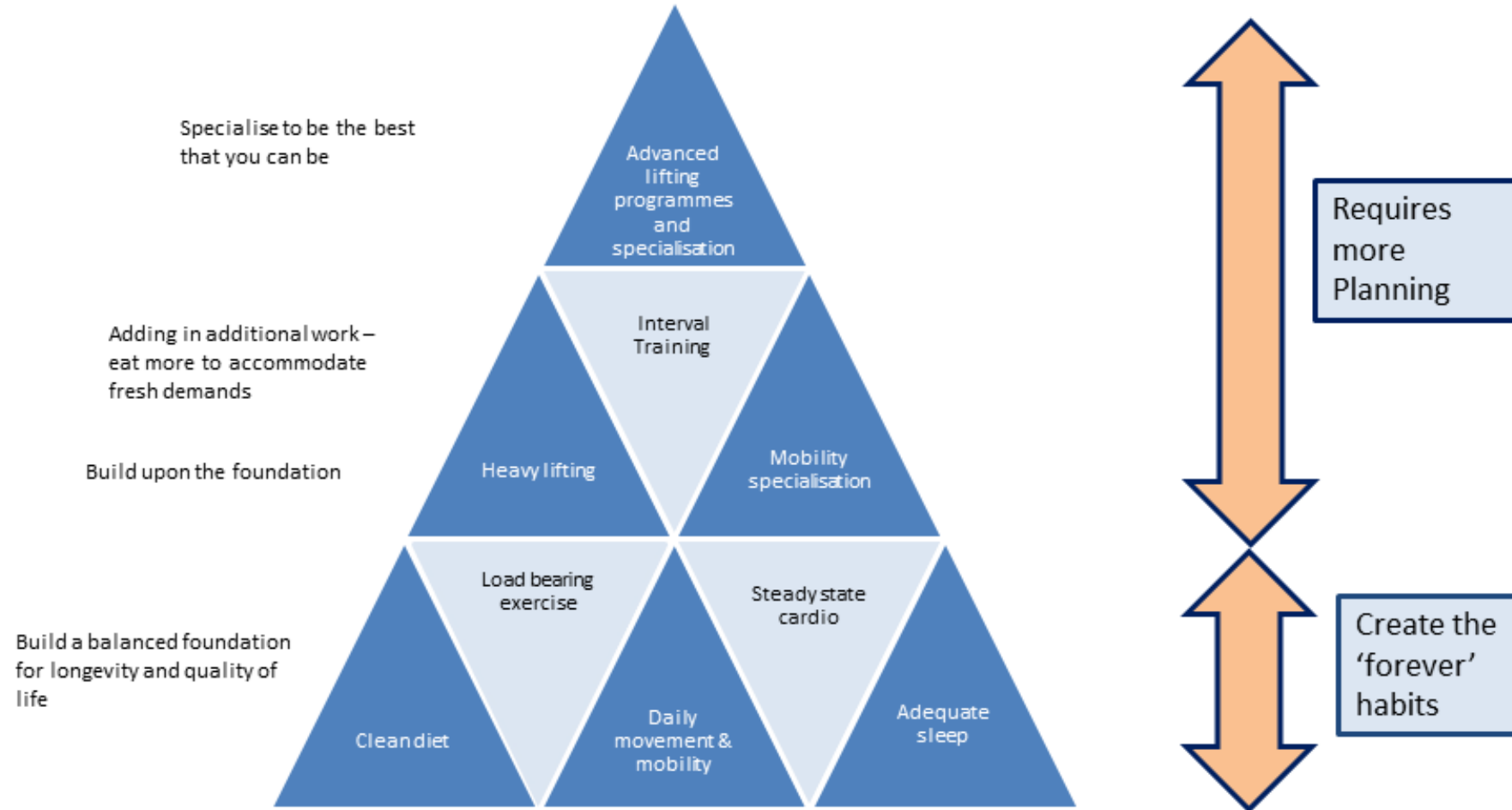
Concept of Health



Concept of Health – Physical Well-being

- Physical health relates to – anatomical, physiological and biochemical functioning of the human body
- “*Normal state*” - in medicine is based on the law of averages and the extent of deviation from the average or mean
 - (variations observed in normal state across different continents)
- Modes of assessment of physical health are – height, weight, muscle mass, head circumference, serum estimations, physiological tests of functioning such as forced expiratory volume etc.
- But all of them define normalcy in statistical terms and in relation to the risk of developing particular disease etc., elevated serum cholesterol related to cardiac diseases.

Physical Wellbeing



Concept of Health – Social Well-being

- More difficult to define
- Social health means that level of health which enables a person to live in harmony with his surroundings
- Social health is a product of and a determinant of social values
- The cultural and ethnic background, the traditions, the economic and literacy level, the need and perceptions are all important in the consideration of social health
- Social scientists measure social health by attitude scales, socioeconomic status, level of literacy
- All these measures are indirect measures of social health



THE BIG FIVE AND SOCIAL WELL-BEING

OPENNESS

Creative, imaginative,
intelligent, curious
and adventurous



EXTROVERSION

Outgoing, friendly,
lively, active
and talkative



CONSCIENTIOUSNESS

Organized,
responsible
and hardworking



AGREEABLENESS

Helpful, warm,
caring, softhearted
and sympathetic



NEUROTICISM

Moody, worrying
and nervous



SOCIAL WELL-BEING

One's connectedness to
society and beliefs that one
can contribute to society's
growth

Social well-being is a good
predictor of mental and
physical health

This study shows that increases
in openness, extroversion,
conscientiousness and agreeableness
and a decrease in neuroticism
correlate to increased social well-being.

Concept of Health – Mental Well-being

- Perhaps the most abstract component to describe
- Developments in psychiatry and psychology helped defining features of mental health in a better fashion
- A positive mental health state indicates that the individual enjoys his routine; there are no undue conflicts, nor frequent spells of depression or elevation of mood
- Has harmonious relations within the family and community spheres and is not unduly aggressive
- Tests have been developed to indicate mental health status of individuals includes IQ, personality tests, thematic appreciation tests and projective techniques

Concept of Health – Mental Well-being



Concept of Health – Spiritual health

- May be construed as a component of mental health
- Indian societies, religion has played an important role shaping the cultural ethos
- Many strongly believe in the supernatural
- In such situations, a positive mental health embraces spiritual health
- Spiritual health may help to resolve both internal as well as external conflicts



Concept of Health –

- Health, therefore, is not a constant entity but a relative state. It is relative to time as well as to individuals.
- The threshold of pain is not the same in any two individuals and so their perception of a healthy state is obviously different.
- Therefore health appears to be a matter of degree.
- Almost every individual's state of health can potentially improve

FIVE WAYS TO WELLBEING



Your time,
your words,
your presence



DO WHAT YOU CAN,
ENJOY WHAT YOU DO,
MOVE YOUR MOOD



EMBRACE NEW
EXPERIENCES,
SEE OPPORTUNITIES,
SURPRISE YOURSELF



TALK & LISTEN,
BE THERE,
FEEL CONNECTED

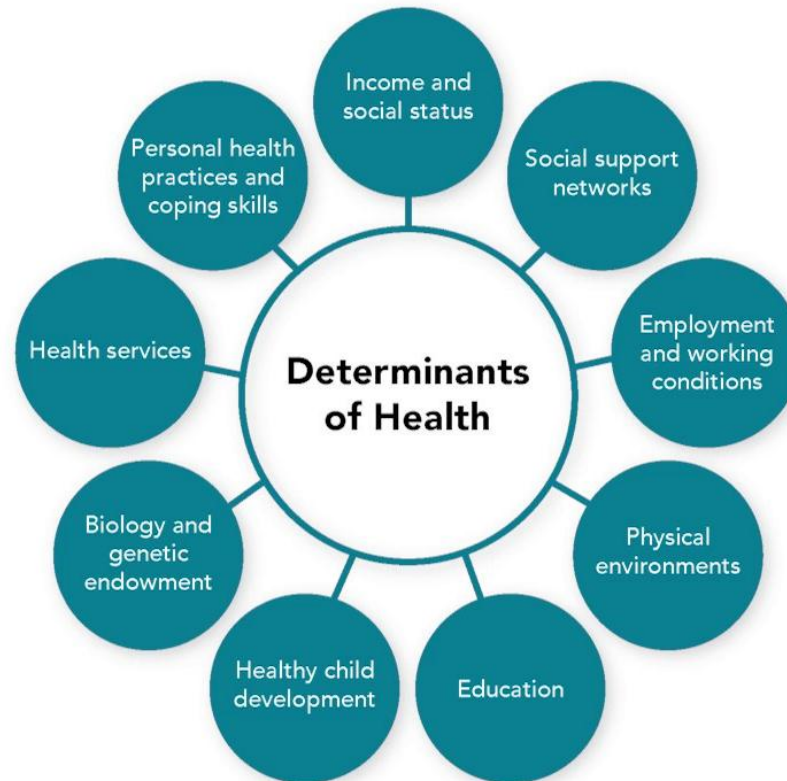


REMEMBER
THE SIMPLE
THINGS THAT
GIVE YOU JOY

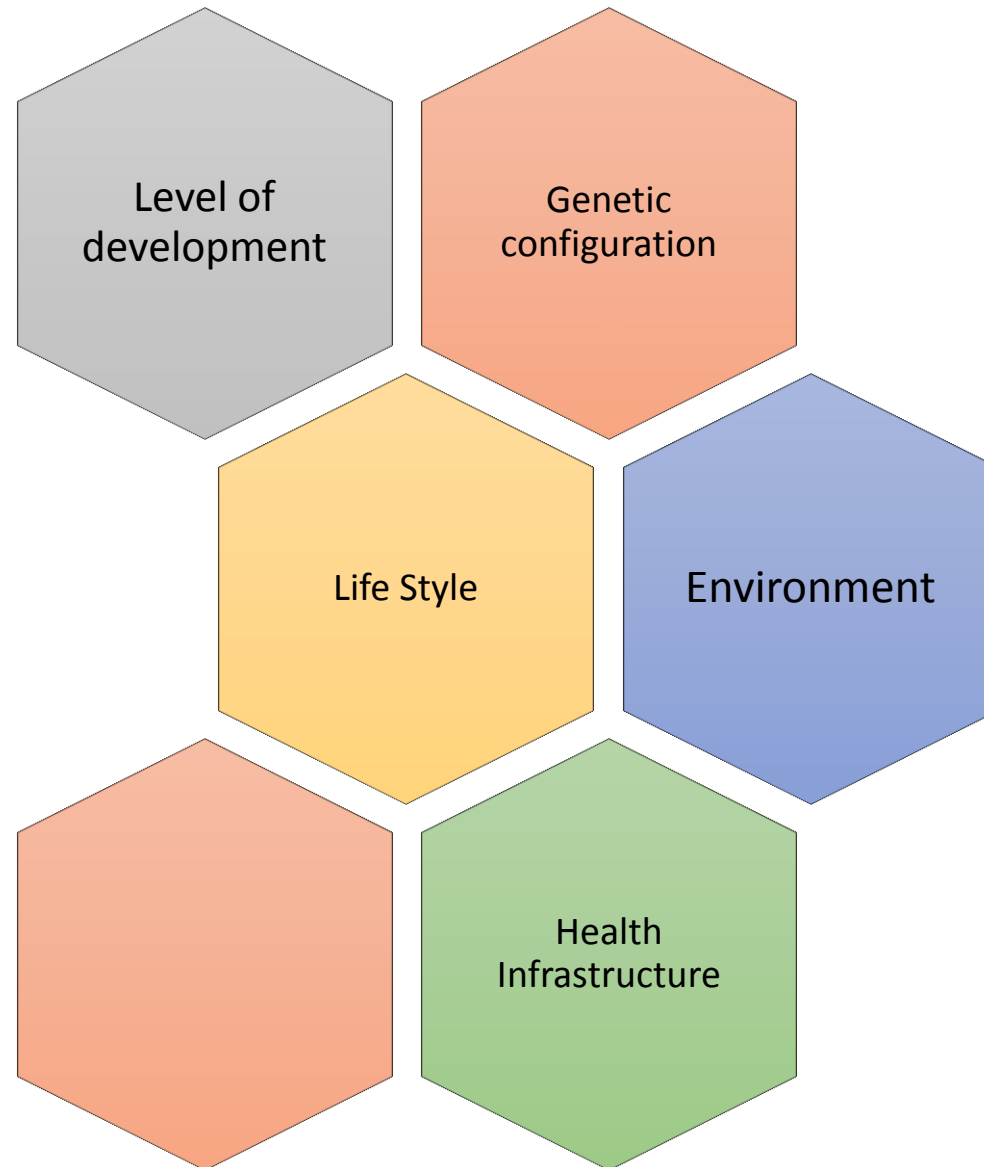
INTRODUCE THESE SIMPLE STRATEGIES INTO YOUR LIFE AND YOU WILL FEEL THE BENEFITS.

Determinants of health –

- What is it that results in good health, optimum health or positive health?
- It is certain that the health status cannot be the result of one particular activity.
- Many influences have a bearing on health.
- The influences which affect health and well-being are called determinants of health.



Determinants of Health –



Determinants of Health –

- Genetic Configuration –

- The health of a population or an individual is greatly dependent upon the genetic constitution of populations.
- These genetic factors may be overshadowed by other factors but still play a substantial role.
- Genetic traits related to certain enzymes (e.g. Glucose-6-phosphate dehydrogenase deficiency) or HLA markers (e.g. diabetes) can lead to a change in health status.

Glucose-6-phosphage dehydrogenase deficiency [G-6-PD] - Glucose-6-phosphate dehydrogenase deficiency is a genetic disorder that occurs almost exclusively in males. This condition mainly affects red blood cells, which carry oxygen from the lungs to tissues throughout the body. In affected individuals, a defect in an enzyme called glucose-6-phosphate dehydrogenase causes red blood cells to break down prematurely. This destruction of red blood cells is called hemolysis.

HLA markers - Human leukocyte antigen (HLA) typing is used to match patients and donors for bone marrow or cord blood transplants. HLA are proteins -- or markers -- found on most cells in your body. Your immune system uses these markers to recognize which cells belong in your body and which do not.

Determinants of Health –

- Level of development –

- Economic and social development helps to improve health status. Such development potentially removes many deleterious factors in the external environment of man.
- However, affluence can also bring many problems in its wake. These are related to the lifestyle adopted by the affluent.

Social Support Network Greater support from families, friends, and communities is linked to better health for individuals. Social support is a source of emotional reassurance and provides a safe place for a person to discuss their problems, which can help them to cope with adversity. Social networks provide information and practical support, such as knowing someone who can assist in a time of need. It can also support people in making healthier behaviour choices.

Determinants of Health –

- Life style–

- Sedentary lifestyles an overambitious outlook, excessively aggressive competition, lack of regular exercise, excessive consumption of alcoholic beverages and smoking, etc. have brought non-communicable diseases like diabetes, hypertension, myocardial infarction, etc. to the forefront.
- Similarly, mental health has also been compromised

Culture- The customs, traditions, and the beliefs of the family and community all affect health. A person's cultural background has an influence on their beliefs, behaviors, perceptions, emotions, language, diet, body image, and attitudes to illness, pain, and misfortune. All of these factors can influence health and the use of healthcare services.

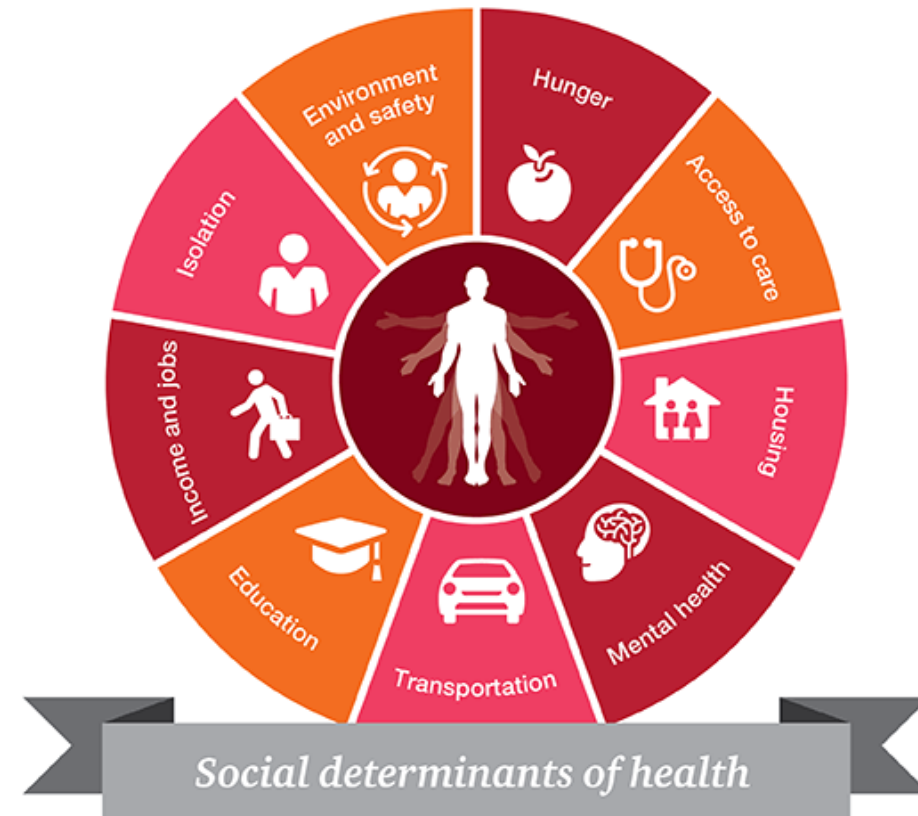
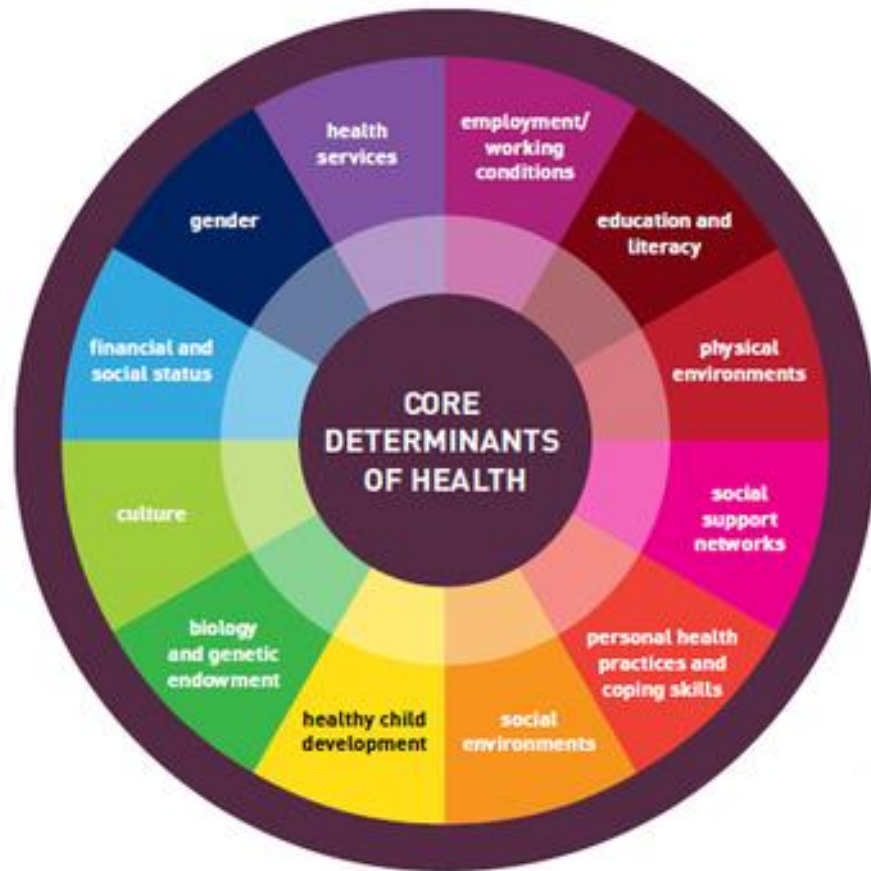
Determinants of Health –

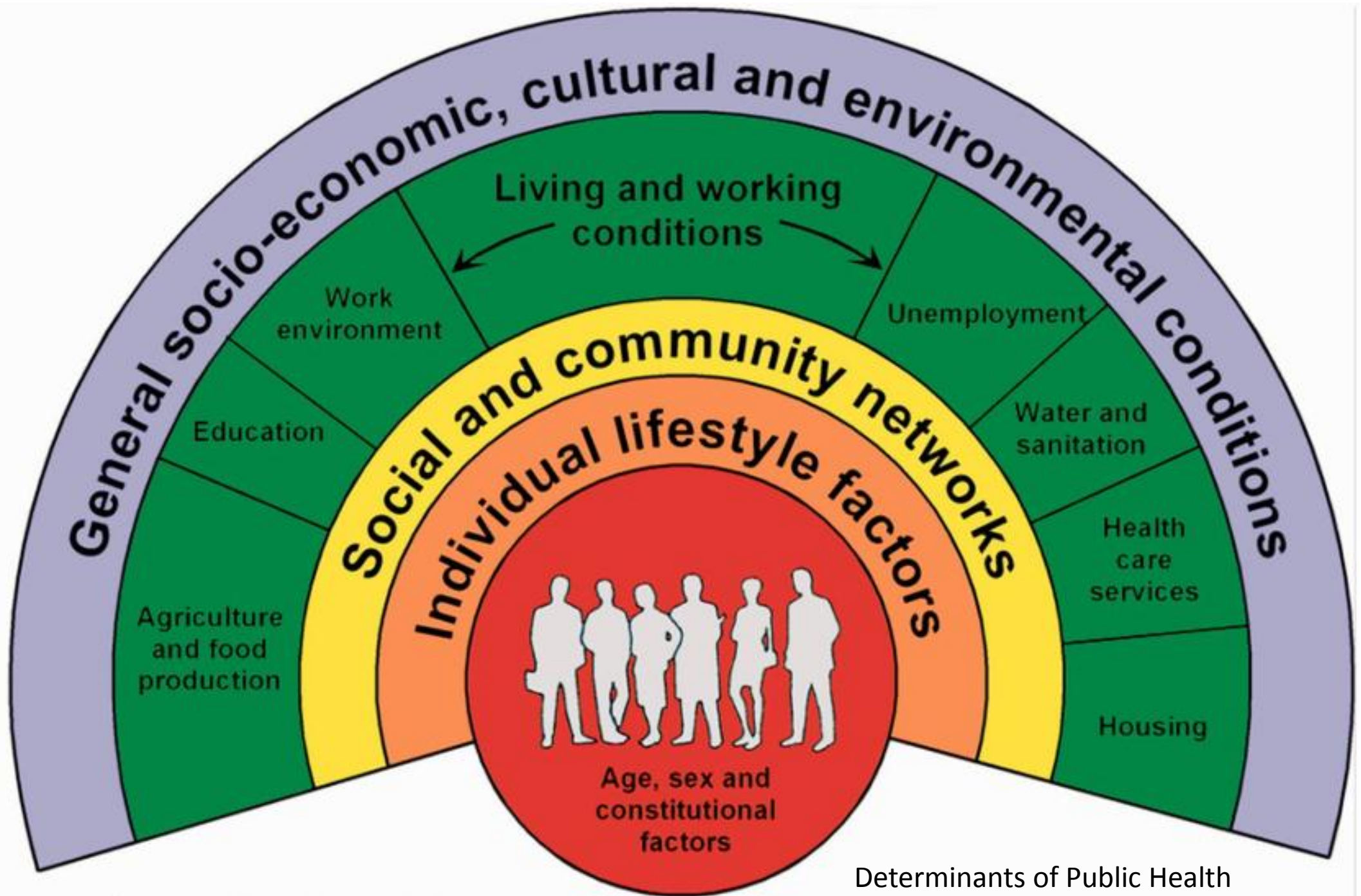
- Environment–
- The physical, social and biological environment of man is a very important determinant of health.
- Poor environmental sanitation, inadequate safe drinking water, excessive levels of atmospheric pollution, etc. are important determinants in the physical environment affecting health.
- The socioeconomic status, employment potential, harmonious marital relationships, positive employer-employee relationship, etc. are all important factors in man's social environment.
- The biological environment is composed of disease bearing arthropods, insects, domestic animals, etc.
- All the members of the animal kingdom can compromise health status of man.

Determinants of Health –

- Health infrastructure –

- Accessible and acceptable health facilities have a direct bearing on health status. If primary health care facilities are available in the vicinity and such facilities are utilized by the population, the health of individuals and communities is bound to improve





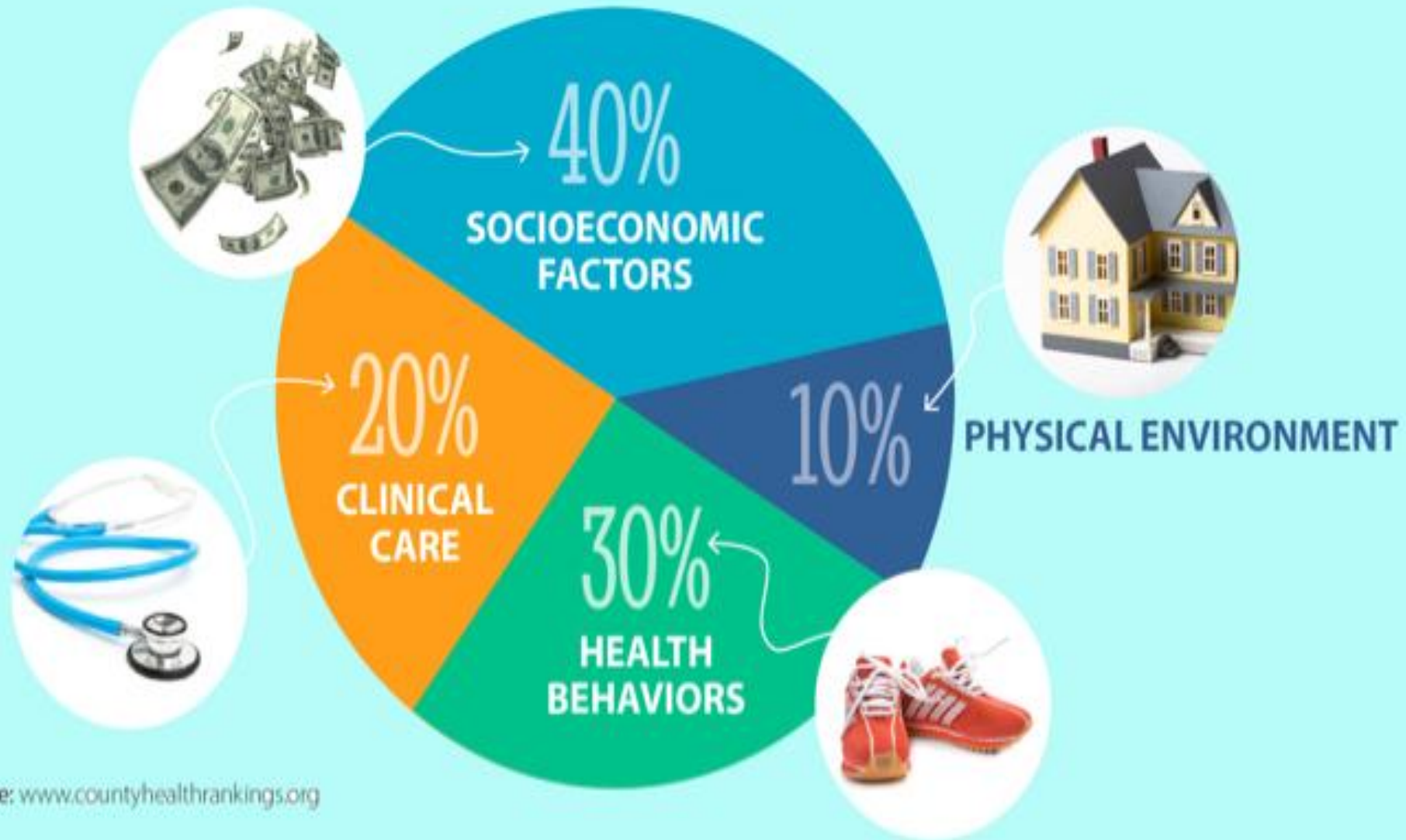
Determinants of Public Health

Indicators of Health –

- An index is an objective measure of an existing situation.
- Indices are generally defined as relative numbers expressing the value of a certain quantity as compared with another.
- In relation to health trends, the term indicator is to be preferred to index as indices are much
- more precise.
- More recently it has been suggested that a health index is better considered as an amalgamation of health indicators.
- Indicators are variables which help to measure changes. They are most often resorted to when a direct measure of the change is not possible.

**FALL IN LOVE
WITH TAKING
CARE OF
YOURSELF.
MIND. BODY.
SPIRIT.**

Indicators of Health – Community Health



Source: www.countyhealthrankings.org

Characteristics of an Indicator –

- An ideal indicator should be:
- Valid: The degree to which the measurement corresponds to the true state of affairs is called validity. In other words, does the indicator actually measure what it purports to measure?
- Precise: Reliability, reproducibility and repeatability are synonymous with precision. They reflect the extent to which repeated measurements of a stable phenomenon are in agreement. The indicator should give the same results if used by different individuals and in different places. Thus precision ensures objectivity.
- Sensitive: The indicator should be able to reflect even small changes in health status. For example, the infant mortality rate is a sensitive indicator of the health status and the level of living of a population. Similarly maternal mortality rate is a sensitive indicator of the provision of obstetric services.
- Specific: The indicator should reflect changes only in the situation concerned. For example, enrolment in primary school is specific to measurement of literacy

Why the health Indicators are needed?–

The uses of Health Indicators are

- They reflect changes in the health profile over a specified time span.
- They enable delimitation of backward and priority areas in a country.
- They permit international comparison.
- They allow evaluation of health services and specific interventions.
- They help to diagnose community needs and perceptions.
- They are helpful to program planners and health administrators for charting out progress.
- They allow projections for the future.



Types of Indicators

1. **Mortality Indicators.**
2. **Morbidity Indicators.**
3. **Disability Rates**
4. **Nutritional Status Indicators**
5. **Health care delivery indicators**
6. **Utilization rates**
7. **Indicators of social and mental health**
8. **Environmental health**
9. **Socioeconomic Indicators**
10. **Health policy Indicators**
11. **Indicators Of quality of life**
12. **Other Indicators**

Vital Indicators

Mortality indicators: Crude death rate; infant mortality rate; maternal mortality rate; perinatal mortality rate, etc.

Morbidity indicators: Incidence and prevalence of infectious disease. An example of incidence indicator is the number of new cases of pulmonary tuberculosis in a given year in a defined population.

Disability indicators: These play a supportive role to other vital indicators. These include sickness absenteeism rates; paralytic poliomyelitis rate; blindness prevalence rate, etc.

Service indicators: These indicators reflect the provision of health facilities. Examples are proportion of population served by PHC/subcenters; doctor population ratio; proportion of population having access to safe drinking water; literacy rate, etc.

Vital Indicators

Composite indicators: These indicators encompass many facets and hence provide a better measure. Expectation of life, growth rate, physical quality of life index, etc. are all comprehensive indicators.

The Physical Quality of Life Index (PQLI) consists of three components:

- Infant mortality rate
- life expectancy at one year of age and
- Basic literacy, in population above 15 years of age

All three components are adequate for international and intercultural comparisons because no society wants to let its infants die and all people want to live longer and to have access to basic literacy.

Physical Quality of Life Index (P.Q.L.I.)

- 1. Life Expectant Rate (L.E.I):** Life expectancy means average number of year a person is expected to live. As per census of 2011, it is 66.8 years in India.
- 2. Infant Mortality Rate (I.M.I):** It refers to the number of infants dying within one year of their birth out of every 1000 births. As per census report of 2011, it is 47 per 1000. Higher infant mortality is harmful for economic development.
- 3. Basic Literacy Rate (B.L.I):** Any person above the age of 7 year who can read and write in any one language with an ability to understand it is considered as literate. As per census 2011, it is 74.04% in India.

Vital Indicators

The performance of individual countries is placed on a scale of 0-100, where '0' represents an absolutely defined 'worst' performance and '100' represents an absolutely defined best performance.

The three indicators are averaged after scaling, giving equal weightage to each component. Thus the final PQLI measure is also scaled from 0-100. The index shows changes in performance overtime, even projecting into the future.

The PQLI is not meant to rank countries. It is meant to show where a country is placed in relation to the ultimate objective of "PQLI 100". It thus affords a country a chance to improve and bridge the gap. Thus the PQLI is a dynamic indicator and is sensitive to changes in the health situation.

Calculation of P.Q.L.I

For each of the indicator, the performance of individual country is rated on a scale of 1 to 100 where 1 represents the worst performance and 100 represent the best performance

1	2	3	100
Worst				Best

Formula to obtain P.Q.L.I =

$$\frac{\text{L.E.I} + \text{I.M.I} + \text{B.L.I}}{3}$$

Example: Suppose, the L.E.I. for India is rated as 75, the I.M.I is rated as 40 and B.L.I. is rated as 65, then the P.Q.L.I will be ?

Answer: 60 [(75+40+65)/3]

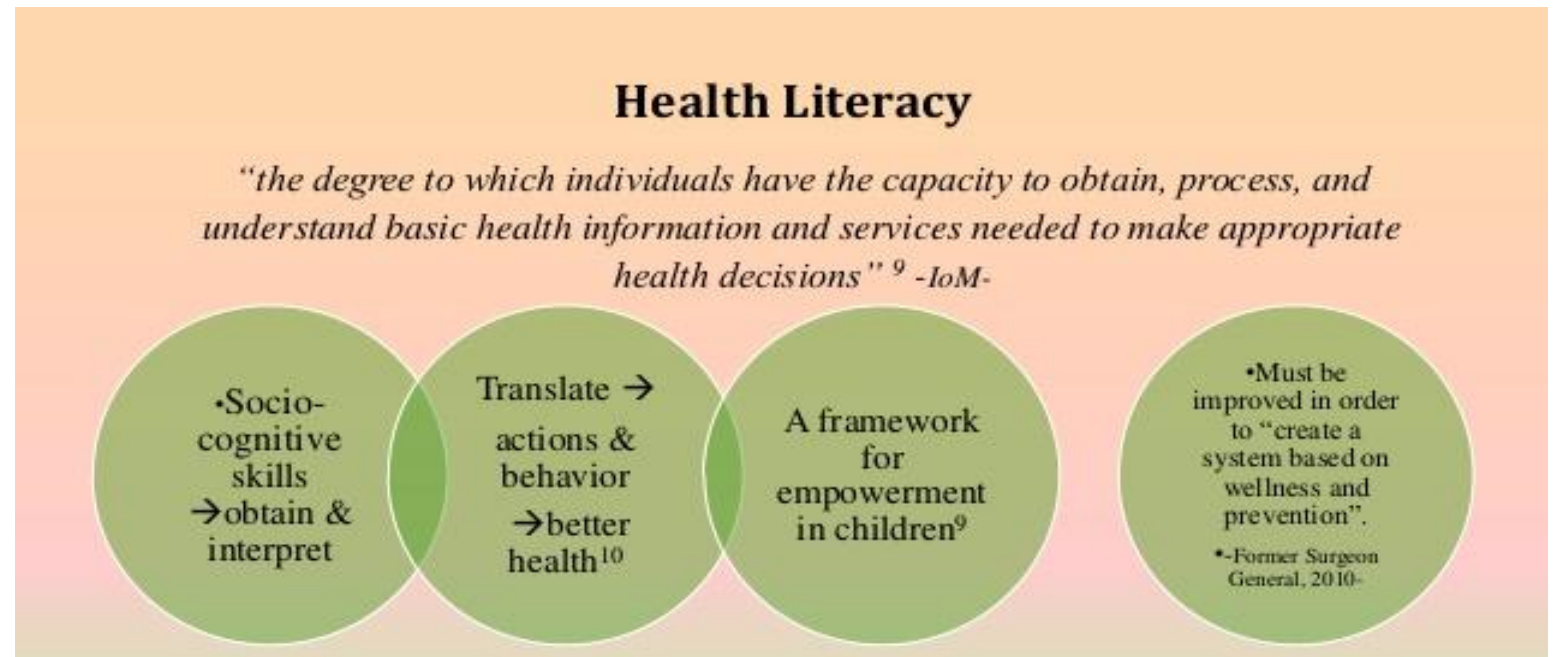
LEI – Life Expectancy Rate
IMI – Infant Mortality Rate
BLI – Basic Literacy Rate

Behavioral Indicators

These measure utilization of services provided, rates of compliance and a attitude of populations.

Utilization rates indicate whether the health facilities provided are adequate, relevant, accessible and acceptable.

Hospital occupancy rates, proportion of population receiving antenatal care, proportion of population visiting primary health centers, etc., are all important indicators of utilization.





**What
do I
need
to
remember?**

Educators of the 21st century must have the following literacy skills.

Write behavioral indicators to manifest the said literacy in your daily life as a teacher.

Skills

Behavioral Indicators

Financial literacy

Health Literacy

Technology Literacy

Civic Literacy

Employability Literacy



Health Literacy is a relational concept – with consequences for measurement and interventions

Measure personal HL
competences

Measure fit
of HL competences
to HL demands

Measure situational HL
demands and support



Improve individual/
population HL
by offers for
personal
learning (education,
training)

Compensate for HL
deficits of
disadvantaged
groups by specific
compensatory
measures

Improve **organizational HL** by
reducing situational
demands & offering specific
institutional support >
develop **health literate
settings**

Behavioral Indicators

Health policy indicators: Which reveal the level of political commitment towards health for all.

Social and economic indicators: Related to health: These indicate the overall development perspectives in a country.

Indicators of the provision of health care: These reflect the actual implementation of the stated policy.

Health status indicators: These indicate the benefit accruing to the population.



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’

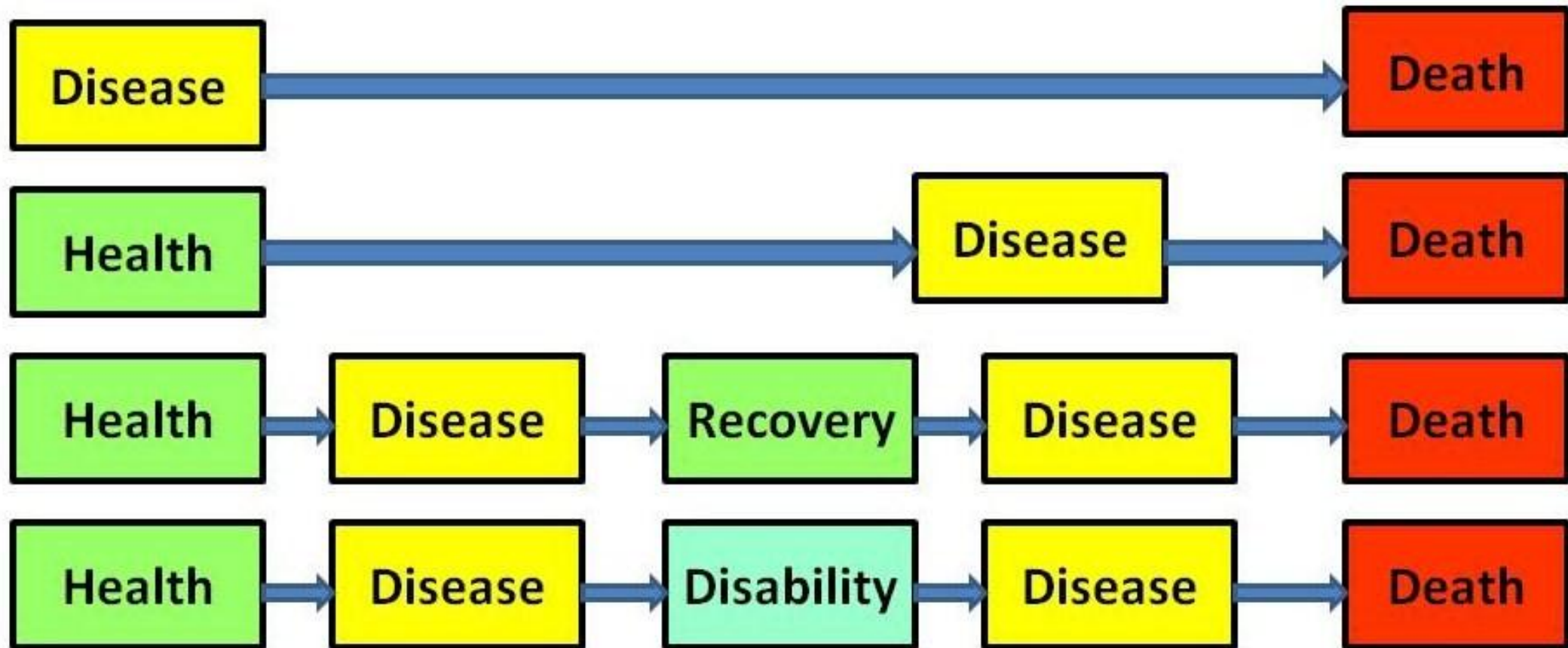
Concept of disease

Nature of Disease

- Disease is easier to appreciate and less abstract than health. Whereas health denotes a perfect harmony of the different body systems, disease denotes an aberration of this harmony.
- This aberration may range from a biochemical disturbance to severe disability or death. Even a psychological dysfunction may be classified as disease.
- It is important to understand the difference between the terms disease and illness. Disease may be defined as the bio physiological phenomena which manifest themselves as changes in and malfunction of the human body.
- Illness, on the other hand, is the experience of being sick. Disease refers to occurrence of something, i.e. body changes and malfunction.

Concept of Health and Disease in Individuals

Scenarios of health and disease in individuals



Concept of disease

Nature of Disease

- Illness refers to experience of something, i.e. being sick. Profound changes and malfunction may occur in the body without their being experienced by the patient. A classical example is hypertension, labelled as “the silent killer”.
- Blood pressure may be markedly increased, yet an individual may not have any symptoms. Such a person has hypertensive disease, but he does not feel he has any illness.
- Conversely, a person may feel ill without having a disease. For example, snake bite by a nonpoisonous snake may result in palpitation, perspiration, fainting and even death. The reason is that strong emotion or belief, in this case about the snake being poisonous, can result in illness.
- Another example is that of a person fainting or going into trance or frenzy under the belief that he is possessed by a spirit. Thus people may feel ill in the absence of disease, just as they can have disease without feeling ill.

Concept of health & disease

- **Health**

- Physical
- Mental
- Social
- Emotional &
- Spiritual well being.

- **Disease**

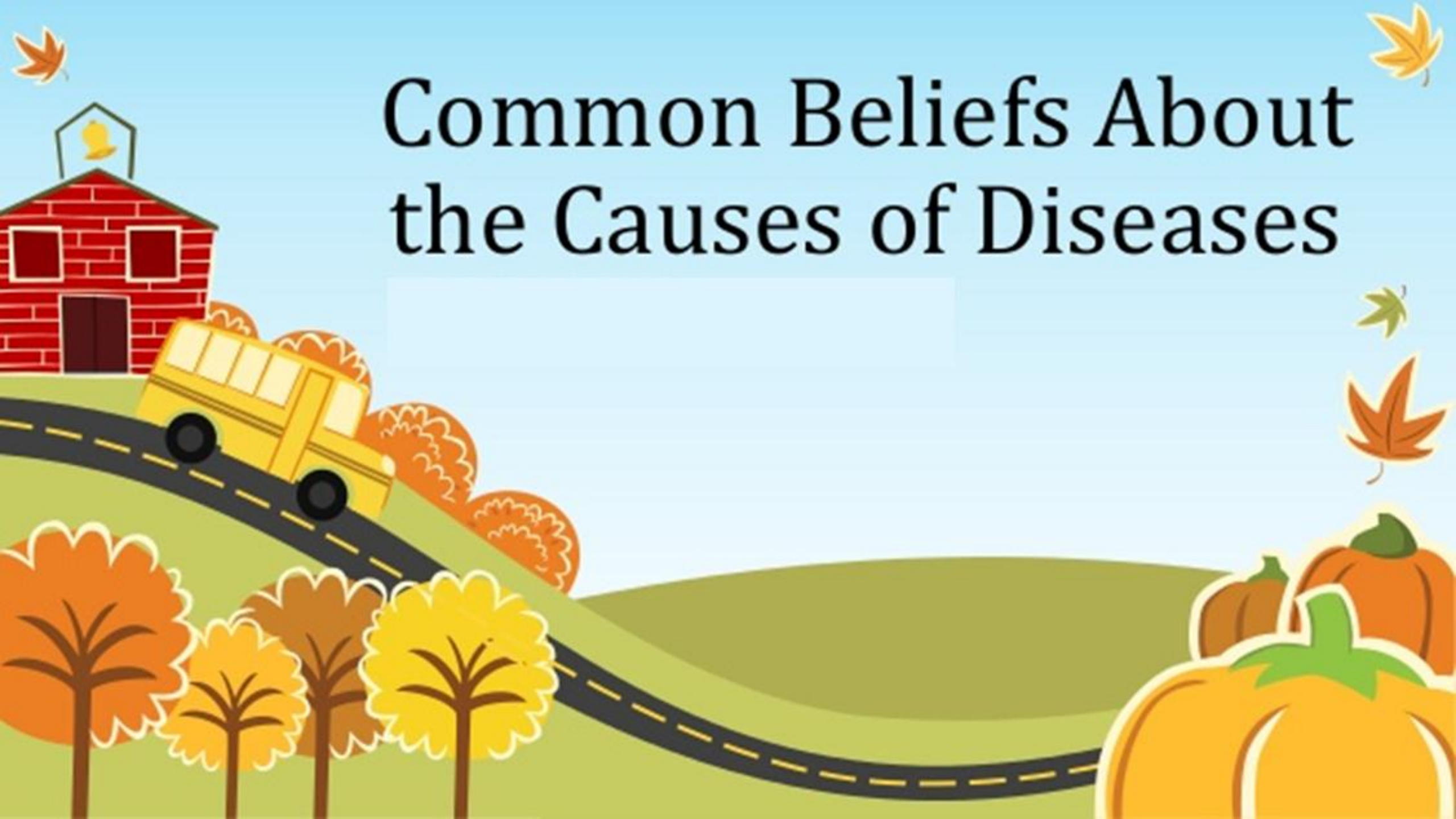
- A predisposed (susceptible) state of body and mind to fall sick
- Pathology is the result of this indisposed state!


CONCEPT OF DISEASE



- Ecological point of view disease is defined as “a maladjustment of the human organism to the environment.”
- The simplest definition is that disease is just the opposite of health: i.e. any deviation from normal functioning or state of complete physical or mental well-being.

Common Beliefs About the Causes of Diseases






Health Equilibrium




General Factors that influence the Health Equilibrium

1. **Susceptible Host** – It is any person who can be infected by the pathogen. Though, not all who are exposed to pathogens can easily get the disease. If your immune system is strong enough to fight the pathogen, you will not get sick at home.
2. **Pathogens** – These are disease-causing microorganisms. They are so small that they cannot be seen by the naked eye. They also come in various shapes, sizes and forms.


examples: bacteria, virus, and parasites



General Factors that influence the Health Equilibrium



3. **Environment** – The mode of transmission or transfer of pathogen from an infected person to a new susceptible host. Mode of transmission may either be airborne, waterborne, or sexual. It can be through direct and indirect contact.



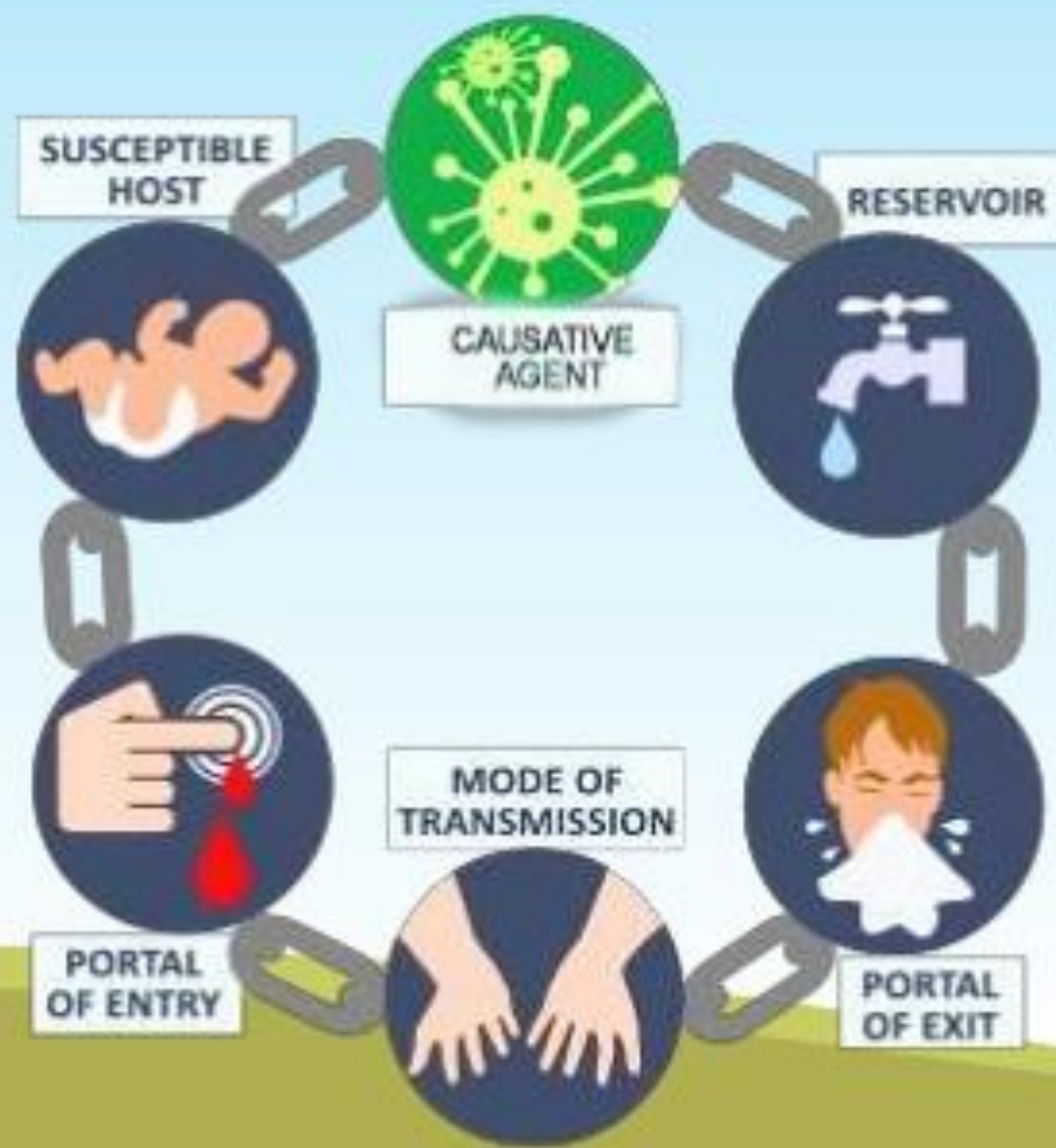
Chain of Infection



Chain of Infection

- Communicable disease (infectious disease) is an illness that is caused by any microorganism. It can be transferred from one host to another through irresponsible health habits like sneezing and coughing without covering mouth and nose, not washing hands properly, and using unclean utensils. Have you ever experienced catching colds and cough from your seatmate in school or your sibling? Would you like to know how you got sick of the same disease?

Elements of Chain of Infection






Chain of Infection






A. **Causative agent** – are the disease-causing microorganisms. they come in various shapes and sizes and they can cause different diseases.



Ex: Bacteria, Virus, Fungi, Protozoa

B. **Reservoir/ Source** – this is a place where causative agents live and multiply. This could be you, your pets, and even the things that you personally use like towels, spoon and fork and glass.







Chain of Infection




C. **Portal of Exit** – is the portal where the causative agents leaves its reservoir. For humans, it could be through secretions like droplets of saliva when the host is talking, sneezing and coughing.



D. **Mode of Transmission** – is the way the causative agent is transferred from the host to another host. It may be through:




1. Direct contact
 2. Indirect contact
- 




Chain of Infection



E. **Mode of Entry** – Refers to the way the causative agent enters the body of the new host. It could be through inhalation and open wounds or skin lesions.



F. **New Host** – Is anybody who is immune-compromised or prone to getting diseases like children and old people.



Infectious Agents

Susceptible Host



Reservoir

Chain of Infection

Portals of Exit

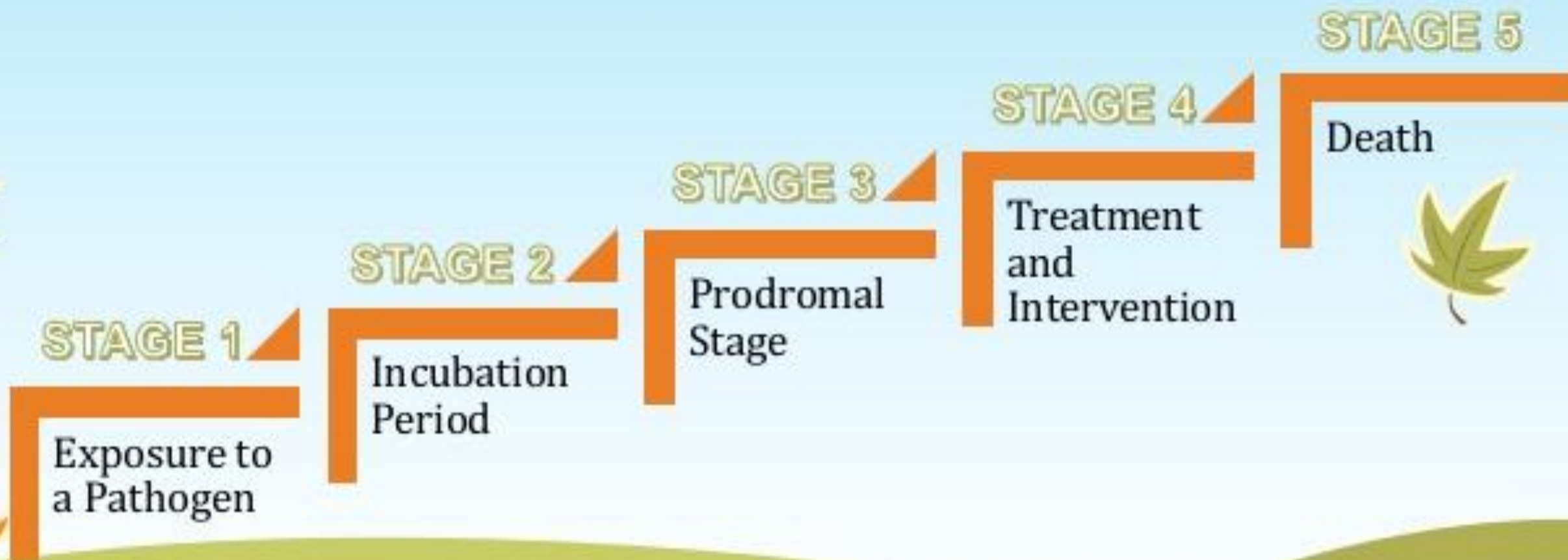


Portals of Entry

Modes of Transmission

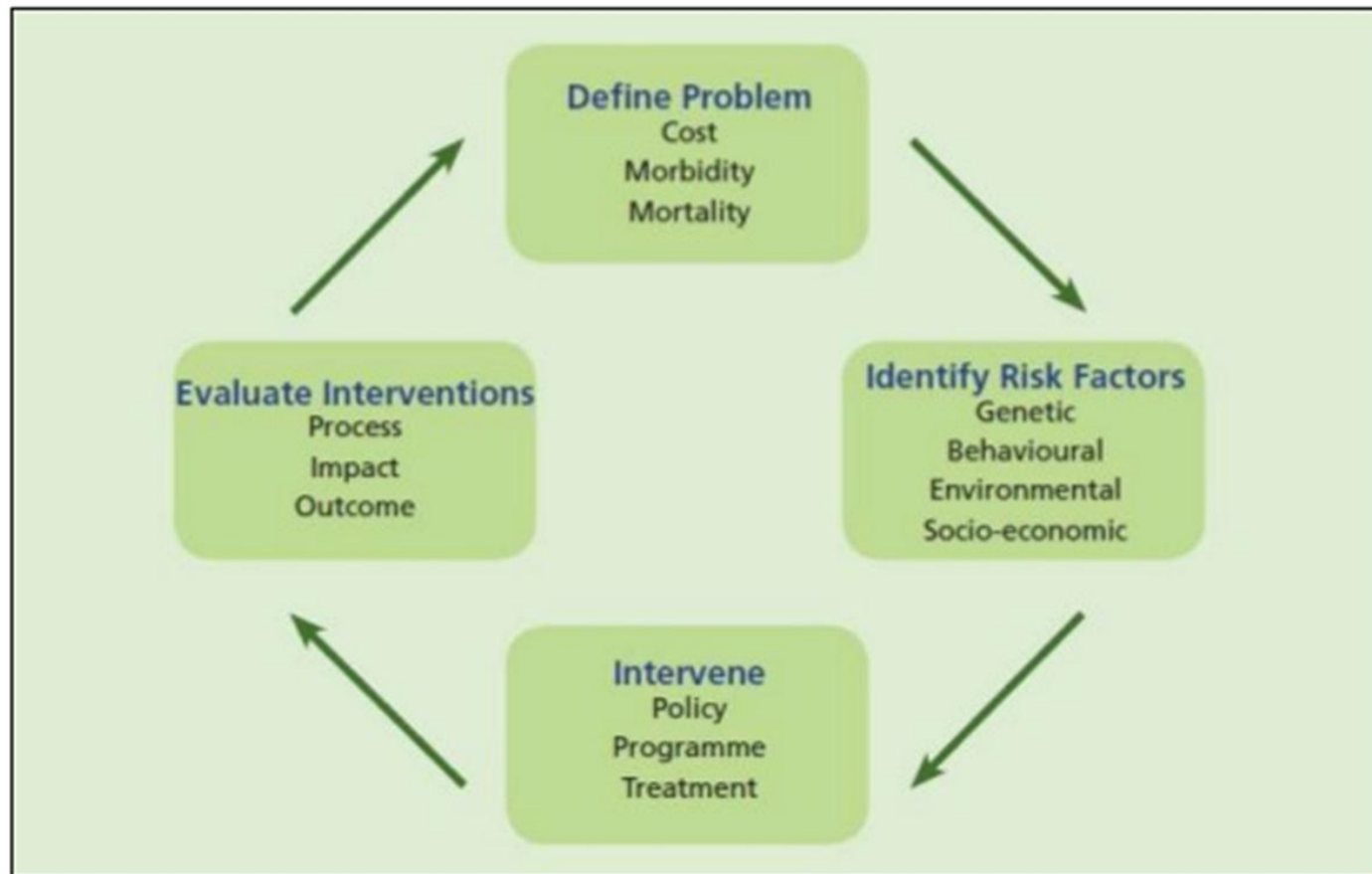


The Stages of Infection



Concept of Prevention and control of disease

Public health approach to disease control

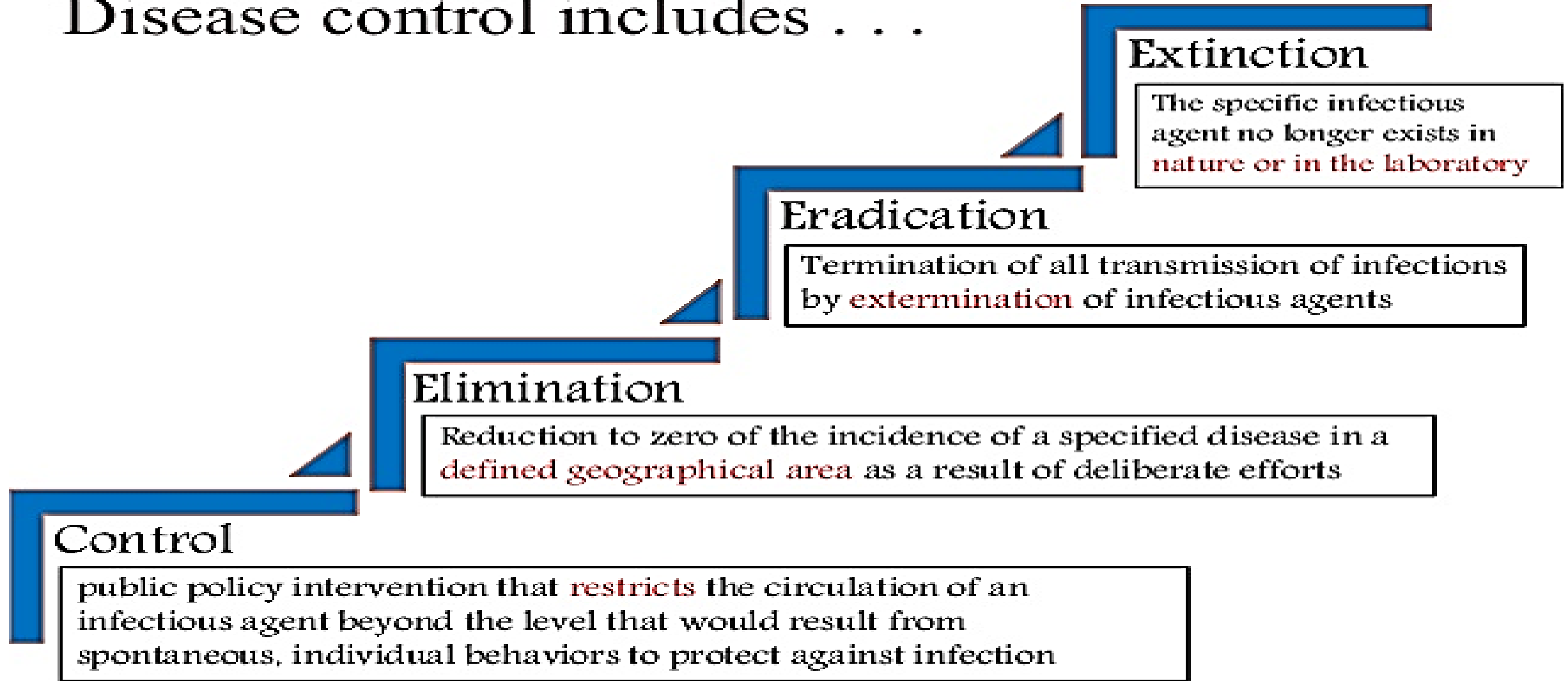


CONCEPTS
OF
DISEASE
CONTROL

DISEASE CONTROL

- Describes (ongoing) operations aimed at reducing:
 - ▣ The incidence of disease
 - ▣ Duration of disease (risk of transmission)
 - ▣ Effects of infection (both physical and psychosocial)
 - ▣ Financial burden to the community
- Mainly focused on primary and secondary prevention

Disease control includes . . .



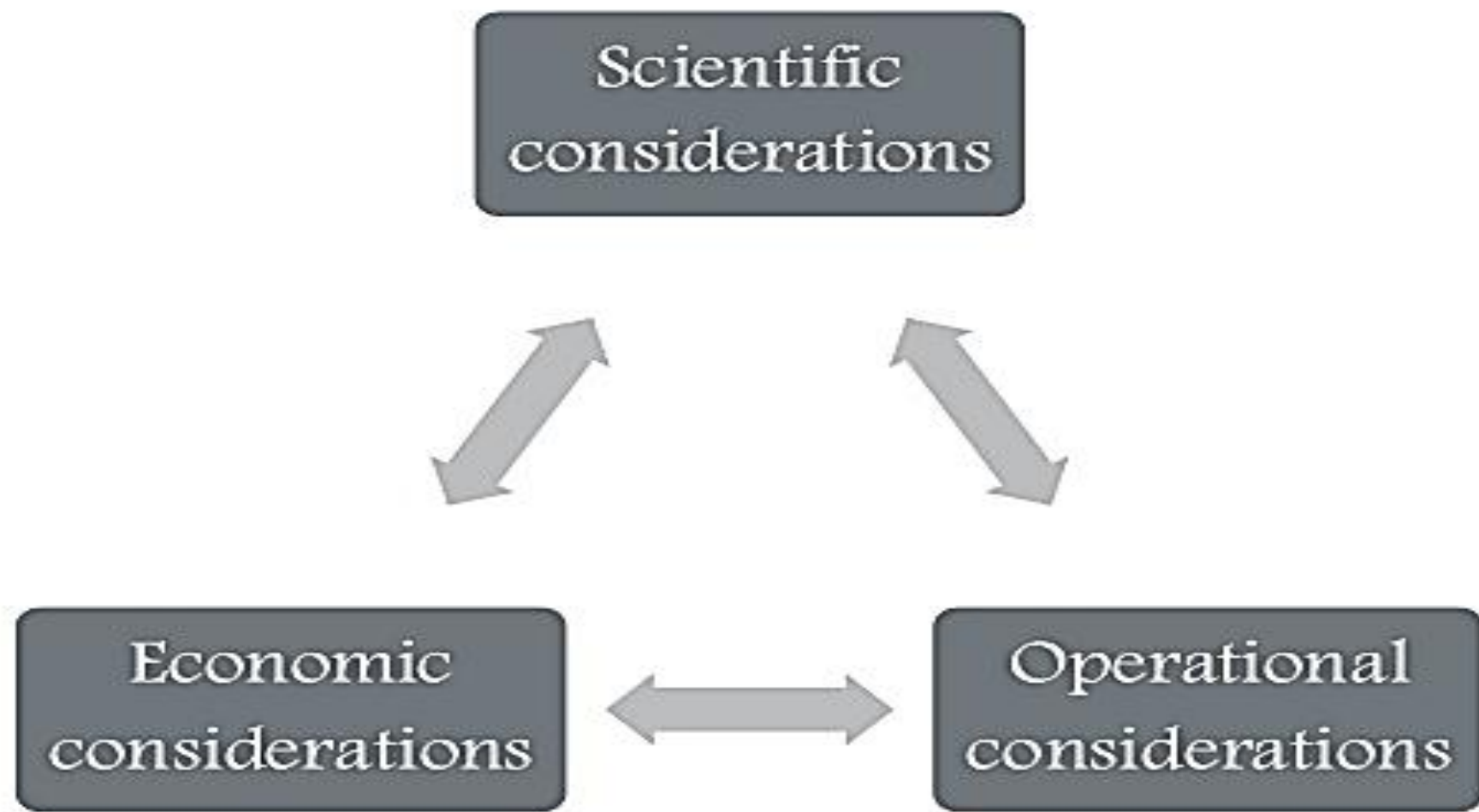
Disease eradication

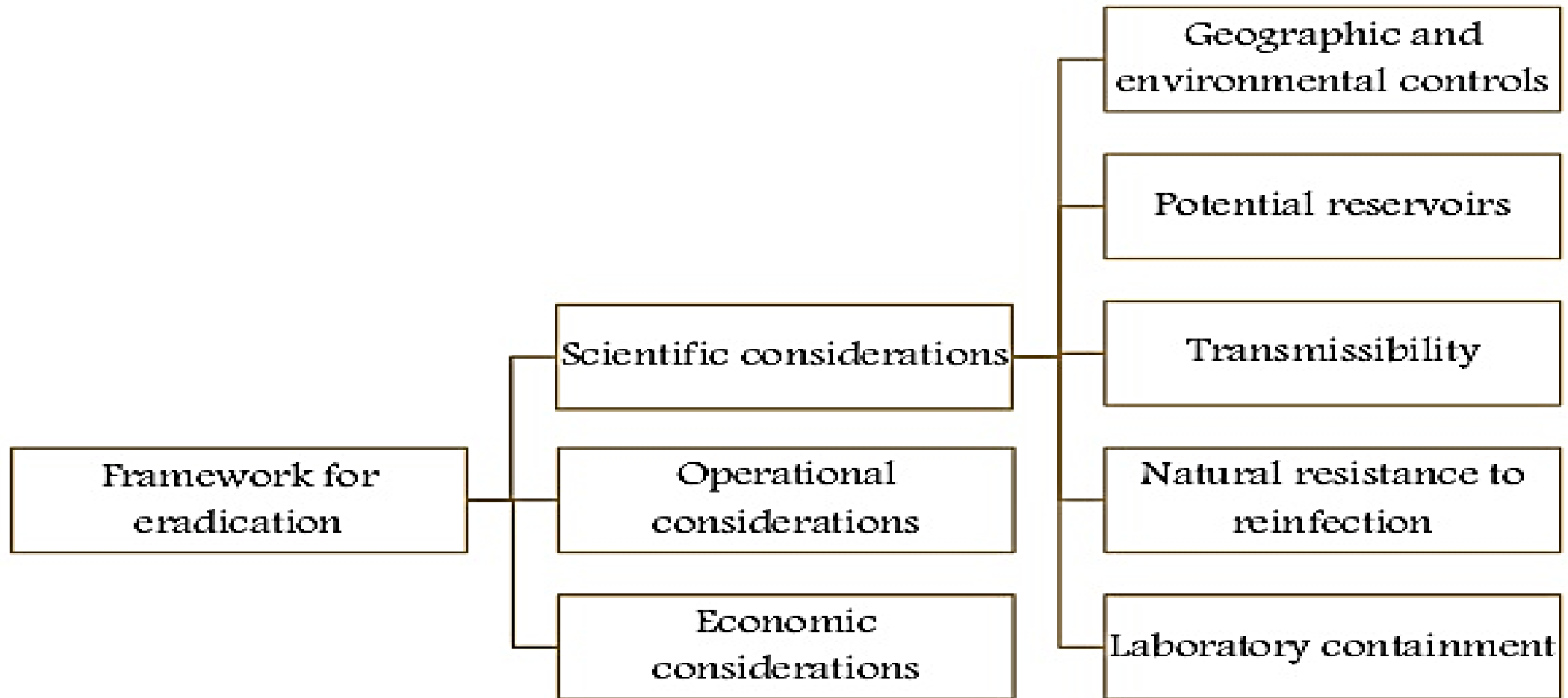
- All or none law

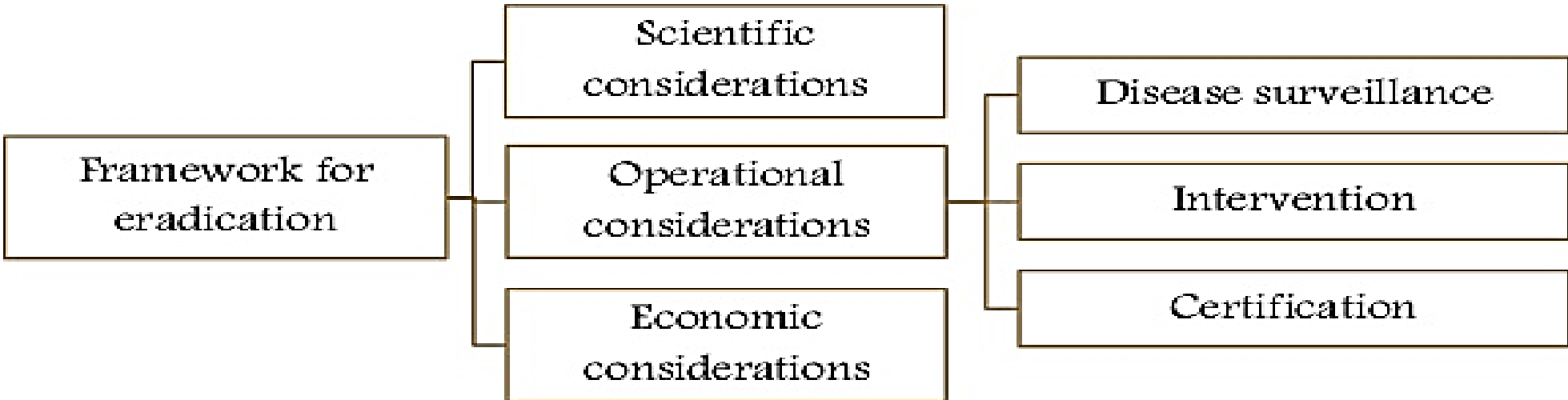
- Only one disease has been eradicated so far: Small pox

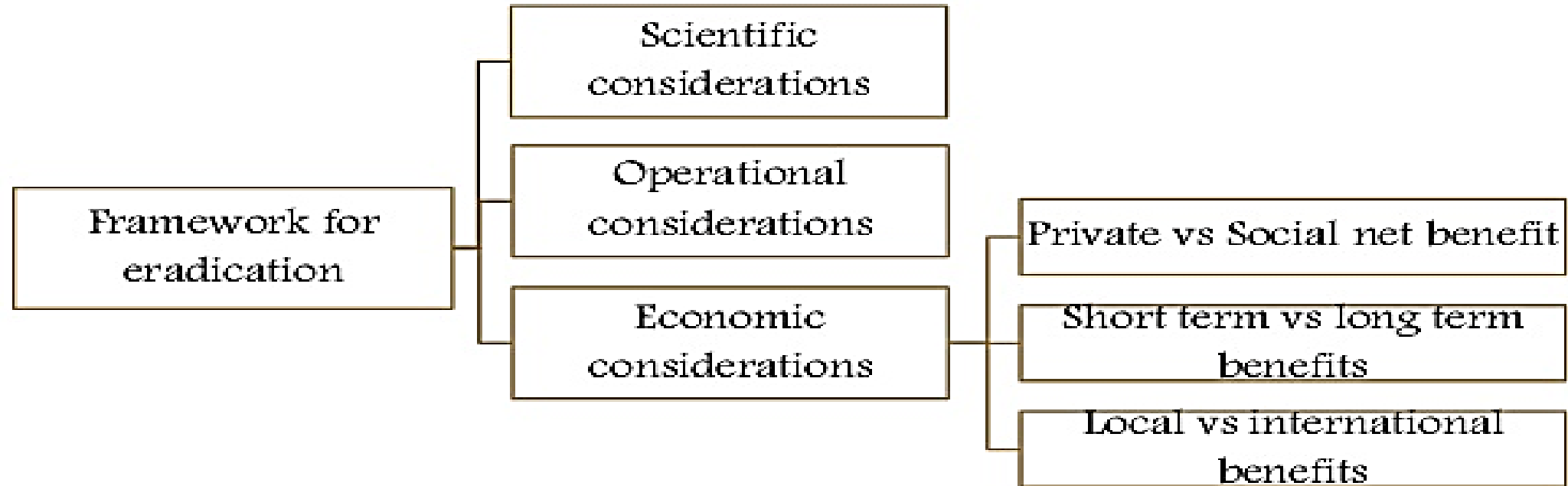
- Eradication underway for:
 - ▣ Poliomyelitis
 - ▣ Dracunculiasis
 - ▣ Yaws
 - ▣ Malaria
 - ▣ Measels

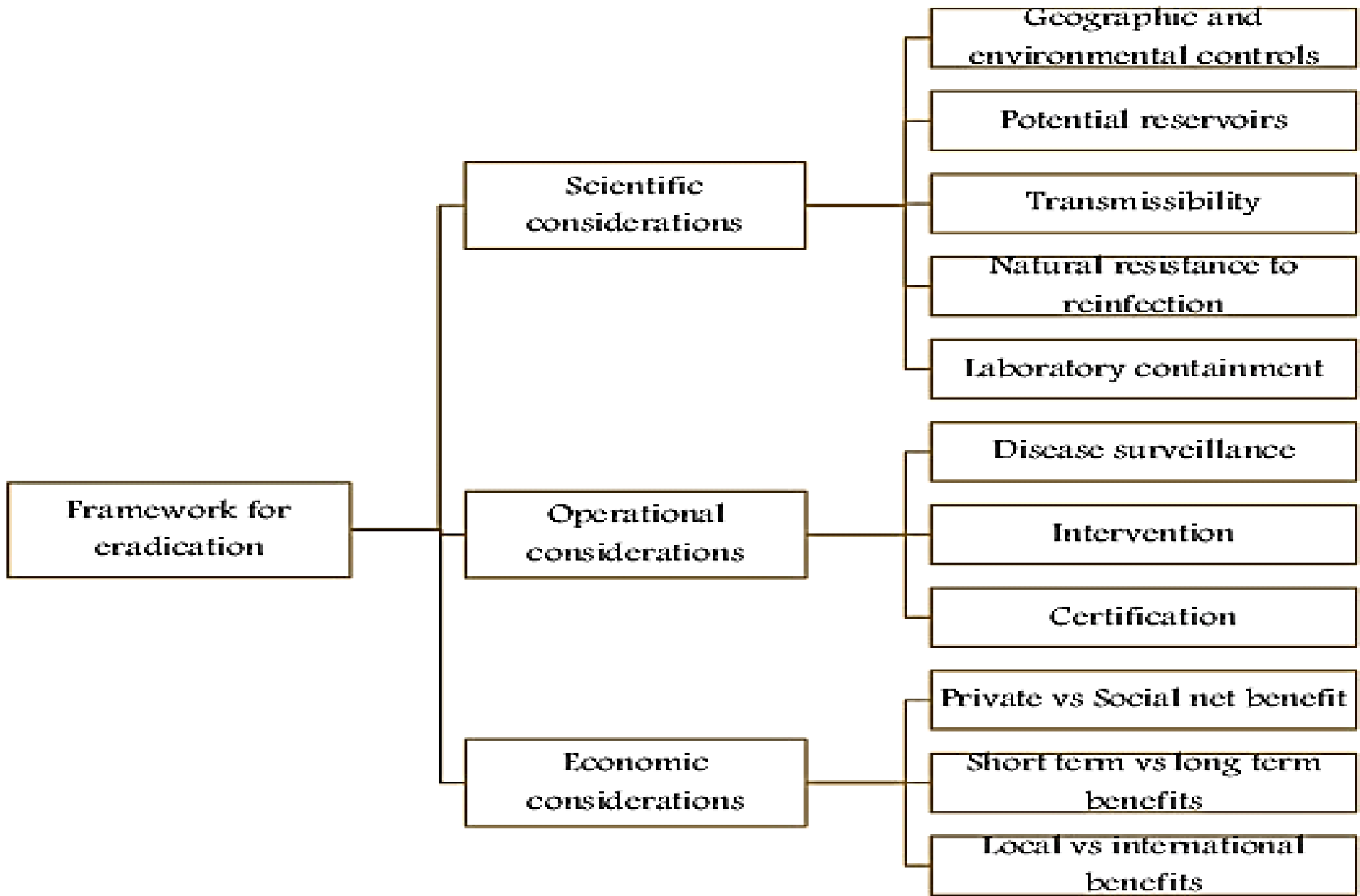
Framework for eradication











Monitoring

- ❑ Monitoring: it is the performance and analysis of routine measurements aimed at detecting changes in the environment or health status of a population
- ❑ Eg: monitoring of air pollution, water quality, growth and nutritional status
- ❑ Also refers to performance of health service or health professional or the extent of patient's compliance

Surveillance

- Surveillance: continuous scrutiny of the factors that determine the occurrence and distribution of disease and other conditions of ill-health

- Objectives of surveillance:
 - To provide information about new and changing trends in health status of a population
 - To provide feed back which may be expected to modify policy and system
 - Provide timely warning of public health disasters so that interventions can be mobilized

- Surveillance is a continuous process which involves three primary activities:
 - i. Collection of relevant data for a specified population, time period and/or geographic area;
 - ii. Meaningful analysis of data;
 - iii. Routine dissemination of data with accompanying interpretation.

Duties of health care professionals in surveillance

- ❑ Identify and describe each individual having an infection as quickly as possible after exposure.
- ❑ Determine the source of infection.
- ❑ Identify exposed individuals to whom the infection may have been transmitted.
- ❑ Specify the frequency of occurrence of infection in population groups at risk by person, place and time.
- ❑ Identify populations that are experiencing, or might experience, an increased frequency of infection.
- ❑ Prepare and distribute surveillance reports to health care professionals participating in disease prevention and control activities.


Types of surveillance

- **Passive surveillance:** receipt of reports of infections/disease from physicians, laboratories and other health care professionals required to submit such reports as defined by public health legislation
- **Active surveillance:** Active disease surveillance is also based on public health legislation and refers to daily, weekly or monthly contacting of physicians, hospitals, laboratories, schools or others to “actively” search for cases
 - Usually seasonal or done during disease outbreaks

CONCEPTS
OF
PREVENTION

Disease prevention: Definition

- Activities designed to protect patients and other members of the public from actual or potential health threats and their harmful consequences
 - Mosby's Medical Dictionary, 8th edition.2009
- Disease prevention covers measures not only to prevent the occurrence of disease, such as risk factor reduction, but also to arrest its progress and reduce its consequences once established.
- Reference: adapted from Glossary of Terms used in Health for All series. WHO, Geneva, 1984

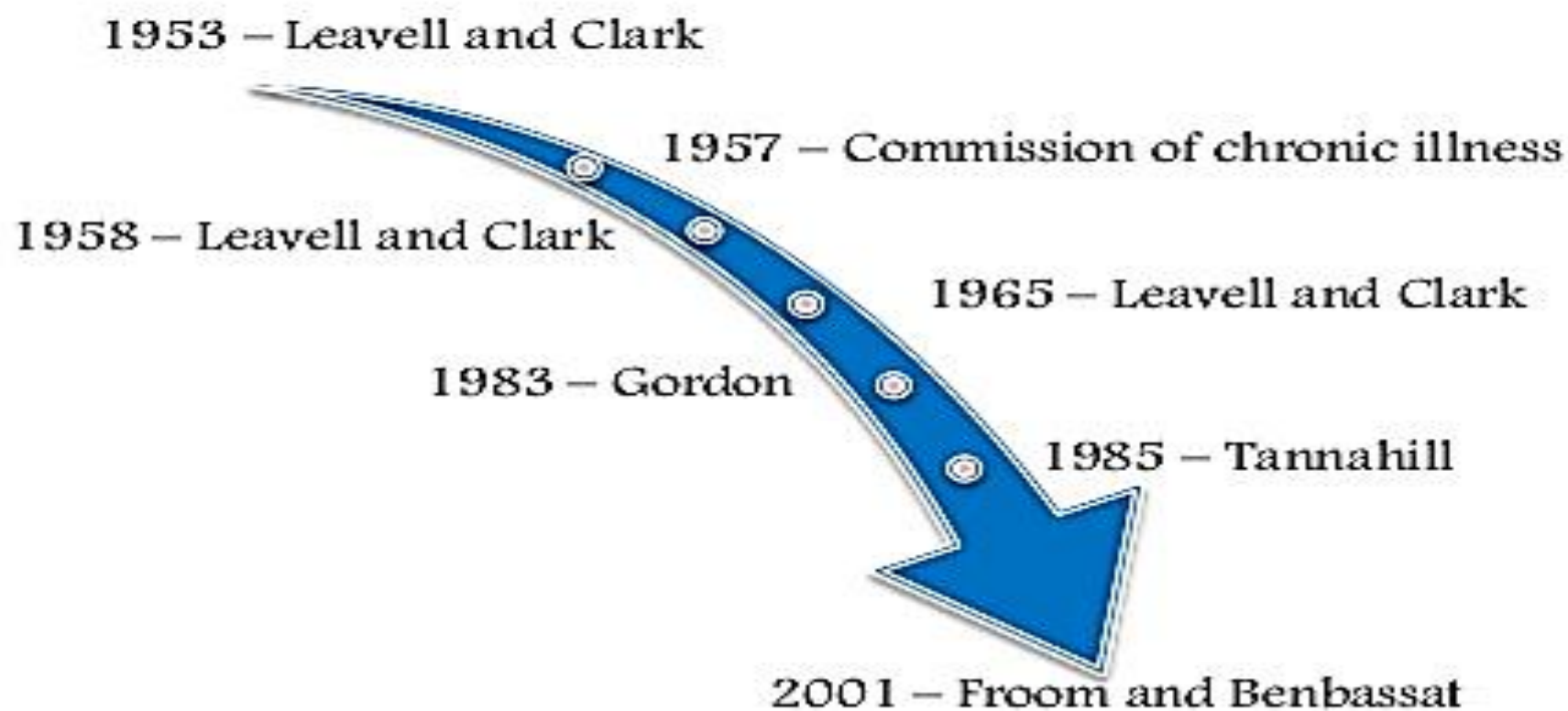
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- Successful prevention depends upon:
 - ▣ Knowledge of causation
 - ▣ Dynamics of transmission
 - ▣ Identification of risk factors and risk groups
 - ▣ Availability of prophylactic or early detection and treatment measures
 - ▣ Facilities for these treatment procedures
 - ▣ Evaluation and development of these procedures

Levels of prevention

- The concepts of prevention can be best defined in the context of “levels of prevention”.

But how many levels of prevention??

Timeline



1953 – Leavell and Clark

- Book: Textbook of preventive medicine

- 5 levels of application
 1. Health promotion
 2. Specific protection
 3. Early recognition and prompt treatment
 4. Disability limitation
 5. Rehabilitation

- Based on his paper on the disease syphilis

1957 – Commission on chronic illness

- Prevention of chronic illness : Volume 1
- First use of the words primary and secondary prevention
- Primary prevention: averting the occurrence of disease
- Secondary prevention: halting the progression of disease from its early unrecognized stage to a more severe one and preventing complications

1958 – Leavell and Clark

- Second edition retitled: Preventive Medicine for the Doctor and the Community

- Defined five levels into three categories
 - Primary prevention
 - Health promotion (serving to further general health and well-being)

 - Specific protection (measures applicable to a particular disease or group of diseases in order to intercept the causes before they involve man)



- Secondary prevention

- early recognition and prompt treatment (preventing spread to others if the disease is communicable, complications or sequelae, and prolonged disability).

- Tertiary prevention

- disability limitation (prevention or delaying of the consequences of clinically advanced disease)
- rehabilitation (aiming at prevention of complete disability after anatomic and physiologic changes are stabilized).

1965 – Leavell and Clark

- Third edition: Preventive Medicine for the Doctor and the Community
- Referred levels of prevention as “phases of prevention” and
- Disability limitation was transferred to secondary phase of prevention

1983 - Gordon

- Public Health Reports

- Limited the use of word prevention to persons who have not yet suffered and discomfort or disability due to the disease

- Classification – target population
 - Universal measures , for everyone
 - Selective measures , for above-risk demographics
 - Indicated measures , for individuals at risk

1985 - Tannahill

- Reviewed the usages of primary, secondary and tertiary by different authors, and proposed a new classification

- Foci of prevention
 1. Prevention of the first occurrence of an illness or unwanted phenomenon
 2. Prevention of avoidable consequences of illness or other unwanted state through early detection when this favorably affects the outcome
 3. Prevention of avoidable complications of established disease or other unwanted state
 4. Prevention of recurrence.

2001 – Froom and Benbassat

- Expanded categories of prevention from three to seven
 - ▣ Level 1: reducing exposure to an etiologic agent
 - ▣ Level 2: increasing resistance to the disease
 - ▣ Level 3: defining it as screening for risk factors for disease (in asymptomatic individuals) in order to reduce them.
 - ▣ Level 4: prevention of recurrence (in asymptomatic individuals after a disease-related event)
 - ▣ Level 5: treatment aimed at prevention of complications (in asymptomatic individuals after a disease-related event)
 - ▣ Level 6: treatment of symptomatic patients for cure, palliation, or reduction of mortality
 - ▣ Level 7: rehabilitation for “adjustment to irremediable conditions.

2008 – 2009: Ronald Hattis (draft stage as on 2012)

□ Classification according to stages of disease

Stages of Disease Development		Corresponding Stages of Prevention
1	Exposure	Avoidance of Exposure
2	Acquisition	Reduction of Acquisition
3	Advancement/Progression	Interruption of Progression
4	Complications	Avoidance of Complications
5	Death or Disability	a) Delay of Mortality b) Rehabilitation of Disability c) Palliative Care for Inevitable Death

Stages		Disease I	Disease II	Disease III
		Type 2 Diabetes	HIV	Dental caries
1	Exposure Avoidance:	Healthy eating, limit simple carbohydrates, maintain healthy weight, exercise	Abstinence from sex (or screening and monogamy of seronegative partners), no injection drug use	Avoidance of sticky fermentable carbohydrate diet
2	Disease Acquisition Reduction:	Weight loss, consider metformin if insulin resistance/pre-diabetes	Condom promotion and programs to discourage drug abuse, needle sharing	Sealing of pit and fissure, use of fluorides and plaque control
3	Interruption or Delay of Disease Advancement:	Anti-diabetic drugs, monitor hgb A-1C, FBS, proteinuria, lipids; bariatric surgery if indicated	Antibody screening, monitoring CD4, viral load; treatment with antiretrovirals	Preventive resin restorations, conservative restorations, ART
4	Avoidance or Delay of Disease Complications:	ACE Inhibitor/ARB to prevent renal sequelae, strict glucose control (insulin if necessary), lipid control, foot and eye care	Prophylactic treatment for opportunistic infections	Indirect pulp capping, deep caries restorations
5	Delay of Mortality from Disease complications	Renal Dialysis, coronary stent or bypass	Intensive treatment for severe opportunistic infections	Root canal treatment and prosthetic rehabilitation

Beyond disease prevention . . .

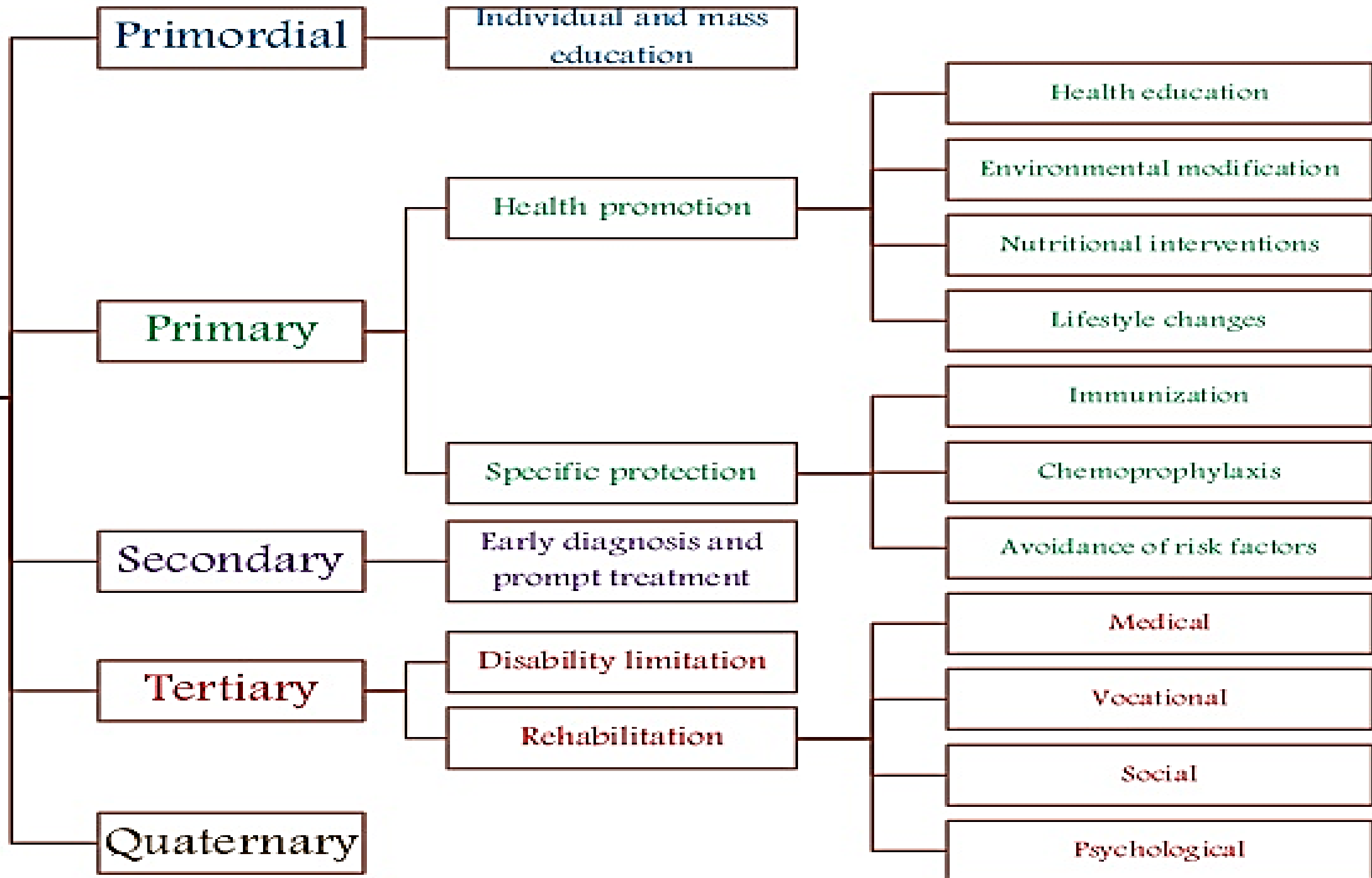
- Breslow proposed in 1999 moving “beyond disease prevention and aiming for “the energy and reserves of health that permit a buoyant life, full of zest the eager ability to meet life’s challenges.”
- Thus a supplementary paradigm consisting of four stages of health promotion/wellness was developed . .

Stages of wellness

- Stage 1: Exposure to positive health influences.
- Stage 2: Adoption of positive health practices (such as healthy diet, exercise, recreation, adequate sleep, etc.).
- Stage 3: Increase in indicators of health and wellness due to the healthy practices (such as increased strength and flexibility, immunity, optimal BMI, etc.).
- Stage 4: Achievement of specific defined health and wellness goals, both
 - subjective (e.g., sense of wellbeing and energy, fulfilling social relationships)
 - objective measures (e.g., high cognitive function, productivity, capacity for role fulfillment or achievement)

**LEVELS
OF
PREVENTION**

LEVELS OF PREVENTION



LEVELS OF PREVENTION

- The concept of prevention is best defined in terms of levels of prevention. Traditionally,
 1. Primordial prevention
 2. Primary prevention
 3. Secondary prevention
 4. Tertiary prevention
 5. Quaternary prevention

PRIMORDIAL PREVENTION

- Prevention of emergence or development of **risk factors** in countries or population groups in which they have **not yet appeared**.
- *it consists of actions and measures that inhibit the emergence and establishment of environmental, economic, social and behavioral conditions, cultural patterns of living known to increase the risk of disease.*

- John Last's dictionary

Primordial prevention . . .

- Mainly associated with chronic diseases
- Intervention – Individual and mass education
- Has to start in childhood when health risk behaviour begins

- Examples of primordial prevention
 - ▣ National programmes and policies on:
 - Food and nutrition
 - Against smoking and drugs
 - To promote regular physical activity

- Responsibility of primordial prevention:
 - parents, teachers and peer groups: imparting health education
 - Government: legislating and enacting laws
 - Professional and nonprofessional organisations
 - Industry
 - Hospitals, health practitioners, health care workers

PRIMARY PREVENTION

- *Action taken prior to the onset of disease, which removes the possibility that a disease will ever occur*
- Intervention – prepathogenesis stage of disease
- Concept of positive health: an acceptable level of health that will enable every individual to lead a socially and economically productive life

- Approaches for primary prevention for chronic diseases (WHO):
 - A. Population (mass) strategy:
 - Directed at whole population irrespective of individual risk levels
 - Directed towards socio-economic, behavioral and lifestyle changes
 - B. High risk strategy:
 - To individuals at special risk

Population approach

ADVANTAGES

- ❑ Recognises influence of society
- ❑ Risk reduction can be achieved at population level
- ❑ Effective in dose-response relationship of diseases

DISADVANTAGES

- ❑ Less effective in situations where there is no dose-response relationship

High risk approach

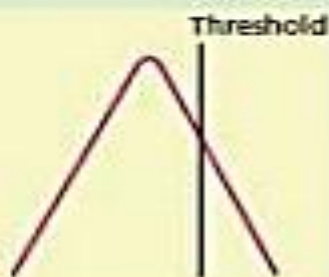
ADVANTAGES

- ❑ Cost effective
- ❑ Motivation level is higher
- ❑ Easier for health professionals to promote change
- ❑ Individuals would have been aware and exposed to the risk

DISADVANTAGES

- ❑ Fails to address public health problems which arise from small risks
- ❑ Tends to medicalise prevention
- ❑ Does not focus on what influences behaviour
- ❑ Little overall impact on control of disease

POPULATION AND HIGH RISK STRATEGIES



Original distribution

The level of risk factors is normally distributed within the population as illustrated by the red curve — It means that majority of people have risk factor level below the threshold, while minority are above the threshold.



Individual-based approach

This approach concentrates its efforts on the high-risk individuals with risk factor level above a certain threshold. When preventive measures are targeted at these identified people at high-risk, the distribution of risk factor level can only shift a little to the low level direction as indicated by the green curve.



Population-wide approach

This strategy seeks to shift the whole distribution of risk factor level to the low level. The whole distribution of risk factor level, as indicated by the shifted green curve towards left to lower values.



Combined strategies

Therefore, combining individual-based and population-wide approach will shift the distribution of risk factor level to a lower range that yield better health outcome among the whole population.

- Achievements of primary prevention:
 - ▣ Controlling diseases like cholera, typhoid, dysentery, plague, tuberculosis, by raising standard of living

- Holistic approach

- Modes of intervention:
 - ▣ Health promotion
 - ▣ Specific protection

Health promotion

- Process of enabling people to increase control over and to improve health

- Not directed against any particular disease

- Interventions in this area:
 - ▣ Health education
 - ▣ Environmental modifications
 - ▣ Nutritional interventions
 - ▣ Lifestyle and behavioural changes



- Values in health promotion

- Equity and social justice
- A holistic definition of health
- Covers a full range of health determinants
- Recognizes influence of environment on health
- Seeks to enhance people's social participation
- Involves intersectoral collaboration (ottawa reference)

Specific protection

- Efforts directed toward protection against specific diseases

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

SECONDARY PREVENTION

- *Action which halts the progress of the disease at its incipient stage and prevents complications*
- Intervention – early pathogenesis stage
- It is the domain of clinical medicine
- Drawback
 - Patient already subjected to mental anguish & physical pain
 - More expensive than primary prevention

secondary prevention . . .

- Modes of intervention:
 - ▣ Early diagnosis (screening tests, case finding programs)
 - ▣ Adequate/prompt treatment

- Effects:
 - ▣ Seeks out unrecognized disease
 - ▣ Provides treatment before irreversible changes occur
 - ▣ Reverses communicability of infectious diseases
 - ▣ Protects community

Early diagnosis and prompt treatment

- Earlier diagnosed – better prognosis
- Reduces morbidity and mortality
- Effective in acute conditions

TERTIARY PREVENTION

- *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*
- Intervention – late pathogenesis stage
- Modes of intervention:
 - Disability limitation
 - Rehabilitation

Disability limitation

- To prevent or halt the transition of disease process from impairment to handicap
- Disease → impairment → disability → handicap
- Impairment: any loss or abnormality of psychological, physiological or anatomic structure or function
- Disability: any restriction or lack of ability to perform an activity in the manner considered normal for a human being
- Handicap: disadvantage for a given individual, resulting from impairment or disability, that limits or prevents the fulfillment of a role that is normal for that individual



ACCIDENT



Impairment. Loss of an anatomical structure



Disability. Lack of ability to perform an activity



Handicap. Prevents fulfillment of normal role



Disease – dental caries



Impairment – loss of tooth



Disability – cant talk



Handicap – cant socialize

Rehabilitation

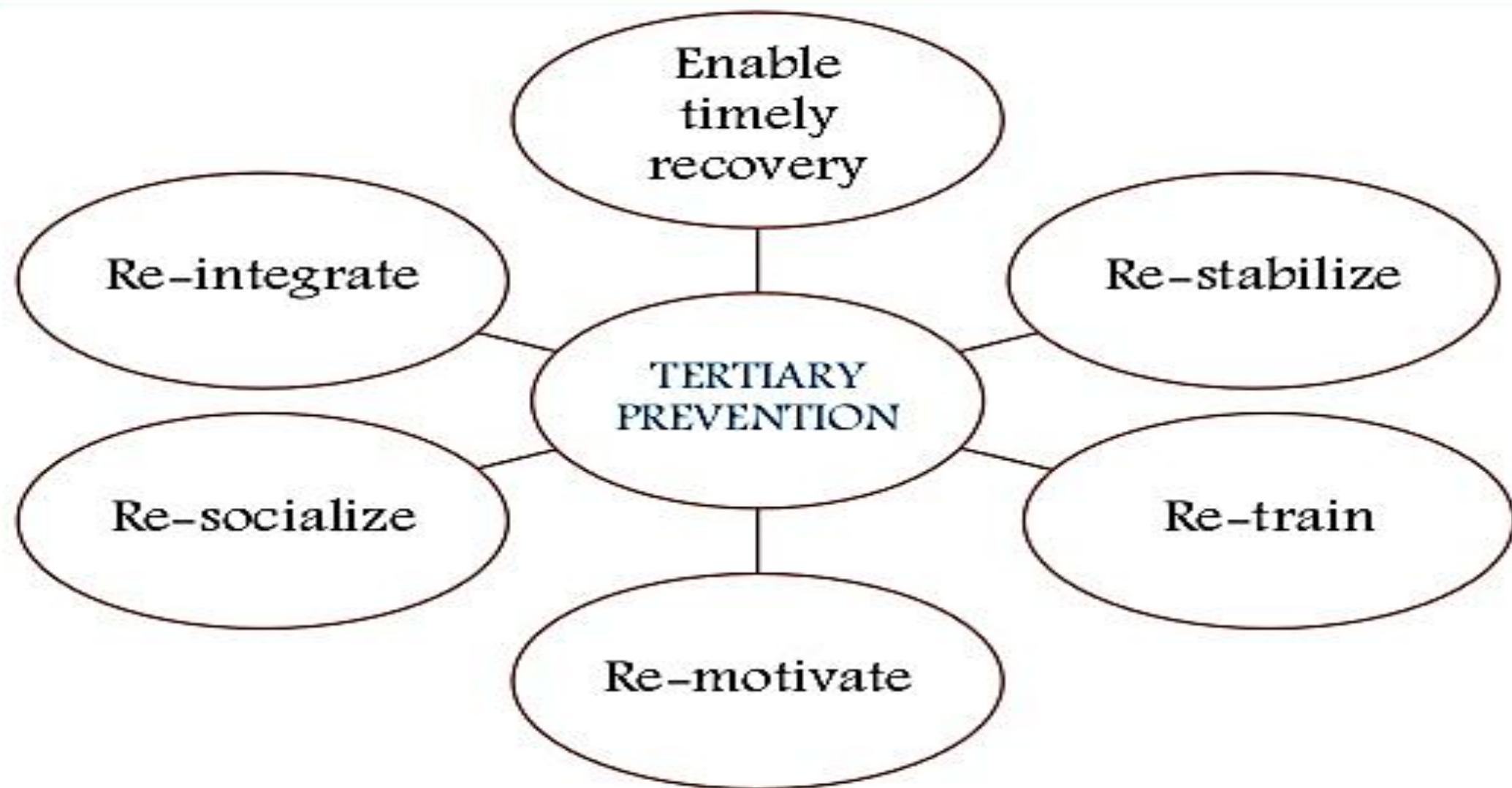
- *The combined and coordinated use of medical, educational, social and vocational measures for training and retraining the individual to the highest possible level of functional ability*

- Types of rehabilitation
 - Medical: restoration of function
 - Vocational: restoration of capacity to earn a livelihood
 - Social: restoration of family and social relationships
 - Psychological: restoration of personal dignity and confidence

- Examples of rehabilitation
 - ▣ Establishing schools for blind
 - ▣ Provision of aids for crippled
 - ▣ Exercises in neurological disorders
 - ▣ Prosthetic restoration of lost tooth

- Requires cooperation from different sections of society

Principles of tertiary prevention



QUATERNARY PREVENTION

- The action taken to identify patient at risk of over-medicalisation, to protect him from new medical invasion, and to suggest to him interventions, which are ethically acceptable.
- Quaternary prevention is the set of health activities to mitigate or avoid the consequences of unnecessary or excessive intervention of the health system.
- Quaternary prevention should take precedence over any alternative preventive, diagnostic and therapeutic, as is the practice version *'primum non nocere'*

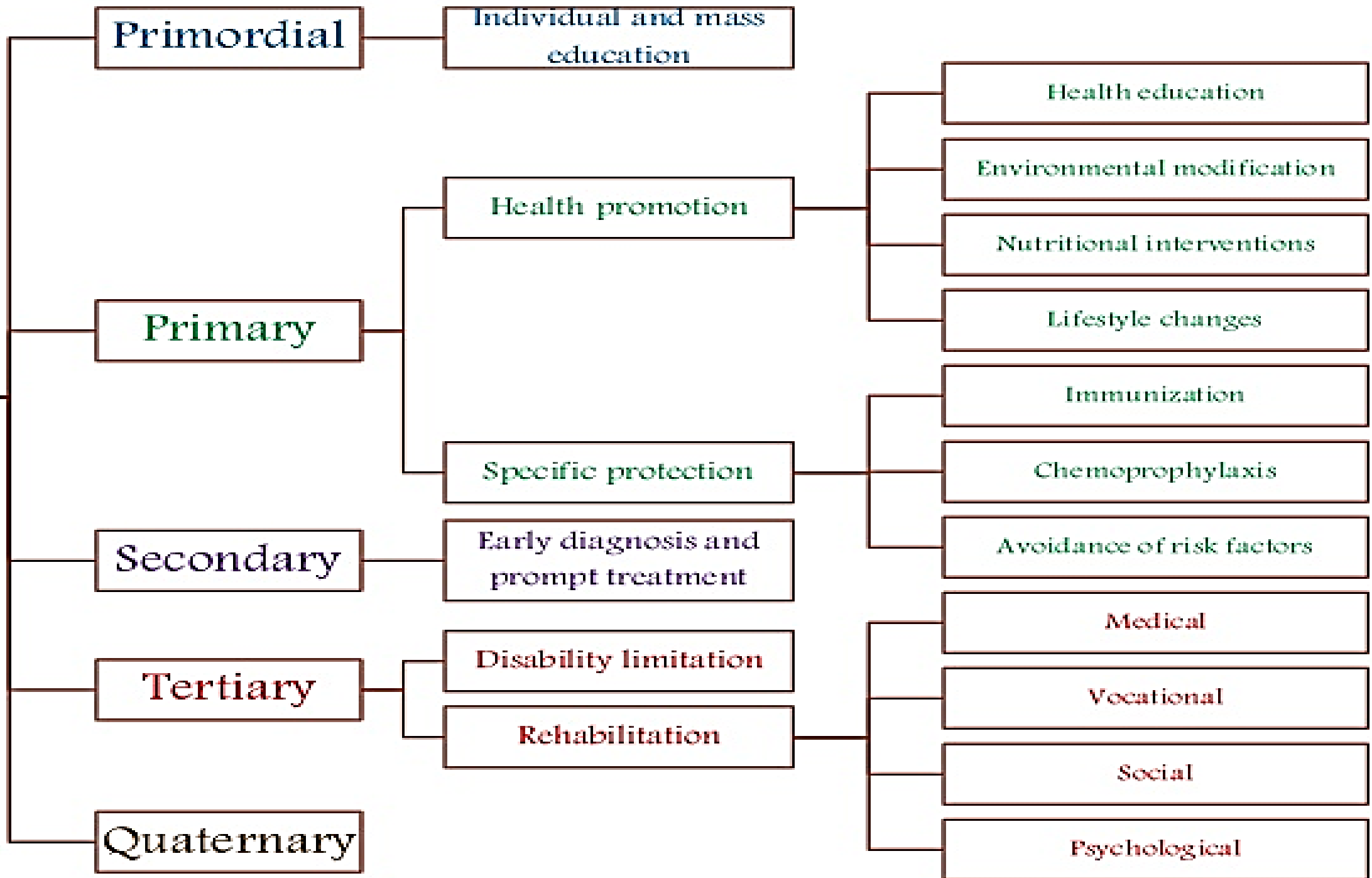


- Intervention types:

Healthcare professionals must be aware of the consequences of their decisions, and include quaternary prevention interventions in their daily clinical practice with each patient

- Do not mistake risk factor with disease.
- To avoid check ups or unnecessary exams.
- To avoid technical interventionism in healthcare.
- To avoid the indiscriminate use of antibiotics (very often unnecessary, with the subsequent unjustified increase of bacterial resistances)

LEVELS OF PREVENTION



CONCLUSION

- Understanding disease pathology is the first step towards formulating preventive measures
- Prevention can be achieved in any stage of disease
- Primordial or primary prevention is most effective and economical
- Disease control is also a part of prevention which is achieved by means of continuous monitoring and surveillance of disease