

# From Natural History of Disease to Vulnerability

## Changing Concepts and Practices in Contemporary Public Health

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A fundamental resource for public health intervention is its theory. Concepts are tools we use to respond to social needs, which demand that we possess knowledge to support our action. This knowledge is based on the material resources, the science and technologies available, as well as the political and ideological conditions, and ethical and moral values existing at a given place and time.

The aim of this chapter is to review three main conceptual frameworks that guide preventive actions in contemporary public health: (1) natural history of disease/levels of prevention, (2) health promotion, and (3) vulnerability.

### **Natural history of disease and levels of prevention**

The concept of natural history of disease (NHD) evolved from a seminal concept in the development of modern epidemiology: the concept of *epidemic constitution*. Originally formulated by Hippocrates and rediscovered in the seventeenth century by the British physician Thomas Sydenham, the concept referred to a set of conditions which determined that some diseases would become more prevalent in certain places and times and that they would assume, under such circumstances, specific characteristics – becoming more or less intense, showing stronger or more attenuated signs and symptoms, etc. (Creighton 1894). The concept remained almost forgotten for approximately 200 years until it was recovered by epidemiologists at the Royal Society of Medicine, in London. These epidemiologists saw in the concept of epidemic constitution a comprehensive way to study, in modern scientific bases, the epidemic behaviour of diseases. They named this method ‘the natural history of disease’ (Hamer 1929).

The idea of epidemic constitution offered the possibility to relate the diseases’ behaviour to the observations of diverse environmental conditions, based on exhaustive compilation, interrelation, and systematic comparison of data referred to diverse places, times, seasons, geographical characteristics, population features, etc.

In spite of being controversial for its time (Goodall 1927), this concept was shown to be crucial for the development of epidemiology as a modern science, delimiting the specificity of its

field of knowledge in contrast with other related disciplines, such as bacteriology and medical statistics (Amsterdanka 2005; Ayres 2005). Investigations on epidemic constitutions demonstrated that the study of infectious agents, focused on the bacteriological approach to epidemic phenomena since the 1870s, was not sufficient to explain the epidemic behaviour of diseases. They indicated the relevance of integrating several areas of science in order to produce knowledge about the occurrence and distribution of diseases. During the first decades of the twentieth century, the concept of epidemic constitution was largely criticised and modified until it was completely transformed into what is now referred to as 'the natural history of disease' (Gordon 1953).

In the United States, William Perkins (1938) defined NHD as the causal chain resulting from the interaction between environment, aggressor agents, and the human organism. Perkins defended and systematised the proposal that one should extend causal investigations to periods and spaces prior to the anatomical and physiological affliction, and that preventive action should be developed during the whole course of the disease, from its causal factors to the different moments of its clinical course and its consequences. Following such developments, Edwin Clark from Columbia University and Hugh Leavell from the Harvard School of Public Health proposed, in the 1950s, a model of NHD which became the definitive reference (Leavell and Clark 1958).

With the concept of NHD, Leavell and Clark postulated the overcoming of rigid distinctions between medicine and public health and between curative and preventive measures. They demonstrated that prevention should be present at every moment that there was a possibility that an intervention could prevent the disease or its consequences. An intervention, therefore, is composed of different *levels of prevention* (LP), ranging from the transformation of environmental and social conditions that influence the appearance of the disease to the reduction of worse effects of the disease in those that are already ill. To support this viewpoint, they adopted the thesis of the multiple causation of disease. According to this thesis, the intervention and the knowledge about the factors that determine the disease require an interdisciplinary framework construction, with the technologies of bio-medical and human sciences mediated by the epidemiological method and statistical analysis.

The NHD/LP model allows us to analytically distinguish two stages involved in the genesis and development of ailments: the pre-pathogenic period, during which the determinants that enhance the appearance of the disease occur, and the pathogenic period, which refers to the evolution of the disease as it runs its course. The pre-pathogenic period distinguishes the determinants related to the agent, the host, and the environment, and the pathogenic is subdivided into three stages: early pathogenesis, advanced disease, and outcome. During the diverse periods and stages, different prevention strategies may be considered, any of which may be initiated at any time during the evolution of the disease. These prevention strategies can be grouped in three phases and five levels of prevention (Figure 10.1).

*Primary prevention* aims to prevent the pathogenic processes from being initiated (pre-pathogenic period). It has two levels: (1) *health promotion*, which refers to actions taken to improve the living conditions of individuals, families, and communities, promote health and quality of life in general, and increase barriers to different pathogenic processes through health education, sanitation, and improved living and working conditions, etc.; and (2) *specific protection*, which refers to actions turned towards preventing specific diseases (e.g. vaccination).

*Secondary prevention* is employed during the pathogenic period, for example in situations where the health-disease process has already been established. It aims to achieve a favourable clinical evolution and the best attainable outcomes for the affected individuals. It also aims to interrupt or reduce the spread of the disease to other people. To achieve these goals, two other levels are defined: *early diagnosis and prompt treatment*, and *disability limitation*.

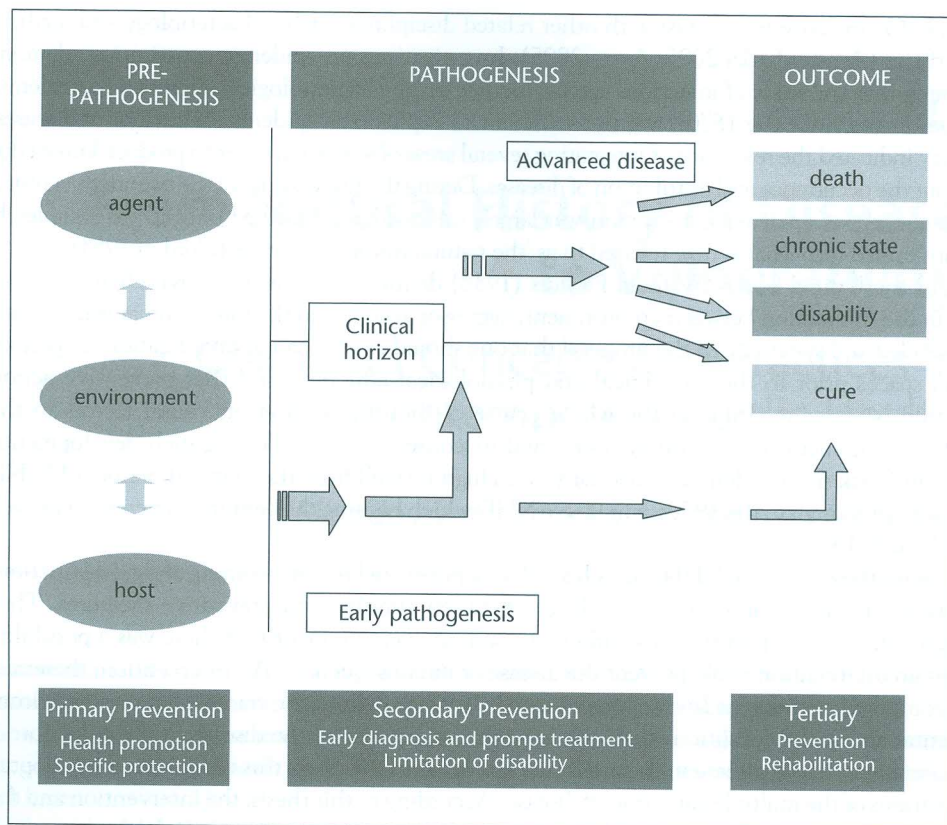


Figure 10.1 Diagram of the natural history of disease and corresponding levels of prevention  
Source: Adapted from Leavell and Clark 1958.

Finally, *tertiary prevention* refers to the moment in which the health–disease process has reached a cure or progressed to a chronic state or irreversible defect or disability. The goal here is to minimise harm to the affected people and to protect their quality of life.

### Health promotion

Since the 1970s, the term ‘health promotion’ has captured a powerful movement of ideas and actions for the renewal of health practices. It is related to Leavell and Clark’s classic primary level of prevention, but introduces significant changes. This new version of health promotion expanded the range of actions originally associated with the primary level and changed its conceptual basis and practical methods.

This ‘new health promotion’ (NHP) has its origin in the renowned 1974 Lalonde Report, which was issued by Canada’s former minister of health. The report questioned the health care model of that country, which was expensive and had little effect on enhancing the population’s health. It concluded that health actions were excessively centred in hospital practices and in the biological determinants of ailments, and required that greater attention be given to the role of environment and lifestyles in people’s health (Lalonde 2009).

In 1978, the first Conference on Primary Health Care, summoned by the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF), highlighted the

