

## Logical graphical representation of medical activity.

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### Introduction

Within the political and institutional framework of each country, the concept of health system includes the ensemble of all public and private organizations, institutions and resources mandated to improve, maintain or restore health; health systems encompass both personal and population services as well as activities to influence the policies and actions of other sectors to address the social, environmental and economic determinants of health<sup>2</sup>.

The health system has two main purposes: 1 / alleviate suffering and 2 / help to die with dignity<sup>3</sup>.

These two purposes are accomplished by four functions:

1 / protection of health (establishing laws, regulations and rules intended to effectively change the care of health problems and health of individuals and populations as desired),

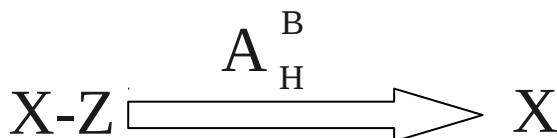
2 / promotion of health (to improve the health of individuals and communities through plans and actions that add health),

3 / disease prevention (campaigns and activities that modified the current health status in ways that avoid greater harms in the future), and

4 / health care (actions that reverse the deterioration of health, which reduce the impact of the disease, or accompany the patient<sup>4</sup>).

This text presents graphically this fourfold conceptualization of health system functions.

### HEALING



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  - 2 Durán A, Kutzin J, Martín-Moreno JM and Travis P, 2011, Understanding health systems; scope, functions and objectives, in McKee and Figueras, Health Systems: Health, Wealth, Society and Well-being. Open University Press, McGraw Hill, New York, pp 19-37
  - 3 Hanson MJ, Callahan D. The goals of Medicine. New York: Hasting Center; 2000.
  - 4 Gérvas J. Atención Primaria, de la teoría a la práctica. Cad. Saúde Pública, Rio de Janeiro, 24 Sup 1:S7-S27, 2008. <http://www.equipocesca.org/index.php?s=cadernos>

Legend:

X: Usual health status.

Z: Health problem (biological, social, psychological).

A: Intervention (preventive, diagnostic, therapeutic, rehabilitative).

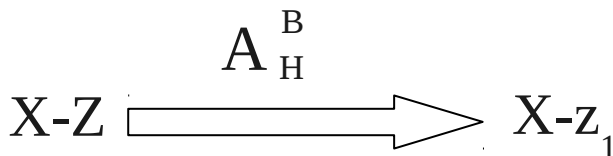
B: Benefits associated with the health intervention.

H: Harms associated with the health intervention.

**Comment:** The usual health status deteriorates with biological, social and/or psychological problems. Health care interventions can reduce the impact of problems, to eliminate them and to restore normality to the patient. But all health activities can cause harms. We can minimize the damage (that H tends to zero) by quaternary prevention. Quaternary prevention has an individual component (in the patient treated) and social one (negative externalities, both as an unnecessary expense for other reasons, such as bacterial resistance in the use of antibiotics).

**Example:** Patient (health X), pneumonia (problem Z), which properly used antibiotics (intervention A), achieves *ad integrum* healing (healing, health X again) without serious damage to individual, maybe a little diarrhea (individual H tends to zero), but in any case contributes to the presence of bacterial resistance (social H tends to  $n$ ). The patient comes to forget the pneumonia, which leaves no trace nor any complication. Someone in the population can be seriously damaged by resistant bacteria.

## SEQUELS AND REHABILITATION



Legend:

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H: Harms associated with the health intervention.

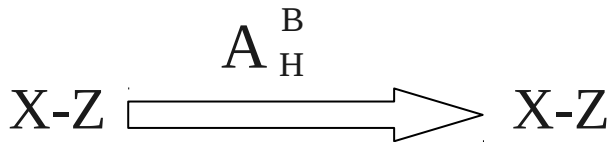
$z_1$ : Sequel, sensible to rehabilitation.

**Comment:** In many occasions we cannot achieve *ad integrum* restoration of health. There are sequelae that require rehabilitation. The individual can be re-integrated into their regular work, but it is damaged. The proper balance between A and H makes a minor sequelae, and where A is enough, you can get the individual to be fully healthy, but at a lower health ( $X-z_1$ ).

**Example:** Patient (health X), appendicitis (problem Z), with appropriate surgery (intervention A), has many harms, as vomiting from anesthesia, and surgical scar (H, individual losses, which we can prevent by quaternary prevention) and perhaps social harms (social harm H that tend to 0 if the

situation is adequately managed and, for example, a patient with ruptured aorta is operated instead of the patient with appendicitis). The patient will always remember the operation, appendicitis, for the scar and may need rehabilitation if the abdominal wall is weakened ( $z_1$  problem). His health will never be X, but a lesser degree ( $X-z_1$ ), which may not prevent normal activities.

### SUPPORT



Legend:

X: Usual health status.

Z: Health problem (biological, social, psychological).

A: Intervention (preventive, diagnostic, therapeutic, rehabilitative).

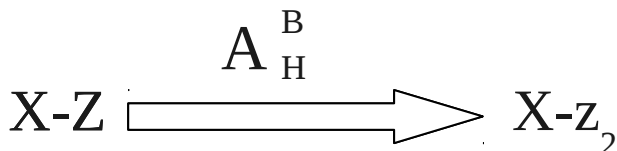
B: Benefits associated with the health intervention.

H: Harms associated with the health intervention.

**Comment:** Many times the problem (Z) has no solution, and persists over time despite the interventions (A). The intervention does not produce harm (H tend to 0). The important thing is to support the patient to ensure that health does not deteriorate further, to stay as is.

**Example:** Patient (health X) with knee osteoarthritis (problem Z), managed with weight control, exercise, rehabilitation and occasional use of anti-inflammatory (intervention A), and other actions to prevent harms (H). Over the years, the health does not worsen, and the situation becomes stable.

### SIDE EFFECTS WITHOUT REHABILITATION



Legend:

X: Usual health status.

Z: Health problem (biological, social, psychological).

A: Intervention (preventive, diagnostic, therapeutic, rehabilitative).

B: Benefits associated with the health intervention.

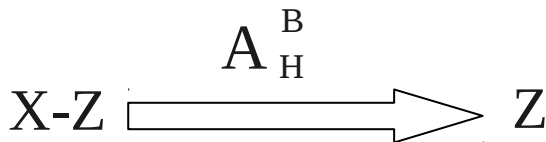
H: Harms associated with the health intervention.

$z_2$ : Health problem as side effect, without any possibility of rehabilitation.

**Comment:** The situation is similar to the previous of sequels and rehabilitation, but here the sequel is not sensitive to rehab. The patient (X) suffers a problem (Z). With the intervention (A) we can change the evolution with some benefits (B), but it produces also some harm (H) that becomes permanent and there are no possibilities of rehabilitation. The damage can be death (and go to the following situation).

**Example:** Patient (health X), with hyperlipidemia (problem Z), treated with statins (intervention A), which has rhabdomyolysis and lost a kidney (harm, H, that leaves a permanent problem  $z_2$ ).

### DEATH



Legend:

X: Usual health status.

Z: Health problem (biological, social, psychological).

A: Intervention (preventive, diagnostic, therapeutic, rehabilitative).

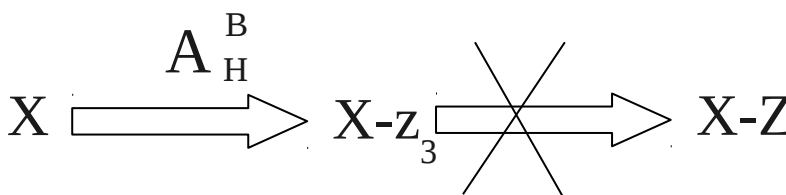
B: Benefits associated with the health intervention.

H: Harms associated with the health intervention.

**Comment:** Sometimes health problems cannot be overcome, and carry death. If death was a not avoidable one, H might tend to 0 with interventions (A) appropriate to the problem (Z) and palliative care in general (good health care can lead to die "healthy"). Health, X, becomes 0 (death).

**Example:** Children (health X) with refractory leukemia (problem Z), subjected to various treatments (interventions A), which cause benefits (benefits B) and harms (harms H), and achieved good clinical care to alleviate symptoms, die in peace (effective quaternary prevention, which reduces the problems of harms, and relieved and allowed a dignified death).

### PREVENTION



Legend:

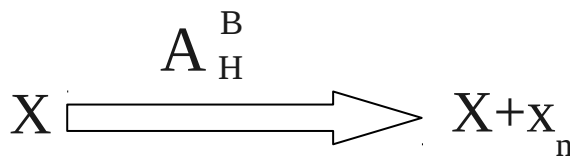
X: Usual health status.

Z: Health problem (biological, social, psychological).  
 A: Intervention (preventive, diagnostic, therapeutic, rehabilitative).  
 B: Benefits associated with the health intervention.  
 H: Harms associated with the health intervention.  
 $z_3$ : Harms as a consequence of preventive activities.

**Comment:** Preventive activities (intervention A) designed to prevent future problems (problem Z), causing minimal damage (damage H, which should tend to 0, but might tend to  $z_3$ ). All medical activities cause harms, prevention in some way means "being sick today ( $z_3$ ) for not being sick tomorrow (Z)". In some cases harms by prevention could leave sequelae, which may require rehabilitation or be unrecoverable.

**Example:** Children (health X), vaccinated (intervention A) against measles (problem Z), which will cause fever and malaise ( $z_3$ ), with a change (benefit B), which involves antibodies in the blood that prevent future measles. The child might have a permanent hearing loss because vaccination ( $z_1$ ), which can be solved with cochlear implant and special education and rehabilitation. If the child has post-vaccinal encephalitis with permanent mental harm ( $z_2$ ) would be the case of adverse effects without rehabilitation.

### HEALTH PROMOTION



Legend:

X: Usual health status.  
 Z: Health problem (biological, social, psychological).  
 A: Intervention (preventive, diagnostic, therapeutic, rehabilitative).  
 B: Benefits associated with the health intervention.  
 H: Harms associated with the health intervention.  
 $x_n$ : Increase health care subsequent to medical/social intervention.

**Commentary:** Health (X) can be increased with various activities, medical and social (A), so some *quantum* of health ( $x_n$ ) are added to health (X) [being the *quantum*,  $x_n$ , the elemental health unit].

**Example:** The elders of Canencia de la Sierra (a little village in the Madrid Sierra) go to Benidorm (at the Mediterranean seaside) with a program of INSERSO, two weeks in February (intervention A). They sunbathe, swim and walk along the seashore and at night they dance. They return to the mountains with the strength ( $x_n$ ) to overcome what remains of winter. One of them forgot her regular treatment for diabetes and had a diabetic coma (harms H); a harm because health prevention ( $z_3$ ).

## HEALTH PROTECTION

The health policy, organization and management of all previous activities and more, when A (activities) is the set of laws, rules and regulations that seek to effectively change the care of health problems and health of individuals and populations with measurable objectives.

**Comment:** Protection of health is a set of non-clinical activity, but can get to the doctor and other health workers in their final application.

**Example:** Legislation, standards and regulations for the mining, processing, handling, transport, use and disposal of radioactive materials. Includes, inter alia, prohibiting the passage through the cities of trucks with radioactive material, regulations for use in medical facilities, and standards for recycling of contaminated metals. Includes also rules for the appropriate use of radiation in diagnosis and treatment, the introduction of individual records for patients to track their "radioactive record" and other measures which required the direct involvement of health professionals.