

Natural History of Disease

Development and Prevention

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Original Content | [Titles](#) | Additional Notes | **Important**

LEARNING OBJECTIVES

- Describe the natural history of disease development.
- Define the terms prevention, control, elimination and eradication.
- Give examples of classes of diseases in relation to severity.
- Explain the relation between disease severity and reporting.
- Identify the level of prevention in relation to the natural history of disease development.
- Identify the measures applied at each level of prevention.

NATURAL HISTORY OF DISEASE

How do people shift from a normal status to being sick?

- It refers to the progress of a disease process in an individual over time, in the absence of intervention (treatment).
- It describes the course of the disease in an individual starting from the moment of exposure to the causal agents till one of the possible outcomes occurs (complications or death).

NATURAL HISTORY PHENOMENON

It's important for us to know the stages that represent the course of a disease to know WHEN and HOW to intervene and prevent. The terms presented here are used by a major epidemiology textbook (*Rothman and Greenland, Modern Epidemiology*) to represent these four stages:

➤ **Susceptibility:**

Likelihood of an individual to develop a disease.

➤ **Induction:**

Time between **causal action** and **disease initiation**.

➤ **Incubation:**

Time between **disease initiation** and **symptoms**.
(infectious diseases).

➤ **Latency:**

Time between **disease initiation** and **detection**.
(non-infectious diseases).

E.g. Small carcinoma of the prostate in old men is often found incidentally at autopsy.

LEVELS OF PREVENTION

Primary: Prevent diseases before it occurs by:

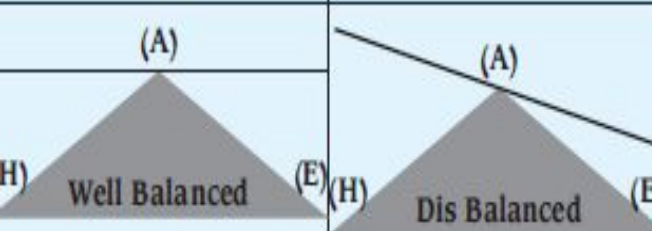
- 1) Health Promotion e.g. exercise → at the stage of perfect health.
- 2) Specific Protection e.g. vaccination → at the stage susceptibility.

Secondary: Treatment of an ongoing, asymptomatic disease by:

Early diagnosis e.g. screening for cervical/breast cancer in women +40.

Tertiary: Reducing complications of an ongoing, diagnosed disease by:

- 1) Disability limitation: Preventing organ damage as much as possible.
E.g. eyes and feet protection in patient with diabetes.
- 2) Rehabilitation: Maximum utilization of the remaining abilities.
E.g. teaching blind patients to practice an independent lifestyle.

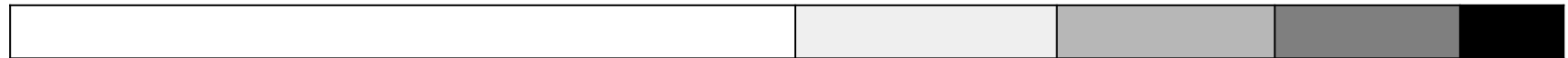
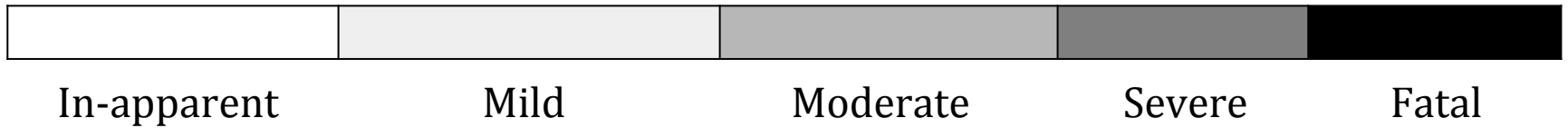
		Stages of Pathogenesis			
Stage of Positive Health	Stages of Susceptibility (Pre Pathogenesis)	Asymptomatic (Early Pathogenesis)	Early, Discernible Disease	Full-Blown (Classical) Disease	Termination
 <p>(A) (H) Well Balanced (E)</p> <p>(A) (H) Dis Balanced (E)</p>	<p>Balance between Agent, Host and Environmental Factors is disturbed; conditions have been created for disease process to start; however pathological processes have still not started.</p>	<p>Pathological process has started. However, outwardly, there are no signs or symptoms whatsoever. Detection is only possible by specialized pathological / investigative studies.</p>	<p>There are very mild or non-specific signs / symptoms which occur at a very early stage of clinical course; not easy to detect at this stage unless very fine clinical acumen and / or specialized equipment is used.</p>	<p>Full fledged disease in classical form; quite easy to diagnose.</p>	<ul style="list-style-type: none"> - Complete Recovery - Chronic Disease - Life With Residual Disability - Death
Health Promotion	Specific Protection	Early Diagnosis and Prompt Treatment	Disability limitation		Rehabilitation
Primary Prevention		Secondary Prevention	Tertiary Prevention		
Levels of Prevention					

IMPORTANCE OF STUDYING THE NATURAL HISTORY OF DISEASES

- Understanding the progress from disease onset to final end point (cure or death) is important for epidemiologists.
- Knowledge of the natural history is necessary for the prevention and control of disease.
- The intervention early in the course of the disease (asymptomatic stage) is likely to change the course of the disease favourably.

CLASSES OF DISEASES IN RELATION TO CLINICAL SEVERITY (SPECTRUM OF DISEASE)

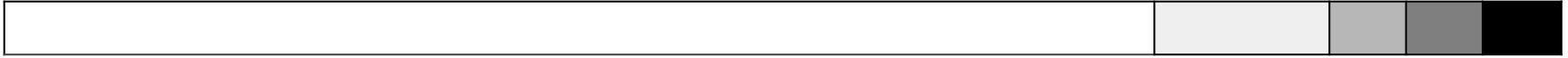
Scale/ legend



Likely to be seen by a doctor
and likely to be recorded

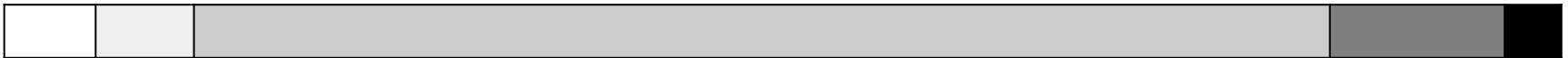
Likely to be
hospitalized and
recorded

Class A



INAPPARENT, FREQUENT DISEASE e.g. Tuberculosis, Poliomyelitis, Hepatitis A, Meningitis, HIV. Most people are asymptomatic, hence, don't go to the hospital.

Class B



CLINICAL, FREQUENT DISEASE WITH FEW DEATHS e.g. Measles, chicken pox. Patients usually go to the hospital and it's unlikely for them to die.

Class C



INFECTIOUS DISEASES USUALLY FATAL e.g. Rabies, hemorrhagic fevers caused by Ebola and marburg virus. Patients develop severe complications or die.

PUBLIC HEALTH ASPECTS

OF NATURAL HISTORY OF DISEASE AND DISEASE SEVERITY

- People with in-apparent or undiagnosed infections can transmit infections to others (carrier state).
- Control measures must be directed toward all infections capable of being transmitted to others; so to both:
 - clinically apparent cases and
 - in-apparent or undiagnosed infections.

PREVENTION

Averting a disease or ill-health before its occurrence.

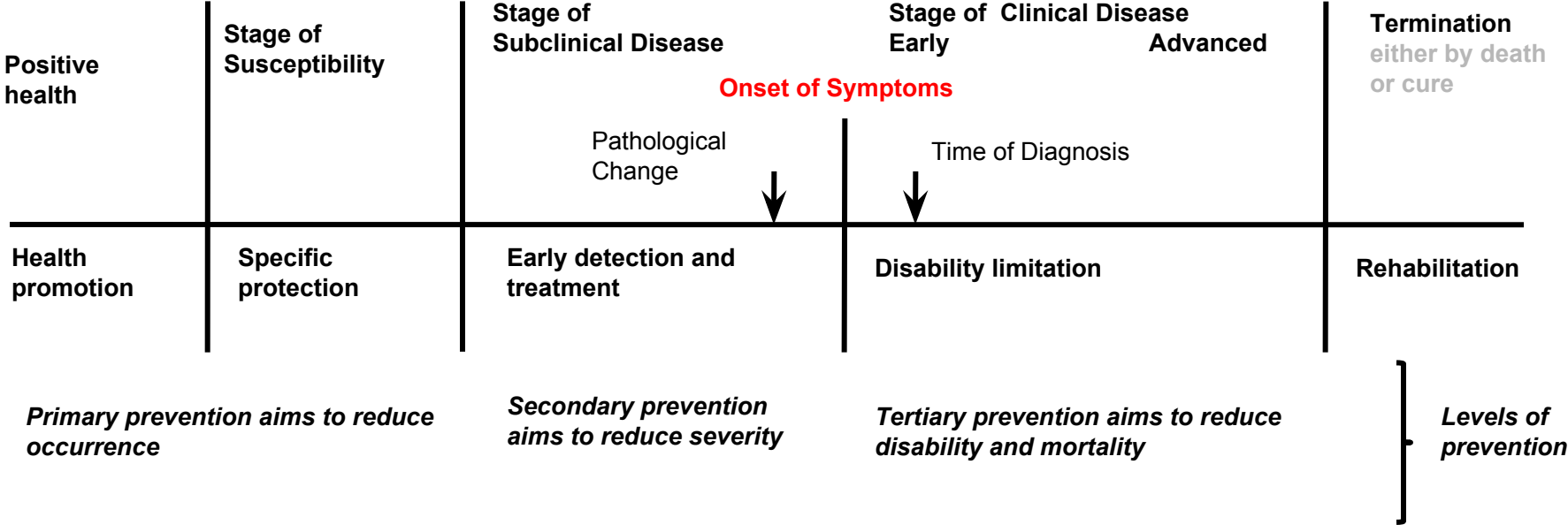
Control of Communicable Diseases in Men, 2013

Actions that aim to eradicate, eliminate, or minimize the impact of a disease and/or disability (primary and secondary prevention). If none of these is feasible, retarding the progress of disease and disability (tertiary prevention).

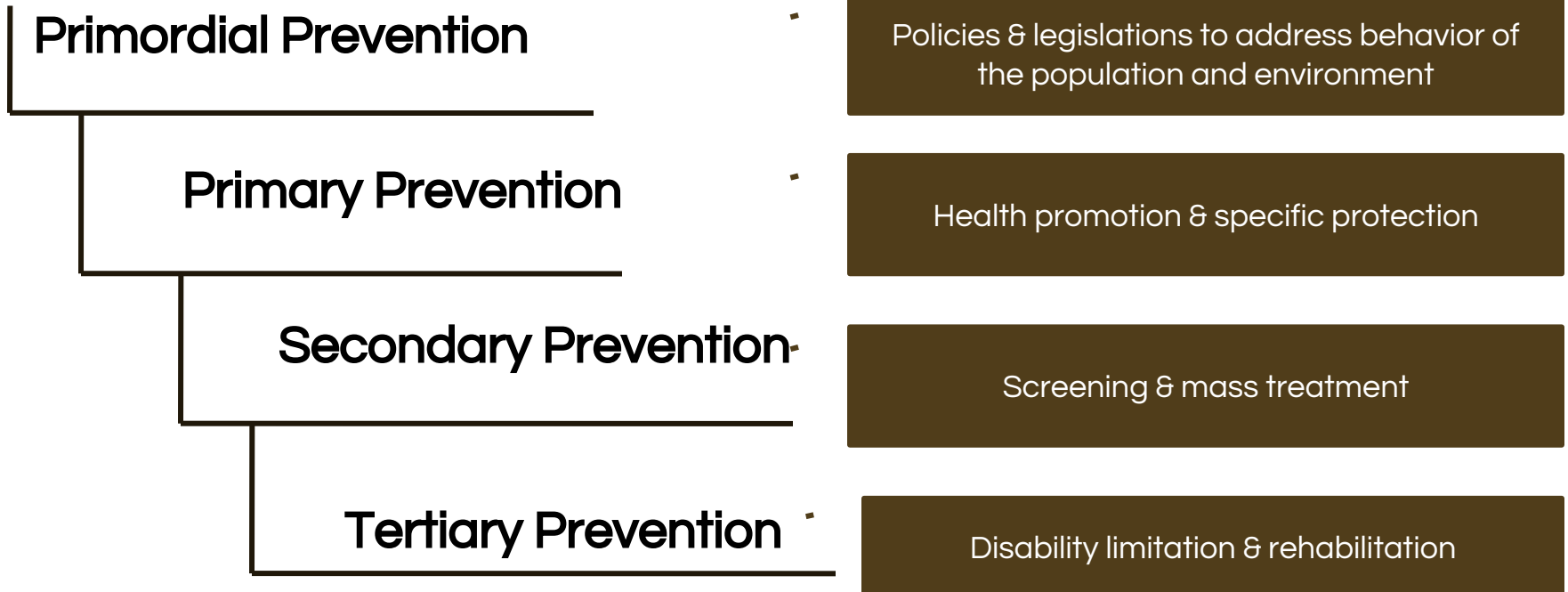
The concept of prevention is best defined in the context of levels of prevention; primary, secondary, and tertiary prevention.

Oxford Dictionary, 2008

NATURAL HISTORY OF DISEASE AND LEVELS OF PREVENTION



LEVELS OF PREVENTION



PRIMARY PREVENTION

□ HEALTH PROMOTION

- Health education
- Nutrition intervention
- Sanitation of the environment
- Life style modification

□ SPECIFIC PROTECTION

- Immunization
- Chemoprophylaxis
- Specific micronutrient
- Protection from unintentional injuries
- Protection from environmental hazards

DISABILITY LIMITATION & REHABILITATION

- Disability limitation ===== Prevent disability progression
- Rehabilitation ===== Attain highest level of functional abilities by trying to overcome the disability or adapt to it.
 - Medical rehabilitation
 - Vocational rehabilitation
 - Social rehabilitation
 - Psychological rehabilitation

REFERENCES

- Principles of Epidemiology in Public Health Practice. Third Edition. An Introduction to Applied Epidemiology and Biostatistics. Centers for Disease Control and Prevention (CDC)
- Gordis L. Epidemiology. 2009