HACCP-Concept

Synonyms

Hazard analysis and critical control point (HACCP)

Definition

Microbiological, chemical and physical deficiencies in the fabrication, processing and distribution of food are ascertained and dangers are minimized in advance. Therefore, operating procedures have to be analyzed and documented. Thereby the delivery of food to the consumer is more transparent. To achieve ► food safety, the EU order (no. 852/2004) declares that all participants who are involved in food fabrication but also in processing and trade are obligated to self-control.

Haematopoietic Stem Cells

► Hematopoietic Stem Cells

Haemophilus influenza B (Hib) Vaccination

Synonyms

Haemophilus influenza B immunization

Definition

The ► vaccine against Hib was introduced in 1974 in Finland and the United States, and its effectiveness was improved over the following years. In the Federal Republic of Germany, the Hib vaccine has been authorized since 1990. Its rate of protection (90%) and its tolerance are good. From the third month of age, immunization is generally implemented three times as part of the 6-fold vaccination, or twice when no pertussis component is involved, at intervals of at least 4 weeks, followed by a further vaccination after 4–12 months. When vaccination begins after the first year of life, a single inoculation is sufficient to achieve an adequate immune response. Depending on the vaccine administered, the line is drawn between 14 and 18 months of age. Contraindications for the Hib vaccine are acute illness with fever, and a known severe allergic reaction to components of the vaccines or the carrier protein.

Haemopoietic Stem Cells

► Hematopoietic Stem Cells

Hallucination

Definition

Seeing objects or persons (i. e., visual hallucinations) or hearing voices (i. e. auditory hallucinations) when nothing or nobody is actually there.

Hamlet

Synonyms

Village; Small settlement

Definition

Hamlet is defined as a community of people smaller than a village. It may also refer to a settlement smaller than a town.

Hand Hygiene

Definition

Hand hygiene is the most important and basic means of reducing the spread of infections in healthcare settings. Hand hygiene is a general term that applies to hand washing (with plain soap and water), antiseptic hand washing (with water and soap or other detergents containing an antiseptic agent), application of an alcohol-based hand rub (alcohol-containing preparation applied to the hands to reduce the number of viable microorganisms), or surgical hand hygiene/antisepsis (an antiseptic hand wash or antiseptic hand rub undertaken by surgical personnel preoperatively). When healthcare personnel have hands that are visibly dirty, contaminated, or soiled, they should wash with soap and water. Hand rubs should be used when hands are not visibly soiled, to reduce bacterial counts. Hand hygiene is indicated before patient contact, and when donning gloves for the insertion of catheters or other invasive devices that do not require surgery. Hand hygiene is also indicated after any activity or contact that contaminates the hands, including following the removal of gloves.

Handicap

Definition

A handicap is a disadvantage for a given individual, resulting from an impairment or disability, that limits or prevents the fulfillment of a role that is normal, depending on age, sex, social and cultural factors, for that individual.

Cross-References

► Disability
► Impairment and Disability

Hand Surgery

Definition

Hand surgery is the field of medicine that consists of the investigation, preservation, and restoration by medical, surgical, and rehabilitative means of all structures of the upper extremity directly affecting the form and function of the hand and wrist.

Hansen's Disease

► Leprosy

Hanta Fever

Synonyms

Hemorrhagic fever with renal syndrome (HFRS); Nephropathia epidemica (NE); Korean hemorrhagic fever (KHF)

Definition

Hantaviruses are found in rodents, especially in mice and rats. The infection can be transmitted by breathing in contagious particles of feces or by ingestion of contaminated foodstuff. Hantavirus infections appear in Europe, Asia, Africa, North and South America, with the courses of the infection often being milder in Europe. One third of the infections are asymptomatic but in 20–30% a severe form has to be expected, with renal failure, shock and possible death. A vaccine is not available. The most important prophylactic measures are compliance to hygienic rules concerning food (► food safety and fecal-orally transmitted diseases) and the avoidance of contact with rodents.

Haplotype

Definition

A certain combination of ► alleles at a given set of linked genes.

Haplotype Structure

Definition

Haplotype refers to a set of ► alleles that are co-propagated, whether in an entire haploid ► genome or in a designated segment of that genome (such as a particular region of a chromatid). The independent segregation of ► chromosomes together with recombination between sister chromatids during meiosis will

tend to randomize the arrangement of alleles within the genome. Within a population the non random association of alleles at two or more loci is referred to as linkage disequilibrium and is measured by the indices D, D' and r^2.

Hard Tooth Structure

► Hard Tooth Tissue

Hard Tooth Tissue

Synonyms

Hard tooth structure

Definition

Hard tooth tissue comprises the firm substances of the tooth, including dental enamel, dentin, and tooth cement.

Harmful Substance Use

► Substance Abuse

Harmful Use

Definition

A pattern of psychoactive substance use that is causing damage to health. The damage may be physical (as in cases of hepatitis from the self-administration of injected psychoactive substances) or mental (e. g. episodes of depressive disorder secondary to heavy consumption of alcohol). Harmful use and abuse of substances are conceptualized as potential precursors for dependence.

Harmful Use (of Drugs)

► Drug Abuse

Harm Principle

Definition

The harm principle states that one person's freedom should not result in another person's harm (see the "On Liberty" by John Stuart Mill). It has been followed by institutions as an ► ethical principle when applying measures which have overruled the individual ► autonomy and freedom in the name of the common good.

Harvest Bug

► Chiggers (Burrowing Fleas)

Harvest Mite

► Chiggers (Burrowing Fleas)

Hazard

► Source of Potential Harm

Hazard Analysis and Critical Control Points (HACCP)

Definition

The HACCP is a science based and systematic system which identifies specific hazards and measures for their control to ensure the safety of food production and processing. It is used also in catering and retailing. HACCP is a tool to assess hazards and establish control systems that focus on prevention rather than relying mainly on end-product testing. Any HACCP system is capable of accommodating change such as advances in equipment design, processing procedures or technological developments. HACCP can be applied throughout the food chain. The application of HACCP systems can aid inspection by regulatory authorities and promote international trade by increasing confidence in ► food safety.

Cross-References

► HACCP-Concept

Hazard Identification

Definition

Hazard identification evaluates the weight of evidence for adverse effects in humans based on assessment of all available data on health impact and mode of action. It aims to determine the probability that an individual receiving a specific dose of the contaminant (chemical, ► radiation, ► noise, etc.) will develop an adverse effect. This is done, for chemical hazards, by drawing from the results of toxicology, epidemiology and animal studies. For other kinds of ► hazard, engineering or other disciplines are involved. Hazard identification is a first step in the ► risk assessment procedure.

Hazard Information

► Risk Management and Communication

Hazard Management

► Risk Management and Communication

Hazardous Use (of Drugs)

► Drug Abuse

Hazard Preparedness

► Emergency Preparedness

Hazard Ratio

Definition

The hazard ratio is an estimate of the ratio of the hazard rate in the treated versus the control group or between two differently treated groups. In a clinical trial where disease resolution is the endpoint, the hazard ratio indicates the relative likelihood of disease resolution in treated versus control subjects at any given point in time. The hazard ratio, which is derived from the Cox proportional hazards model, provides a statistical test of treatment efficacy and an estimate of relative risk of ► events of interest to clinicians. The hazard ratio may be used for purposes of statistical hypothesis testing and as one indication of amount of benefit (an increase in the odds of healing), but other measures must also be applied to understand the full importance of the study.

Hazard Reduction

► Risk Management and Communication

Hazards

Synonyms

Source of potential harm

Definition

Hazards are biological, chemical or physical agents in, or condition of, food with the potential to cause an adverse health effect. Hazard analysis is the process of collecting and evaluating information on hazards and conditions leading to their presence to decide which are significant for ► food safety and therefore should be addressed in the HACCP plan. Hazards should be minimized to the lowest possible level by the introduction of preventive measures which are applied at a number of control points. Control points which are the most important for the control of hazards and where hazards should be eliminated or lowered as much as possible are called Critical Control Points (► hazard analysis and critical control points (HACCP)). Preventive actions taken at critical control points must be documented as they form part of the documentation of the HACCP system.

Hazards, Natural

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Synonyms

Risk of natural disasters

Definition

Natural hazard – the possibility of occurrence of a potentially damaging natural event.

Basic Characteristics

There are a set of fundamental notions germane to natural hazard, risk, and disaster. Natural hazards can be defined as the possibility of occurrence of a potentially damaging natural event in a given area. Often, the above definition is rendered more quantitative by interpreting the possibility as a probability, or chance of occurrence, of a damaging event within a specified period of time, which can be expressed in per cent. The notion of risk contains the above concept of hazard and the notion of loss/damage/harm to human health (► human health aspects of disasters), property, or the environment. Natural disasters are consequences of a combination of natural hazards and human damage potential and vulnerability (► vulnerability concerns); an earthquake over a desert does not result in a natural disaster because the damage potential is not present.

Natural disasters are determined by the presence of destructive element (e. g. volcanic lava, earthquake force, fire, snow, mud, cold, strong wind, abundant water, or lack of needed water) in vulnerable places with high damage potential. Since the dawn of civilization, natural disasters have jeopardized people and their settlements.

There are several generating mechanisms of natural disasters, such as earthquake, volcano eruption, tsunami, storm, flood, drought, wild fire, landslide, avalanche, extreme heat wave, cold winter weather, blizzard, and meteorite fall. The probability of occurrence of a severe disaster in each of these categories depends on the geographical location.

Disasters are getting more frequent in the more overpopulated world, with busy traffic. In many areas of the world, natural disasters have recently become more destructive, causing material damage of tens of billions of Euros as well as human damage of tens of thousands of fatalities, annually. In particular, catastrophic weather events have exhibited a rapid upward trend: the average annual material damage, in inflation-adjusted monetary units, increased tenfold between the 1950s and the 1990s. A large proportion of the human population is exposed to a traumatic disaster in their lifetime.

Material damage, caused by natural disasters, has been increasing with time for a number of reasons, especially due to increasing ► exposure. For instance, humans have been massively encroaching flood-endangered areas, developing floodplains and coasts, and increasing damage potential by accumulation of population and wealth in flood-prone areas. High vulnerability to flooding accompanies urban squatting. Furthermore, urbanization has adversely influenced the flood hazard in many watersheds. Increase in the amount of impervious areas (roofs, yards, roads, pavements, parking lots, etc), reduction of storage, e. g. by the loss of natural inundation areas (lakes, wetlands, flood plains), deforestation, and regulation of watercourses result in faster and higher maximum river flow (water level) generated by intensive precipitation. Nowadays, less extreme rain (compared with the past) is needed to lead to a serious flooding disaster. In mountainous areas, development extends to hilly slopes, which are endangered by landslide and debris flows triggered by intense rains.

There have been many large natural disasters that have caused immense human and economic damage. Nearly every week, natural disasters occurring somewhere in the "global village" are reported by the media.

Many people have died of hunger caused by drought- and flood-related famines. For example, during and after the 1931 floods in China, the death toll was up to 3.7 million according to some sources (conflicting estimates). Hundreds of thousands of fatalities have been caused by cyclones (e. g. in the Bay of Bengal), tsunamis, and earthquakes. About 500,000 people drowned (and 100,000 went missing) during a coastal storm surge caused by the Bhola cyclone in East Pakistan and Bangladesh in November 1970, while another cyclone killed nearly 140,000 in Bangladesh in April 1991.

The tsunami disaster in December 2004, triggered by an earthquake (Richter magnitude 9.0 to 9.3) in the seabed off the Indonesian island of Sumatra, was unique in encompassing a very large area from Indonesia to

Africa, including numerous resorts packed with foreign Christmas holiday tourists. The number of dead and missing is evaluated as about 230,000, while the number of displaced was nearly 1.7 million. The height of the tsunami waves reached 30 meters. The furthest recorded tsunami-caused death occurred in Port Elisabeth (South Africa), i. e. 8000 km away from the epicenter.

The Great Kantō earthquake devastated Tokyo (Japan) in September 1923, killing 100,000–150,000 people. A more recent Tangshan earthquake in China (July 1976) caused a death toll of over 240,000. On 1 November 1755, an earthquake *cum* resultant fires devastated Lisbon, causing 15,000–40,000 fatalities.

Heat wave events are associated with marked short-term increases in mortality. In August 2003, a heat wave in Western and Central Europe caused between 27,000 and 40,000 excess deaths, while the death toll of a heat wave in the summer of 1980 in the United States (US) was between 1250 and 10,000.

Tens of thousands of people have been killed by single volcanic eruptions, such as the Nevado del Ruiz volcano in Armero, Colombia (November, 1985), with a death toll of 23,000–25,000. A large number of fatalities have been caused by landslides (e. g., 20,000 were killed in Peru in 1970), avalanches (10,000 fatalities in Tirol, Austria, in 1916), and blizzards, with over 300 people killed in one day in November 1950 in the Eastern US.

Disaster events that cause the highest economic losses are not necessarily the main killers. The most costly disaster ever was Hurricane Katrina in the US (August 2005), with – according to some estimates – up to 300 billion US $ in direct damage and 1 trillion US $ in total (i. e. including indirect) damage. Estimates of the death toll vary between 1,600 and 5,000 people. The material damage of the Kobe earthquake (Japan) in January 1995 was about 100 billion US $ (with over 5000 lives lost), while the material damage tag of the 1998 floods in China exceeded 30 billion US $ (and over 3600 fatalities).

According to some definitions, epidemics also belong to the category of natural disasters. It is estimated that in the 14th century, pests and famine killed 75 million people in Europe. In 1918–1919, the (pandemic) epidemic of Spanish flu killed 25–30 million. A more recent, and widely spread, infectious disease is HIV/AIDS, which has considerably challenged public health care systems worldwide. However, epidemics are not considered in the present field material.

Analysis of data for individual destructive flood events worldwide has led to the finding that, in general, the ratio of material losses to number of fatalities grows with the wealth level measured by the GNP per capita of a country. That is, more wealthy countries are more successful in saving lives, while material damages cannot be avoided.

Cross-References

► Human Health Aspects of Disasters
► Vulnerability Concerns

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Hazards, Technological

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Synonyms

Technological risk

Definition

Technological hazard – the possibility of occurrence of a potentially damaging event resulting from application of technology.

Basic Characteristics

The active presence of the rapidly growing population has added new hazard dimensions to the increasingly more crowded world. It is estimated that 7–8% of people who have ever lived on Earth are living right now. A category of disasters that are man-caused has emerged. Furthermore, in many areas, people have become more vulnerable (► vulnerability concerns) to some natural disasters (► hazards, natural).

Man-made disasters can be caused by accidents – unfortunate, undesirable, unplanned, and unforeseen events; which may, or may not, result from carelessness or ignorance. Accidents trigger loss, injury, or death, which are not necessarily due to any fault or misconduct on the part of adversely affected persons.

A technological hazard can be understood as the possibility of occurrence of a potentially damaging event in a given area, resulting from application of technology and capable of harming people, property, or the environment. The above definition can be rendered more quantitative by interpreting the possibility as a probability or chance within a specified period of time, which can be expressed in per cent. The notion of risk includes the above concept of technological hazard and the notion of loss/damage/harm to human health, property, or the environment. Technological hazards may lead to technological accidents when failure or loss occurring through the application of technology, as above, actually occurs.

Man-caused disasters can be classified into a number of categories. Many disasters have been related to human production activities: mining disasters, industrial disasters, chemical accidents, explosion or fire disasters, and nuclear accidents. Numerous man-caused disasters have been related to transport, oil spills, infrastructure failure – e. g. dam breaks, and terrorist attacks. One special category of man-caused disasters is war, which includes the two World Wars in the 20th century, with a legacy of greater than a hundred million victims – dead and wounded – and immense human suffering. Mismanagement-related disasters constitute a special category. The enforcement of the communist system (collectivization of agriculture) can be blamed, at least partly, for large famines in the ex-USSR, killing millions of people.

Technological disasters can be related to objects whose functioning involves the possibility of major hazards, such as chemical plants and nuclear, coal, and oil power production plants, etc.

Chemical accidents are related to introduction of an undesirable substance into the environment. Undesirable contact with noxious substances may cause adverse changes in the physical, chemical, or biological characteristics of the air, water, or land that can harmfully affect properties or the environment, adversely affecting health, survival, or activities of humans or other living organisms. Noxious substances accidentally released into the environment can cause acute or chronic disease or injury to the human body. For instance, heavy metals interfere with the respiration, metabolism, and growth of organisms.

Man-caused environmental disasters may also be linked to refuse, which poses a hazard to the environment or to human health when improperly handled; and can include carcinogenic (adversely transforming cells to replicate and form a malignant tumor), mutagenic, teratogenic, or phytotoxic wastes; wastes harmful to aquatic species; or poisonous wastes.

Nuclear hazard refers to danger to human health or the environment related to harmful effects of ionizing energy. This hazard is connected to the functioning of nuclear power plants or use, storage, and transportation of radioactive materials. In a nuclear power plant, a nuclear disaster may result from a rapid reaction of atomic nuclei, yielding high temperatures and the release of potentially dangerous levels of radioactive materials into the environment. In such an incident, the steel and/or concrete containment chamber that encloses a nuclear reactor may fail and radionuclides could escape into the environment, causing harm to human health and the environment.

A specific class of technological hazards is biohazards, which are related to the possibility of damage via personal, laboratory, and environmental exposure to potentially infectious agents, including applications of genetic techniques in the manufacturing process or in environmental management capable of harming persons, property, or natural resources. Biohazards must be contained in order to reduce the potential exposure of the laboratory workers, people outside of the lab-

oratory, and the environment to potentially infectious agents.

There have been man-caused disasters in the 20th century that have had considerable human health consequences. They include the Bhopal disasterin 1984 (7 thousand fatalities), mercury poisoning in Minamata, Japan, and Itai-itai disease, due to cadmium poisoning, in Japan. Disasters in nuclear power plants – the Three Mile Island and, in particular, Chernobyl accidents – are another category. Among the disastrous oil spills in the last decades were the catastrophes of the tanker ships Amoco Cadiz and Exxon Valdez, and, above all, the oil fires generated by the order of Saddam Hussein in Kuwait during the Gulf War. One of the most widely known man-caused environmental catastrophes, resulting from acute mismanagement of water resources, is the shrinking of the area and the volume of the Aral Sea.

Many catastrophes are related to the movement or collision of vessels, vehicles, or persons along a land, water, air, or space route – ship or ferry, rail, car or bus, and plane or spacecraft disasters. The sinking of the RMS Titanic in April 1912 caused over 1500 fatalities. In Poland, road traffic accidents during a single weekend may kill more people than floods do over decades. Transport disasters are particularly dangerous to the environment when transported goods create hazards (e. g. toxic, ignitable, corrosive, or reactive products or by-products of technological processes).

The terrorist attacks on 11 September 2001 were examples of "innovative" intentional mass killing. Passenger jets with many people on board, fully fuelled, were taken over by terrorists who crashed them against some of the most important buildings in the USA, with very high damage potential. The death toll of the terrorist attack on 9/11 exceeded 3000.

In China, a dam on the River Huang He was blown up in order to stop the Japanese invasion during the World War II. The dam break caused several hundred thousand fatalities. A large mining disaster in Honkeiko (China) in 1942 caused 1549 fatalities, while explosions in Greece in 1856 killed about 4000 people. A large fire in Sandoz works in 1986 caused the inflow of 30 tons of mercury pesticides into the Rhine, which devastated life in the river. In 1989, in Asha, Ufa, and Bashkiria, USSR, over 500 people were killed by explosions and fire caused by leakage in a long distance pipeline and sparks from passing trains.

Cross-References

► Hazards, Natural
► Vulnerability Concerns

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HDM

► House Dust Mites

Head Injury

► Traumatic Brain Injury

Head Lice

Synonyms

Pediculosis capitis

Cross-References

► Infectious Diseases in Pediatrics

Healing

Synonyms

Treatment; Cure

Definition

Healing is defined as any method by which an illness or injury is cured; specifically, the use of a technique which is not recognized within orthodox medicine and involves no form of physical therapy or manipulation. Sometimes prayer, visualization, meditation, or other methods are used by the patient, healer, or both to help focus beneficial thoughts and energy onto the illness.

Although touch may be used to transmit healing energies, some healers claim to be able to treat their patients from a distance. Controlled studies have shown the beneficial effects of positive thoughts and healing energies directed at bacteria, plants, cancer cells, and even animals such as mice.

Health

Synonyms

Well-being; Wellness

Definition

The preamble to the Constitution of the World Health Organization in 1946 defined health as "A state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity". In 1984, this definition was revised and following definition was proposed that condensed to "The extent to which an individual or a group is able to realize aspirations and satisfy needs, and to change or cope with the environment; health is a resource for everyday life, not the objective of living; it is a positive concept, emphasizing social and personal resources as well as physical capabilities". This implies that individuals, families, and communities have some control over many determinants of their health. An alternative definition describes health as "A sustainable state of equilibrium of harmony between humans and their physical, biological and social environments that enables them to coexist indefinitely and to lead a socially and economically productive life."

Health Action Plan

► Health Strategy

Health-Adverse Life Styles

Definition

A health-related, i. e. health-adverse or health-promoting lifestyle, is defined as a collective pattern of behaviors with relevance to health that are based on routine choices people make about food, exercise, drugs, hygiene, safety, relaxation, and so on. This pattern is structured by specific needs, social norms, and constraints. Lifestyles are largely acquired through socialization, and they vary according to culture and social class. Importantly, a health-adverse Western lifestyle characterized by physical inactivity, unhealthy diet, smoking and alcohol consumption, among others, has been adopted more readily by less educated people, accounting for a relevant part of the social gradient of morbidity and mortality.

Health Advocacy

► Advocacy

Health for All

Definition

In 1977, the ► world health assembly decided that the major social goal of governments and WHO should be the attainment by all people of the world by the year 2000 of a level of health that would permit them to lead a socially and economically productive life. In 1981, the Assembly unanimously adopted a Global Strategy for "Health for All" by the Year 2000. Health for All means that resources for health are evenly distributed and that essential health care is accessible to everyone. It also means that health begins in several settings (at home, in schools, and at the workplace) and that people use better approaches for preventing illness and alleviating unavoidable disease and disability. Health for All means that people recognize that ill-health is not inevitable and that they can shape their own lives and the lives of their families, free from the avoidable burden of disease. Although it has been interpreted differently by each country in the light of its social and economic characteristics, the health status and morbidity patterns of its population, and the state of development of its health system, it has provided an aspirational goal, based on the concept of ► equity in health.

Health Anxiety

► Anxiety Disorders
► Hypochondria

Health Behavior

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Introduction

Health can be negatively defined as the absence of disease and injury, sometimes as a normative judgment referring to the average state of most people, and sometimes as a positive concept of well-being. Disability may be distinct form health or, together with health, represent different points on a continuum. From a medical perspective, people are healthy if they are uninjured and free of disease, but a person with risk factors for disease might be considered unhealthy. Health-related behavior is one of the most important elements in people's health and well being. Its has grown as nutrition and sanitation have improved and medicine has advanced. Diseases that were once incurable and fatal can now be prevented or successfully treated, and health behavior has become an important component of public health. The improvement of health behavior is central to public health activities.

► Behavioral patterns play a role in the leading causes of death, including chronic diseases such as heart disease, cancer and stroke. The most common behavioral contributors to mortality or death include the use of alcohol, tobacco, and motor vehicles, diet and activity patterns, sexual behavior and illicit use of drugs. Behaviors such as these contribute to almost half of the deaths in the United States and Northern Europe (McGinnis, Foege 1993) Those who are physically fit and have healthy habits are less likely to develop disability or die prematurely from chronic disease. People with high-quality personal relationships and supportive social networks tend to be more resistant to disease and to recover more quickly than those with poorer social relationships. Several epidemiological studies demonstrate that supportive social relationships reduce the risk of death form cardiovascular disease (Berkman 1995). The magnitude of the effect of social isolation on the risk of cardiovascular disease is comparable to that of elevated serum cholesterol or mild hypertension. Positive psychological states are associated with better coping with severe stress attendant to acquired immune deficiency syndrome (AIDS), cancer or arthritis (Folkmann 1997). Frankl (1992) demonstrated that a sense of purpose in life was associated with a greater likelihood of surviving Nazi concentration camps and psychological recovery from that experience.

A rising interest in preventing disability and death through changes in health behavior has emerged the 80th of the past century; particularly changes in lifestyle habits and participation in screening programs have been focused on. Much of this interest has been stimulated by the change in disease patterns from infectious to chronic diseases as leading causes of death, combined with the aging of the population, rapidly escalating health care costs and data linking individual behaviors to increases risk of morbidity and mortality.

Although there is more information about what constitutes healthy behavior and risk factors than ever before, this information has not always led to healthier behaviors. There have been some positive changes, however. Between 1988 and 1994, the average daily intake of dietary fat in the United States dropped from 36 per cent to 34 per cent of total calories; seat belt use increased from 42 per cent to 67 per cent; and the number of women over the age of forty who had breast examinations and mammographies doubled. Cigarette smoking has decreased among men by as much as 50 per cent in some countries. Unfortunately, during this same period, the number of obese adults rose, sexual activity among adolescents increased, more teenage girls began smoking, and the incidence of HIV (human immunodeficiency virus)/AIDS reached epidemic proportions.

Concepts of Health Behavior

Although the concept of positive health is clearly important, it presents several challenges. First, it is not clear whether positive health is incorporated into other definitions of health-particularly those that include both current function and prognosis. Most of the evidence supporting positive health per se is associated with better outcomes for those with healthy bodies, high-quality personal relationships, a sense of purpose, and high self-regard. Like people who refrain from smoking cigarettes or who have low serum cholesterol, those with positive psychological attributes could stay healthy longer than other people do or adapt better to health challenges.

Second, assessing positive health is difficult. Across cultures, socioeconomic status, and ethnic groups, people rate restrictions in activities associated with health conditions as less desirable than not having such restrictions (Patrick et al. 1985). The requirement to use a wheelchair is consistently rated as less desirable than is being able to walk freely. Such consensus is not evident, however, for attributes associated with good health. For example, there is much greater variability in ratings for the desirability of having a spouse, of participating in community activities, or of other aspects of social affiliation. There is considerable agreement regarding desirable aspects of physical functioning but there is little agreement regarding social components. There is also a difficulty with the definition of positive health. Current approaches regard optimal health as the condition of having no limitations on activity and being free of symptoms. The way in which positive and negative components interact to produce a given health status has not yet been described. There are many questions about health related behavior, or health behavior that are not yet well understood.

Health behavior encompasses a large field of study that cuts across various fields, including psychology, education, sociology, public health, epidemiology and anthropology. In the broadest sense health behavior refers to the actions of individuals, groups and organizations as well as their determinants, correlates and consequences, of these actions which include social change, policy development and implementation, improved scoping skills and enhanced quality of life. This is close to the concept introduced by David Gochman (1997) which includes not only observable, overt actions but also the mental events and emotional states that can be reported and measured. Gochman defined health behavior as those personal attributes such as beliefs, expectations, motives, values, perceptions and other cognitive elements; personality characteristics including affective and emotional states and traits; and overt ► behavioral patterns, actions and habits that relate to health maintenance, to health restoration and to health improvement. Interestingly, this concept of health behavior emphasizes the actions and the health of individuals. By contrast, a public health perspective is concerned with individuals as part of a larger community. These perspectives are interrelated, as the behaviors of individuals determine many of the social conditions that affect all people's health.

Categories of Health Behavior

Gochman's definition of health behavior is consistent with the concept of specific categories of overt health behavior proposed by Kasl and Cobb (1996). Kasl and Cobb define three categories of health behavior:

1. Preventive health behavior involves any activity undertaken by individuals who believe themselves to be healthy for the purpose of preventing or detecting illness in a asymptomatic state. This may include wearing a helmet when riding a bicycle, using seat belts, or wearing a condom during sexual activity.
2. Illness behavior is any activity undertaken by individual who perceive themselves to be ill for the purpose of defining their state of health, and discovering a suitable remedy.
3. Sick-role behavior involves any activity undertaken by those who consider themselves to be ill for the purpose of getting well. It includes receiving treatment from medical providers and involves a range of dependent behaviors, and leads to some degree of exemption from one's daily duties.

The classic categories and definitions have been well established. However, there is some degree of overlap between them and there are also several categories of behavior that need specific definitions.

Behavior versus lifestyle. Health behavior can be something that is done once, or something that is done periodically – i. e. getting immunization or a flu shot. It can also be something that one does only to oneself, i. e. putting on sun screen, or a behavior that affects others, like putting up a shade cover in order to protect children in a playground from the sun. Other health behaviors are actions that are performed over a long period of time, such as eating a healthful diet, getting regular physical activity, and avoiding tobacco use. These latter types of behavior are sustained patterns of complex behavior that are named lifestyle behaviors. A composite of various healthful behaviors is often referred to as health lifestyle.

Self-care behavior. Self care behavior, a key concept in health promotion, involves taking actions to improve or preserve one's health. Self-care is often thought of in terms as prevention or self-treatment of definable health problems. Examples of self-care behaviors include seeking information (i. e. searching in the internet, attending classes, joining a self-help group), exercising, consulting a doctor regularly, getting more rest,

lifestyle changes, monitoring vital signs, and seeking advice through lay and alternative networks (Wagner and co-workers 2005). An important feature of self-care behavior is that it involves active participation in the health care process. Studies report that 80 to 95% of all health problems are managed at home through self-care and that most people who consult a physician have tried to treat themselves before seeking medical advice (Dean 1986). The seriousness of the health problem and the extent and type of disability, including its affect on daily activities, are the best determinants of whether an individual uses self-care practices or seeks help from a professional. In one study of older persons Norburn and co-workers (1995) observed that race, gender, education, place of residence, and socioeconomic status did not significantly influence self-care behavior. Persons with chronic health conditions often become more knowledgeable about their conditions than the average health care professional, and they frequently participate in group or community self-care educational and support programs.

Health care utilization behavior. Health care utilization behavior is a continuum that ranges from using preventive services, such as getting immunization or early detection and screening tests, to elective surgery or involuntary hospitalization after an injury. The study of trends in health care utilization provides important information on this behavior and may spotlight areas that may warrant future in-depth studies because of potential disparities in access to, or quality of, care. Health care utilization also has evolved as the population's need for care has changed over time. Some factors that influence health care utilization behavior include aging, sociodemographic population shifts, and changes in the prevalence and incidence of different diseases. As the prevalence of chronic conditions increases, for example, residential and community-based health-related services have emerged that are designed to minimize loss of function and to keep people out of institutional settings. New and emerging technologies, including drugs, devices, procedures, tests and imaging machinery have changed patterns of care and sites were care is provided. Multiple forces determine how much health care people use, the types of health care they use, and the timing of that care. Some forces encourage more utilization; others deter it. For example, antibiotics and public health initiatives have dramatically reduced the need for people to receive health care for many infectious diseases, even though overuse can also increase antibiotic resistant strains. Aging is associated with increased health care utilization (Mathers 1999).

Dietary behavior. Recent years have seen an epidemic in obesity in the United States and European countries (Mokdad et al. 1999, Prugger, Keil 2007). Although genetic factors are important diet contributes significantly to maintenance of appropriate body weight. The contribution of inactivity and detrimental dietary patterns has been ranked as the second leading factor contributing to mortality in the United States (McGinnis, Foege 1993). Studies show that dietary factors are associated with 4 of the 10 leading causes of death, including coronary heart disease, stroke, some forms of cancer and non-insulin dependent diabetes mellitus (CDC 1997, USDHHS 2000). Recommendations for healthful dietary behavior include limiting consumption of high-fat foods, having a high intake of fruit and vegetables, increasing fibre, and controlling calorie intake to prevent obesity. Although most American and Europeans know about the health consequences of unhealthful diets, many of the public health goals for dietary behavior have not been met. Dietary behaviors play a role in preventing or managing disease when they are sustained over the long term. Behavioral considerations are key to any attempts to promote healthful dietary behavior. Several core issues about dietary behavior have been recognized. First, most diet-related risk factors are asymptomatic and do not present immediate or dramatic symptoms. Second, health-enhancing dietary changes require qualitative change, not just changes in the amount of food consumed. Third, both the act of making changes and self-monitoring dietary behaviors require knowledge about foods. Thus, information acquisition and processing may be more complex for dietary change than for other changes in health behavior i. e. smoking and exercise.

Substance-use behavior. Substance-use behavior focuses on the use of both licit and illicit mood-altering substances. This category of substances, typically referred to as drugs includes tobacco, alcohol, marijuana, cocaine, heroin, amphetamine-derivates and prescription medications taken improperly. Substance abuse which occurs when substance use behavior is at an extreme and harmful level is often associated with addiction. There is widespread agreement in the public health and medical communities that both cigarette-

smoking and alcohol consumption are the biggest external (non-genetic) contributors to death in the United States: tobacco-related diseases account for more than 400,000 deaths amongst adults per year and approximately 100,000 deaths are related to alcohol consumption in each year (CDC 1995, USDHHS 2000). Compared with other threats to human health, alcohol causes the widest variety of injures (Rose 1992). By the first grade, or earlier, children show temperament and behavior traits that are predictors of their inclination to use and abuse alcohol and drugs in their teenage and adult years. Brook (1992) and Hops (1990) have identified not only childhood risk factors and behaviors that predict drug and alcohol abuse potential but also protective factors that may shield children from influences to use drugs.

Sexual behavior. Sexual relationships and practices are complex to investigate, but their study is important because infectious disease has always been a possible outcome of sexual relationships, as has unwanted pregnancy. Both are crucial public health issues. Concern about AIDS has been an important motivation for recent studies of sexual behaviors, including a large survey of sexual behaviors and attitudes (Laumann 1994). Most of the issues that arise in relating sexual behavior to risk of infection with the human immunodeficiency virus (HIV) pertain to many other, more common, sexually transmitted infections such as human papilloma virus, gonorrhoea, chlamydia, and genital herpes, which vary in the severity of their consequences. By contrast, HIV has made unsafe sex a matter of life and death. Behavioral means for prevention of sexually transmitted infections include delaying the onset of sexual activity, limiting the number of partners, abstaining from sex with people not known to be infection free, and using effective barrier contraception. Community-focused interventions also are useful in reducing sexually transmitted infections. Such interventions generally aim to change behavioral norms. Mass media campaigns have used reinforcing messages to increase knowledge about HIV infection and ways to prevent it. Because only a small percentage of adolescents receive any prevention information from parents, and because for most teenagers schools are the main source of information about sexually transmitted infections, school-based interventions can be significant in motivating young people to modify their behaviors (American Social Health Association 1996).

Models of Health Behavior

The best way to design programs to achieve positive changes in health behavior is to explore why people behave as they do and what might motivate them to change. Theories of health behavior (► health behavior, theories) can be useful during the various stages of planning, implementing, and evaluating interventions. Growing evidence suggests that effective programs to change individual health behavior require a multifaceted approach to helping people adopt, change and maintain behaviors. For example, strategies for establishing healthy eating habits in children and adolescents might be quite ineffective for changing maladaptive eating behaviors – that is, when they are used to substitute one pattern for another – in the same population (Jeffrey and co-workers 2000). Similarly maintaining a particular behavior over time might require different strategies than will establishing that behavior in the first place. Models of behavior change have been developed to guide strategies to promote healthy behaviors and facilitate effective adaptation to and coping with illness. The stages of change model concern an individual's readiness to change unhealthful behaviors. Its basic premise is that behavior change is a process and not an event, and that individuals are at varying levels of motivation, or readiness to change. This means that people at different points in the process of change can benefit from different programs for change, and the programs work best if matched to their stage of readiness.

Social relationships can be described by three aspects. First, social integration refers to basic quantitative features of social relationships such as the number of active relationships and frequency of contacts. Second, mostly conceptualized very close to integration, social networks can be defined as person-centered webs of social relationships; characteristics of such networks are elaborate measures such as their reciprocity, intensity, complexity, and density. Finally, a third aspect of social relationships has been termed functional or relational content, thus essentially referring to their quality. Three specific sub-dimensions in terms of different kinds of social processes are distinguished: regulation and control, demands and conflicts, and support. As noted, particularly the latter has been a focus in research on health and health behavior. Establishing a closer link with basic behavioral science promises to provide important directions for the continued development of

health-related behavior interventions. One important example of a model that attempts to integrate individual psychological processes with contextual factors is Social-Action Theory. It views the person as influenced by environmental contexts or settings to which he or she brings a particular temperament and biological context. Thus, a person's capacity to practice healthy eating habits and to exercise is influenced by access to health-enhancing foods and safe places to exercise and by internal goal structures, self-efficacy beliefs, and problem-solving skills. In Social-Action Theory, biology and social environmental contexts determine the success of interventions to promote individual behavior change. Social-Action Theory specifies mediating mechanisms that link organizational structures to personal health. It provides a framework for multilevel approaches to health promotion and illness prevention. It offers a theoretical rationale for intervening in health policy and for creating environments that are conducive to self-protective choices. Social-Action Theory provides an approach for defining public health goals and modifiable social and personal influences that can be used to encourage individual health behavior change. It fosters interdisciplinary collaborations by incorporating and coordinating the perspectives of the biological, epidemiologic, social, and behavioral sciences. Like other models Social-Action Theory underscores the long-term nature of the process of altering health behavior, and of the need to make a detailed behavioral diagnosis for each person and to tailor interventions to match his or her current stage of readiness to change.

Summary

The impact of behavior on health is enormous. In the early eighties of the past century the US Department of Health and Human Services compared the estimated contributions of various determinants of mortality and morbidity on the ten leading causes of death in the US, showing that individual lifestyle accounted for more than 50 per cent of the overall contribution (Badura 1994). The European Commission (EC 1998) has reported that approximately 80 per cent of death among European citizens aged 35 to 64 are due to cancer, cardiovascular diseases, accidents and suicides, thus underlining the significance of behavioral factors known to be contributing to these diseases and causes of death. Given this epidemiological situation, health psychology understandably has a major focus on behaviors that lead or contribute to health and illness. Healthcare professionals, community leaders, and policy try to understand interactions between health and behavior and to make that knowledge useful to improve the health status of individuals and populations. Health and behavior are related in various ways, yet those interactions are neither simple nor straight-forward. Given the wide acknowledgment that cigarette smoking is linked to a variety of deadly diseases, for example, it has to be questioned for which reason people smoke. And given equally convincing evidence connecting excess weight with cardiovascular disease and other health problems it has to be questioned for which reasons so many people are far above their optimal weight. It is not clear whether such unhealthy behavior indicates a simple lack of willpower. It is still being under investigation how social environment influences these behaviors. It is not understood how stress makes people sick. The present synopsis reviews available information about links between health and behavior, about the influence of social environment on these behaviors, and about interventions to improve health by means of modifying behavior or personal relationships.

Cross-References

- ► Behavioral Patterns
- ► Health Behavior, Theories

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Health Behavior, Theories

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Synonyms

Theories of health behavior; Models of behavior change

Definition

Models of behavior change have been developed to guide strategies to promote healthy behaviors and facilitate effective adaptation to and coping with illness. The corresponding theories focus on a range of factors influencing behavior determinants, including facts within an individual (such as thoughts, feelings and beliefs), factors in groups or relationships, and factors that exist in organizations and communities (such as structures, regulations, policies and laws). The concept of community itself has been defined repeatedly. Most of these definitions include two basic features: locality and quality, or structure and function. Structure refers to an area with geographic boundaries. Function describes shared values, norms, communication, and helping patterns. This function is also the major operating force in community psychology interventions.

Basic Characteristics

Many theories that have been developed in health psychology to explain health-related behaviors emphasize individual cognitions, thoughts or beliefs. These theories can be named social-cognition models (Conner and Normann 1998). Prominent examples are the ► health belief model (Rosenstock 1974), the theory of reasoned action (► reasoned action theory) (Ajzen and Fishbein 1980), the theory of planned behavior (► planned behavior theory), ► protection motivation theory (Conner and Normann 1996), ► health locus of control and self-efficacy theory (Sanders 1982). Other models include the model of health promotion behavior, the ► transtheoretical model of change, the model of conditioning (► conditioning model), the ► cognitive social learning theory, ► self-regulation, the theory of trying, the precaution adoption process model, the ► social action theory, and the health action process approach (Schwarzer 1996). Self-efficacy is a concept, which is most widely, acknowledged across these theories (O'Leary 1985). It has been applied to diverse areas such as school achievement, mental and physical health, career choice and socio-political change

(Wagner and Kirch 2006). Self-efficacy has become a key variable in clinical, educational, social, developmental, health and personality psychology. By means of the self-system, individuals exercise control over their thoughts, feelings and actions. Among the beliefs with which an individual evaluates the control over his/her actions and environment, self-efficacy beliefs are the most influential arbiter of activity. Self-efficacy is constructed on the basis of the four most influential sources: enactive attainment, vicarious experience, verbal persuasion and physiological as well as emotional factors. It plays a central role in the cognitive regulation of motivation, because people regulate the level and the distribution of effort they will expend in accordance with the effects they are expecting from their actions. While outcome expectancies refer to the perception of the possible consequences of one' s action, perceived self-efficacy pertains to personal action control (Bandura 1992). A person who believes in being able to cause an event can conduct a more active and self-determined life-course. Self-efficacy reflects the belief in being able to cope with challenges by means of adaptive action. It can also be regarded as an optimistic view of one's capacity to deal with stress. A low sense of self-efficacy is often associated with feelings of depression, anxiety and helplessness. People with low self-efficacy levels often have pessimistic thoughts about their accomplishments and personal development. In order to initiate and maintain health behaviors, it is necessary to believe that one has the capability to perform the required behavior. Therefore, the likelihood that people will adopt a valued health behavior (i. e. physical exercise) or quit a detrimental habit (i. e. smoking) depends on the level of self-efficacy.

Cross-References

- ► Cognitive Social Learning
- ► Conditioning Model
- ► Health Belief Model
- ► Health Locus of Control
- ► Planned Behavior Theory
- ► Protection Motivation Theory
- ► Reasoned Action Theory
- ► Self Regulation
- ► Social Action Theory
- ► Transtheoretical Model

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Health Belief

► Oral Health Behavior

Health Belief Model

Definition

The Health Belief Model was developed in the 1950s in the U.S. Public Health Service. It is still used as an assessment tool to understand why persons participate in programs for the prevention or detection of diseases (e. g. being immunized against the flu). The original model encompassed five concepts; self-efficacy was added for modern applications. Perceived susceptibility is defined as the subjective opinion about the chances of contracting a condition; perceived severity is the subjective opinion of how serious a condition and its consequences might be if untreated. Perceived benefits means the opinion of the effectiveness of various available actions in reducing the problem, and perceived barriers are the potentially negative aspects of a health action, e. g. side effects or costs. Cues to action might be an environmental event or a bodily trigger. Self-efficacy is defined as the person's confidence in performing a particular behavior successfully.

Health of Boys and Men

► Men's Health

Health Campaigns

Synonyms

Health promotion; Prevention

Definition

Health campaigns refer to various activities aimed at promotion of healthy lifestyle and prevention of health risk factors such as smoking, poor diet habits, sedentary lifestyle, etc. They include activities such as preparation and dissemination of culturally appropriate health materials in native languages, inclusion of indigenous health practitioners in health promotion activities, and also promotion of mutual learning, capacity building and sharing information through workshops.

Health Care

Synonyms

Health maintenance; Health protection; Medical management; Preventive medicine; Medical services

Definition

Health care refers to the prevention, treatment, and management of illness and the protection of mental and physical ► well-being through the services provided by the medical nursing, and allied health professions. The organized provision of such services may constitute a ► health care system.

There are many ways of providing health care in the modern world. The most common way is face-to-face delivery, where care provider and patient meet personally. This is practice in general medicine in most countries. However, with modern telecommunications technology, it is becoming more common that practitioner and patient communicate over the phone, video conferencing, the internet, email, text messages, or any other form of non-face-to-face communication. The characteristics of a health care system have significant effect on the way medical care is delivered.

Cross-References

► Health Care Services

Health Care Access

Synonyms

Health care availability

Definition

Health care access refers to availability and accessibility of ► health care services in terms of proximity of health care services, infrastructure of ► health care delivery, number of ► health care professionals providing medical services, medical insurance. There is a vast discrepancy between access to health care and ► public health initiatives between developed nations and developing nations. In the developing world, many ► public health infrastructures are still forming. There may not be enough trained health workers or monetary resources to provide even a basic level of medical care and disease prevention. As a result, a large majority of disease and ► mortality in the developing world results from and contributes to extreme poverty.

Cross-References

► Health Determinants, Economic

Health Care Availability

► Health Care Access

Health Care Costs

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Synonyms

Health care expenditures; Expenditures on health care

Definition

Health care costs are the sum of both public and private expenditures spent on health care services in a given country at a given time. The variation in health care costs between countries is substantial. The main drivers of health care costs are non-demographic factors such as national income, relative prices, and technology.

Basic Characteristics

Health Care Costs: International Comparisons

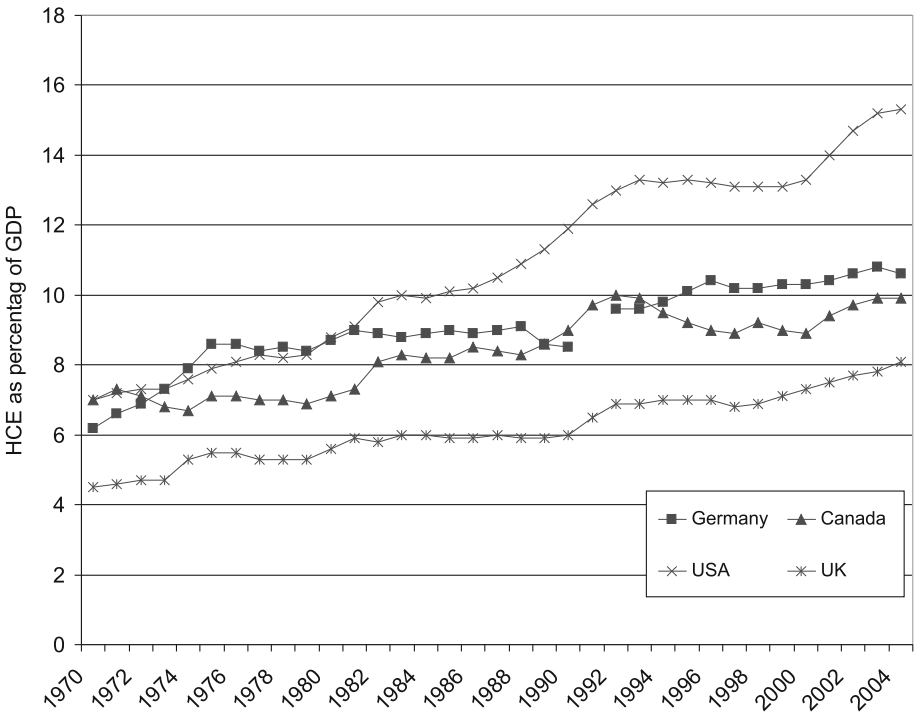
From a macroeconomic point of view, the sum of health care costs is the sum of both public (taxes, social insurance) and private (private insurance, out-of-pocket payments) expenditures spent on health care services in a given country at a given time. The Organizations for Economic Co-Operation and Development (OECD) has developed a methodology to standardize health care expenditures and to make them comparable across member countries (OECD 2005). Health care costs are either measured per capita in US$ PPP (► purchasing power parity) or as a share of ► gross domestic product. Figure 1 shows the development of health care expenditures as a share of GDP over time for four selected countries.

The variation in health care spending between countries is substantial and is mostly determined by the wealth of individual countries – measured in GDP per capita, the outliers being the United States (way below the regression line in the upper right hand quadrant), Luxemburg (way above the regression line in the upper right hand quadrant) (see Fig. 2). Moreover, differences in health care costs also originate from different approaches toward health care system design such as ► health financing and remuneration of health care providers (► regulatory mechanisms).

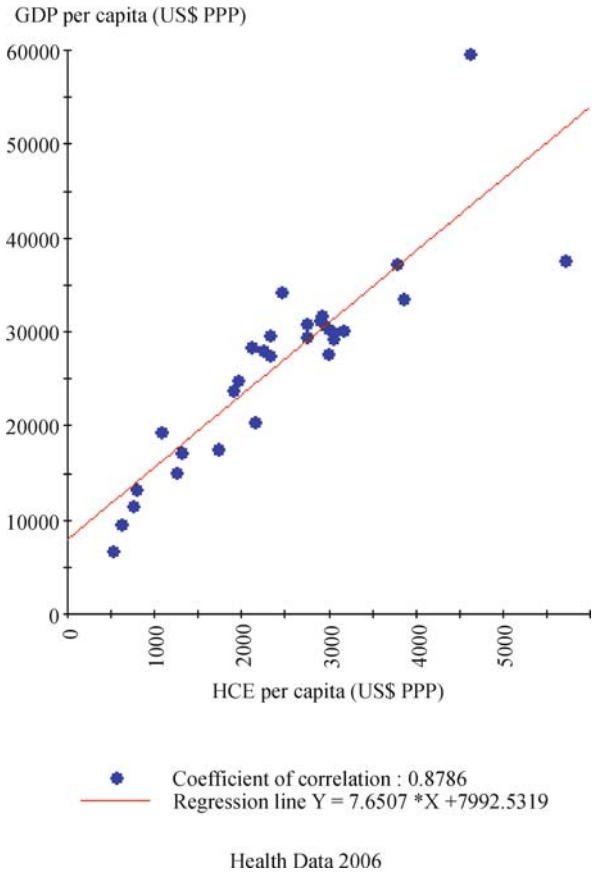
Drivers of Health Care Costs

Policy makers are concerned about the pressure that rising health care costs are putting on publicly financed health care systems. As a consequence, projections about the future trends of health care costs have been developed both nationally and internationally. In order to project future trends, the main drivers of health care costs need to be identified. These can be distinguished as demographic and non-demographic factors (OECD 2006).

Demographic factors originate from the tendency that population ageing – i. e. a rising share of older age groups in the population as a consequence of increased



Health Care Costs, Figure 1
Health care expenditures as a share of GDP in the United States, Canada, the United Kingdom and Germany 1970–2004. Source: OECD Health Data, October 2006



Health Care Costs, Figure 2 Health care expenditures per capita and gross domestic product per capita. Source: OECD Health Data, October 2006

life expectancy – will induce upward pressure on health care costs, since health care costs increase with age. This is true if an increase in longevity increases the number of years lived in bad health (► expansion of morbidity); however, there is at least one major factor that alleviates this tendency. Health care costs are concentrated at the end of life. If increased life expectancy means that more individuals live longer and die later, pressure on health care costs will be lower than expected (► compression of morbidity). In other words, if longevity gains translate into more years of► "healthy ageing", there is no reason to identify population ageing as a major driver of costs in health care (OECD 2006). As a consequence, projections which identify population ageing as a major driver of health care costs will overestimate the growth of health care costs (Stearns and Norton 2004). Empirical evidence on the question whether "healthy ageing" or "unhealthy ageing" is prevailing points to the hypothesis that non-demographic factors are the main drivers of health care costs. Several empirical studies have found that the impact of population ageing on health care costs is rather limited if proximity to death is controlled for – with the possible exception of long-term care, in which circumstance "unhealthy ageing" matters (Zweifel et al. 2004; Werblow et al. 2007).

Health Care Costs, Table 1 Decomposing growth of public health care spending, 1981–2002

	Health Spending	Age Effect	Income Effect	Residual
Canada	2.6	0.4	1.7	0.6
Germany	2.2	0.2	1.2	1.0
United Kingdom	3.4	0.2	2.3	1.0
United States	4.7	0.1	2.0	2.6

Source: (OECD 2006)

As a consequence of the rather weak link between population ageing and health care costs, other – non-demographic – factors need to be considered as the key drivers of health care costs. These factors include growth of national income, since health care costs tend to grow as national income goes up (see Fig. 2). However, even after controlling for demographic factors and growth of national income, a "residual" growth in health care costs remains. The residuum can mostly be explained by technology and a growth of relative prices (OECD 2006). Table 1 shows a decomposition of public spending growth per capita for selected OECD-countries.

Cross-References

► Compression of Morbidity
► Expansion of Morbidity
► Gross Domestic Product
► Health Financing
► Healthy Ageing
► Purchasing Power Parity
► Regulatory Mechanisms

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Health Care Delivery

Definition

Medical care delivery
Health care delivery is aimed at prevention and treatment of disease through health care system. It is classified into primary, secondary and tertiary care.
Primary care medical services are provided by physicians or other health professionals who have the first contact with patient seeking treatment or care. It is organized in medical office's, nursing homes, schools, home visits. It also includes preventive care and health education.
Secondary care medical services are provided by medical specialists in their offices at clinics or hospitals. Patients are referred to them by primary ► health care provider who first diagnosed or treated patient.
Tertiary care medical services are provided by specialist hospitals or regional centers equipped with diagnostic and treatment facilities not generally available in secondary care medical services.

Health Care Differences

► Health Care Disparities

Health Care Disparities

Synonyms

Health care differences

Definition

Health disparities are defined as population-specific differences in the presence of illness, health outcomes or access to health care. Health disparities refer to gaps in the quality of health and health care across racial and ethnic groups. There is evidence for higher incidence of chronic diseases (such as diabetes, cardiovascular diseases, etc.), higher ► mortality and poorer health outcomes among minority populations (or indigenous populations in nation-states).

Health Care Education

► Health Care Profession

Health Care Expenditures

► Health Care Costs

Health Care Facility

Synonyms

Medical building; Health facility

Definition

Health care facility is defined as a building with the necessary medical equipment and health care professionals aimed at practicing medicine.

Health Care Financing

► Health Financing

Health Care Funding

► Models of Finance

Health Care Industry

► Health Care Profession

Health Care Informatics

► Medical Informatics

Healthcare Information System

► Health Information System

Health Care Plan (US)

Synonyms

Health insurance

Definition

Health care plan in the United States means health insurance. Health care plans cover the risk of illness or injury of an individual through the insurance principle. They may be privately financed and administered through insurance premiums and private insurance companies or publicly administered by the state and financed through public funds such as ► medicare and ► medicaid.

Health Care Policy

► Family Health Policy

Health Care Profession

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Synonyms

Health care industry; Pharmaceutical industry; Health care education

Definition

The health care profession comprises all persons who provide services aiming at the preservation or improvement of the health of individuals or the treatment or care of individuals who are injured, sick or disabled. In a very broad definition, all individuals that participate in some way in the delivery of health care are part of the health care profession. The contemporary health care profession is more and more characterized by a group of highly trained professionals providing their services as an interdisciplinary team.

Basic Characteristics

Background

The health care industry is one of the world's largest industries with still significant growth rates. It consumes about 9% of the gross domestic product (GDP) of the OECD countries compared to nearly 7% in 1990 and 5% in 1970. Health care thus forms an enormous part of a country's economy. The United States has the highest share of health care costs related to GDP in the world with 15.3%. The USA is followed by Switzerland with 11.6%, France with 11.1% and Germany with 10.7% share of health care costs related to GDP. Per capita health spend in the OECD countries has in average increased by more than 80% in real terms between 1990 and 2005 compared to only 37% growth in GDP per capita.

Medical Profession

The medical profession holds the most important position within the health professions. The physician forms the central part of the medical profession. Whereas in the United States, the term physician is commonly used, other countries like the UK, Canada, Australia, Germany or Japan usually use the term doctor. In these countries, a physician often refers to specialists in ► internal medicine. In all developed countries, the studies of medicine are offered by a ► medical school belonging to a university. The entry-level medical education programs are tertiary-level courses that are often followed by a period of supervised practice before full registration is granted. Physicians need government permission to practice in most countries, which is known as licensing in the United States, approbation in Germany or registration in the UK.

The general practitioner (GP) or family physician (FP) is a physician who is mainly responsible for providing comprehensive health care to every individual seeking medical care which is summarized as primary care. The GP acts as a generalist and accepts every patient be it for the treatment of acute and chronic illnesses or the provision of preventive care and ► health education for all ages and both sexes. The medical specialists on the other hand limit access to their services based on age, sex and/or diagnosis. They specialize in a certain field of medicine and go through additional training. Usually general practitioners act as gatekeepers. They see the patient first and if necessary refer them to the respective specialist.

According to the OECD, the number of doctors in OECD countries has increased significantly by 35% between 1990 and 2005 to 2.8 million. This growth was predominantly driven by an up to nearly 50% growth of specialists compared to a 20% increase in general practitioners (GPs). In most OECD countries, there are now more specialists than general practitioners. With regard to income levels, the specialists earn more than the GPs in most OECD countries which is one reason for the greater increase of specialists in recent years. There are, furthermore, large variations when it comes to numbers of doctors per capita. As of 2005, in the OECD countries, this number ranges from around 4 doctors per 1000 population in Belgium, Italy, Spain and Switzerland to below 2 doctors in Mexico, Turkey and Korea. Overall, this ratio of practicing doctors per 1000 population has grown in almost all OECD countries between 1990 and 2005. However, this growth was lower than in the 15 years before, mainly driven by the introduction of cost-containment measures in many countries.

Nursing Profession

The nursing profession consists of people responsible for the treatment, safety, and recovery of acutely or chronically ill or injured people. Nurses also support the health maintenance of healthy individuals and the treatment of life-threatening emergencies. Nursing education and career structure differs widely throughout the world. In general, there are in most cases several different levels of nurses that are distinguished by increasing education, responsibility, skills and experience. Besides the clinical activities, nurses might also participate in medical and nursing research as well as the execution of non-clinical functions that are part of the health care delivery. The nursing profession forms the largest group of providers within the health care system and they are still predominantly female. The number of practicing nurses per 1000 population in the OECD countries again differs widely. The countries with the highest density of nurses are Ireland, the Netherlands and Norway with about 15 nurses per 1000 population compared to the countries like Mexico, Korean and Turkey with only about 2 nurses per 1000 population which is only slightly higher than the density of doctors in these countries.

Pharmaceutical Profession

The pharmaceutical industry in general has the two functions of research and development (R&D) and manufacturing. Most pharmaceutical companies are engaged in both functions, some specialize in either R&D or manufacturing. Most of the drug producers are large multinational companies that serve the three largest markets in the world, the United States, Europe, and Japan. Within the pharmaceutical industry, all different health care professions are found as the large drug manufacturers employ individuals with different educational backgrounds like medicine, pharmaceutics, chemistry, bio-chemistry, etc. Spending on pharmaceuticals and other medical non-durables accounts for a significant share of the total expenditure on health in most developed countries. For the OECD countries, this percentage ranges from around 9% in Norway, Denmark and Luxembourg to around 30% in the Slovak Republic, Poland and Hungary. In Germany, pharmaceutical expenditure accounts for 15% of total health expenditure compared to 12% in the United States.

The drugs prescribed by the physicians are distributed by pharmacists in pharmacies that might be either dedicated premises or part of a retail drugstore or chemist. The pharmacists furthermore provide advice on the selection, dosage, interactions and ► side effects of the medication. They also offer detailed information about ► over-the-counter drugs that do not require a prescription by a physician. Some pharmacist offer more and more public health related services: giving advice about diet and exercise, participating in health promotion campaigns, providing advice on complimentary medicine. As mentioned above, pharmacists increasingly pursue non-traditional pharmacy work. Some phar-

macists work as employees of pharmaceutical companies where they are engaged in research and development or marketing and sales or they work for health insurance companies where they develop pharmacy benefit packages and carry out cost-benefit analyses on certain drugs. Other pharmacists work for governmental institutions or pharmacy associations. Finally, pharmacists engage in academic work either as teachers or researchers.

Allied Health Professions

The term allied health profession is used to describe all those people who are not covered by the medical profession, the nursing profession and the pharmaceutical profession but still are part of the health care system and contribute to its function. Allied health professionals are characterized by a formal education and/or clinical training credited through an official certification, registration or licensure. They usually collaborate with physicians and/or other members of the health care system to support a high quality delivery of patient care, be it identification, prevention, or treatment of diseases, disabilities and disorders. There are numerous professions that are encapsulated in the allied health professions, e. g. electrocardiographic technicians, nutritionists and dieteticians, occupational therapists, kinesiotherapist, and speech therapists.

Conclusion

An increase in medical and health care expenditures can be observed on a global level. In many countries, this has resulted in shifting patients away from hospital treatment to outpatient treatment in physicians' private and group practices or ambulatory hospital settings. This is in line with an increasing demand for specifically trained specialist physicians as reflected in the significant growth rates of the last 15 years. Despite this trend, the general practitioner's role remains key to the health care system and some countries, like Germany, have even changed their legislation and increased incentives to prevent patients going directly to the more expensive specialists. This gate keeper role of the GP, already established in the Anglo-American countries, is expected to be further enforced in the future in other countries to mitigate against the growth of the direct use of specialists. The growing importance of public health related topics, especially prevention and care of the chronically ill, will further strengthen the role of the general practitioner as well as the demand for nursing and other services offered by the allied health professions.

Cross-References

- ▶ Health Education
- ▶ Internal Medicine
- ▶ Medical School
- ▶ Over-the-Counter Drugs
- ▶ Side Effect

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Health Care Professionals

Synonyms

Persons providing medical treatment and care; Medical staff

Definition

▶ Health care professionals are people working in health sector providing health care in terms of preventive and curative services in different types of medical and even non-medical institutions.

Health Care Provider

Synonyms

Health professional; Caregiver

Definition

► Health care provider is defined as a person who helps in identifying or preventing or treating illness or disability. Health care providers are physicians, nurses, pharmacists, etc.

Healthcare Providers

Definition

Healthcare providers are persons who provide health care as part of their job responsibilities. In the purest sense, healthcare providers work for emergency medical services, hospitals, medical clinics, etc., but a child-care worker or employee who is required to provide emergency care in any business may be deemed a healthcare provider in his or her employment setting. Normally, a healthcare provider is a doctor, a nurse, or another trained member of a healthcare team.

Health Care Provision Indicators

Definition

Indicators of resources and provision of health care include several dimensions. Some refer to health workers, their education, employment, and performance. Others concentrate on health care itself, its availability, access, provision of health care on all levels of prevention (primary, secondary, tertiary), health expenditures, and medical technology. The utilization of health care is determined by rates of hospitalization, hospital beds, employment-to-bed ratio, and length of stay in hospital. The most difficult factor to estimate is the quality of health care, since it relies on many other parameters – health care, health professionals, and consumers, etc.

Health Care Quality

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Definition

Health Care Quality has been defined by the American Institute of Medicine as "the degree to which health services for individuals and populations increase the likelihood of desired ► health outcomes and are consistent with current professional knowledge" (Lohr 1990). Donabedian proposed thirty years before to define quality in health care as three-fold: quality of health care structure, process-quality and quality of outcome (Donabedian 1966). The quality of the structure of health care relates to adequacy of the facilities, personnel, and policies to deliver medical care. Process quality is concerned about the appropriateness of diagnostic or therapeutic interventions. Outcome quality means the effectiveness and efficiency, i. e. the ► health status that people experience as well as the economic dimension of the health care provided.

Despite all efforts, the proposed definitions of health care quality remain rather vague and suggest that a definition of health care quality on an absolute level is impossible. Health care quality can only be defined with respect to a specific goal, for example with respect to standards, norms and criteria for process and outcome quality. In this case, the definition of health care quality depends on the dynamics of the environment caused for example by technical progress and has to be revised regularly. Another important factor is that the definition of quality relies on rather subjective than objective factors, because the health status of an individual depends mainly on its personal estimation.

Basic Characteristics

History of the Idea of Health Care Quality

The dimension of quality in health care has become increasingly popular in the industrialized world after the first important waves of ► cost containment in the health care sector during the 80s. Economic evaluation and ► rationing in health care have put enormous pressure on health care providers and a lowering of their quality of services has been observed. Although in former times, health care quality was taken for granted, today, more and more patients and health care authorities are concerned about the quality of health care.

As the idea of health care quality had entered the medical scene, health care professionals tried to make it more operational. Various measures of quality have been developed according to the general definitions.

Measures for health outcome were conclusively related to a process or a group of processes that can be modified to improve the outcome. Measures for the organizational quality were either connected to the processes or directly to the outcome in order to be reliable and valid quality measures.

The American Institute of Medicine described a few years later quality in health care as "patient-centered, timely, efficient, effective, safe and equitable, as well as coordinated, compassionate and innovative." Ultimately, health care quality does not mean under-utilizing care that could help people, using the wrong kind of care and overusing care that is not necessary.

Indicators of Quality

In order to assess and improve quality in health care, many countries have developed indicators of quality on a national level that may serve as a framework for all health care provider. Indicators of quality are criteria, standards, and other direct qualitative and quantitative measures used in determining the quality of health care.

In **Germany** for example, indicators of quality are defined along the three-fold definition of quality according to Donabedian.

Indicators for the organizational quality are:

- Education and training of doctors
- Continuing qualification and number of staff
- Equipment of the health care provider (doctors' offices, hospitals, laboratories)
- Access to doctors' offices and hospitals
- IT-infrastructure of the health care provider (doctors' offices, hospitals, laboratories)

Indicators for the process quality are:

- Diagnostic techniques
- Therapeutic measures and nursing
- Principal diagnosis of hospital admissions
- Co-operation between colleagues
- Communication with patients

Indicators for the quality of outcome are:

- Improvement of ► health status, healing of diseases
- ► Patient Satisfaction
- Level of blood pressure and blood sugar
- Change of behavior that influences health status
- Impact on ► morbidity

These indicators are interdependent as the existing organization and resources have an influence on the processes, and processes influence the quality of outcome.

In the **United States**, health care quality indicators have been developed by the Agency for Healthcare Research and Quality (► AHRQ) using a broader approach than the German classification above.

The quality indicators are a set of four modules each of which measures quality associated with processes of care that occurred in an outpatient or an inpatient setting.

1. Prevention Quality Indicators (PQIs) identify hospital admissions that could have been avoided, at least in part, through high-quality outpatient care.
2. Inpatient Quality Indicators (IQIs) reflect quality of care inside hospitals and include:
   - Inpatient ► mortality for medical conditions
   - Inpatient mortality for surgical procedures
   - Utilization of procedures for which there are questions of overuse, underuse, or misuse
   - Volume of procedures for which there is evidence that a higher volume of procedures may be associated with lower mortality
3. Patient Safety Indicators (PSIs) also reflect quality of care inside hospitals, but focus on potentially avoidable complications.
4. Paediatric Quality Indicators (PDIs) both reflect quality of care inside hospitals and identify potentially avoidable hospitalizations among children.

On an **international level**, the Organization for Economic Co-Operation and Development (OECD) has recently developed International Health Care Quality Indicators responding to the growing interest by health care policymakers and researchers in OECD countries in measuring and reporting the quality of medical care. These indicators serve to compare the quality of different countries with different health care systems.

According to the OECD, quality indicators means "indicators for the technical quality with which medical care is provided, i. e. measures of health outcome or health improvement attributable to medical care (changes in ► health status attributable to preventive or curative activity)" (Kelly, Hurst 2006).

The recommended indicators from the OECD Health Care Quality Indicators Project are:

- Breast cancer survival
- Mammography screening
- Cervical cancer survival
- Cervical cancer screening

- Colorectal cancer survival
- Incidence of vaccine preventable diseases
- Coverage for basic vaccination
- Asthma mortality rate
- AMI 30-day case fatality rate
- Stroke 30-day case fatality rate
- Waiting time for femur fracture surgery
- Influenza vaccination for adults over 65
- Smoking rates.

The comparison of OECD countries according to the health care quality indicators in this project has shown that no country is among the best countries on all indicators and no country is among the worst countries on all indicators. Most of the countries have one or more indicators on which they are high performers and some other indicators where they are low-performers. The differences across countries may depend on several factors, for example the country specific disease incidence or prevalence of risk factors (age, gender, etc.).

Quality Assurance and Quality Management

In the well developed health care systems throughout the world, ► stakeholders in health care are concerned with health care quality. Even if the notion of quality is subjective, health care professionals try to incorporate quality indicators in their daily work and the terms of quality assurance and quality management are part of the health care sector. On the provider level, quality of health care is maintained or improved by measures of quality assurance and by an overall quality management. Quality assurance (or quality assessment) in health care intends to assure or improve the quality of care in a defined medical setting or program. Quality assurance includes the evaluation of the quality of care (for example through quality indicators), the identification of deficiencies and the activities leading to assure or improve quality.

Quality management describes the whole spectrum of activities leading to the continuous improvement of quality. It encompasses the planning of quality measures including quality assurance, the implementation of these measures in the service delivery process, regular checking of the effectiveness of the measures and the follow-up actions to ensure continuous improvement of quality. The quality management approach also analyzes the different factors that influence the quality of the delivery of health care, such as the use of practice guidelines, ► clinical pathways or protocols, the motivation of health care personnel through recognition of professional accomplishment or payment policies.

Country Examples of Quality Assurance

In all countries with well developed health care systems, quality assurance has become increasingly important at least on the national health policy level. With respect to the structure, processes and outcome of health care provision various programs and measures have been developed by the governments. On a provider level, there is in some countries a lack of implementation and transparency of the quality assurance programs. The following country examples highlight the different approaches to implementing quality assurance in health care:

In the United States, there is a growing concern about health care quality since the publication of three reports detailing quality-of-care deficiencies in 1998. The Agency for Healthcare Research and Quality (AHRQ) provides an annual update on quality of health care using performance measures to monitor quality progress in the United States in the National Healthcare Quality Report since 2003. Many health care organizations have implemented their own quality management systems based on the national standards set by AHRQ.

In Denmark, a national strategy for continuous quality development was defined in 1993. According to this strategy, counties and municipalities had to include quality measures in their goals for ► health plans. In this context, compulsory practice guidelines were applied for the first time assuring certain standards of quality of care.

In the Netherlands, quality assurance is an important goal of the public health policy. However, the development and implementation of quality assurance is largely the responsibility of health care providers who regulate themselves. The government acts only as a controller of the quality systems by supporting certification activities of health care providers.

In other countries, specific measures of quality assurance are implemented with great success: In Finland for example, there are quality assurance programs for prevention in the sector of mother-child care. In Switzerland, prevention in the dentistry sector especially for children is excellent.

Cross-References

- ▶ AHRQ
- ▶ Clinical Pathways
- ▶ Cost Containment
- ▶ Health Outcomes
- ▶ Health Status
- ▶ Managed Health Care Plans (U.S.)
- ▶ Morbidity
- ▶ Mortality
- ▶ Patient Satisfaction
- ▶ Quality of Care
- ▶ Rationing
- ▶ Stakeholders

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Health Care and Rehabilitation

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Introduction

Health care is defined as the prevention, treatment, and management of illness and the preservation of mental and physical well-being through the various services offered by the medical profession (physicians/doctors) and other professionals such as nurses, pharmacists, and therapists. The provision of those services constitutes a health care system, which is the response to the health problems of a society. The nature and format of health care delivery is strongly influenced by the respective health care system. The financing approach has the greatest influence within a health care system as it determines the payment and compensation structures for the health care provided. Public health is an important part of a health care system, with the objective of improving health, prolonging life, and improving the quality of life among whole populations through health promotion, disease prevention, and other forms of health intervention. Rather than individual health care that focuses on individual's illnesses and risk factors, public health serves the whole population with a focus on disease causes, means of disease prevention, and on processes and outcome of care.

There has been a wide array of different health care practices since the beginning of recorded history, of which medicine is the mainstream scientific tradition. It was developed in the Western world in around 1450 and is also called biomedicine, allopathic medicine, or Hippocratic tradition. Throughout the world, there are still several other health care practices separate from Western medicine. Health care practice combines science and art, with science and technology being the evidence base for many clinical problems for the general population. The application of this scientific knowledge combined with intuition and judgement to derive the correct individual diagnosis and corresponding treatment approach is the art of health care practice.

The health care industry is one of the major and fastest-growing industries worldwide and constitutes a key part of national economies. It covers over 10% of the gross domestic product (GDP) of most developed nations. For example, health care costs in 2005 for hospitals, doctors, nursing homes, diagnostic laboratories, pharmacies, medical device manufacturers, and other components of the health care system accounted for 15.3% of the GDP of the United States (US), the largest proportional expenditure of any country in the world. The 2005 average for the Organisation for Economic Co-operation and Development (OECD) countries was 9.0%, with the US, Switzerland (11.6%), and France (11.1%) having the top three highest proportional expenditures.

Health care addresses acute diseases as well as chronic diseases. Typically, acute care is delivered in high technology, intensive, institutional type settings such as hospitals or physician's practices. Acute care uses primarily medical care to fix or cure acute diseases or injuries. Chronic care is an array of integrated medical and non-medical services which take place in a variety of settings. The objective is to assist people with chronic conditions to live independent, full lives. Chronic care is a continuum of care that is required over a period of time for people who either never acquired or have lost functional abilities. Rehabilitation services are applied to both acute diseases and chronic conditions (diseases and disabilities), with a clear focus on the latter. In case of acute diseases, rehabilitation services are only used for a certain period of time ("subacute care") whereas for chronic conditions they are in most cases applied longer term. There is no temporal dividing line between acute and ► chronic disease as the difference in addressing the respective diseases is more attitudinal than temporal. Management of acute illness tends to focus on cause and cure while management of chronic disease tends to focus on limitation of effects, dealing with these effects, and maximizing patients' potential quality of life.

Profession

Although the physician ('doctor') holds the most important position within the ► health care profession, other professionals like nurses, therapists (e. g. occupational therapists, physiotherapists, and speech and language therapists), and pharmacists are also fundamental in offering their respective services. This is especially true for ► long-term care and rehabilitation, where the important role of interdisciplinary teams has become increasingly recognized in recent times.

The term physician is traditional and commonly used, especially in the US, whereas the term doctor is more common in other countries like the United Kingdom (UK); physician then often refers to specialists in internal medicine. The entry-level medical education programs in developed countries are tertiary-level courses offered by medical schools that usually belong to universities. After completion of the entry-level program, the graduated doctors often have to undertake a period of supervised practice prior to receiving full registration. The permission to practice must often be granted by government and is known as licensing in the US, registration in the UK, and approbation in Germany.

The general practitioner (GP) or family physician plays a vital role in many health care systems as he or she provides ► primary care by treating acute and chronic illnesses, provides preventive care, and offers health education for all ages and both sexes. GP is a common term in the UK and some other Commonwealth countries. A medical specialist is a physician who is specialized in a particular field of medicine. Medical specialists have to undertake additional training and internship to become sufficiently knowledgeable about a specific part of the human body. GPs usually see the patients first and refer them to the respective medical specialist if they cannot cure the illness or cannot identify the cause of the illness.

A nurse is – along with other health professionals – responsible for the treatment, safety, and recovery of acutely or chronically ill or injured people, health maintenance of the healthy, and treatment of life-threatening emergencies in various health care settings. Nurses might also be involved in medical and nursing research programs and they often offer a wide range of non-clinical services that are necessary for the delivery of health care. Although the structure of the nursing profession differs throughout the world, there are usually different levels of nursing practitioners depending on education, responsibility, and skills.

Pharmacists are drug therapy experts who optimize medication management to produce positive health outcomes. In a traditional view, pharmacists have primarily compounded and dispensed medications on the orders of physicians. In the recent past, the pharmacists' services have evolved towards clinical practice, medication review, and drug information. In some country legislation, those new roles have become mandated by law.

Distinct from the medical, pharmaceutical, and nursing professions, there are many other clinical healthcare professions, often summarized as allied health professions. They act as allies in the healthcare team and ensure that the healthcare system functions well. Titles and roles vary from country to country. Depending on the country and the local healthcare system, the following professions may be included: bioengineers, dental hygienists, diagnostic medical sonographers, electrocardiographic technicians, hemodialysis technicians, laboratory technicians, medical assistants, nutritionists & dietitians, occupational therapists, phlebotomists,

physical therapists, physician's assistants, radiographers, respiratory therapists, and speech therapists. Due to consistently increasing costs for health care, there has been a trend towards shifting patients away from expensive hospital treatment towards physician's practices and ambulatory clinics, resulting in an increased requirement for skilled health care delivery personnel. The allied health professionals increasingly have to adhere to national training and education standards, which is often reflected in diplomas and certified credentials that have to be accomplished.

Health Care Delivery

Health care delivery is the process of providing health care, with face-to-face delivery being the most common form. However, technological progress also allows for health care offerings in absentia by, for example, communication by phone or internet, video conferencing, emailing, text messaging, or any other form of non-face-to-face communication.

Health care provision can be differentiated into primary care, secondary care, and tertiary care. Primary care can be defined as "the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients and practicing in the context of family and community" (Green et al. 2004). Primary care is provided by physicians specifically trained for and skilled in comprehensive first contact and continuing care for persons with any undiagnosed sign, symptom, or health condition not limited by origin of the problem, organ system involved, or diagnosis. Primary care includes diagnosis and treatment of acute and chronic illnesses in a variety of health care settings as well as health promotion, disease prevention, health maintenance, counseling, and patient education. A significant proportion of all medical visits can be treated by the primary care provider. The primary care physician – often a GP or family physician – usually collaborates with other health care professionals utilizing consultation or referral as appropriate. When it comes to ► medical specializations, the primary care physician usually covers family practice, internal medicine, pediatrics, and at times obstetrics and gynecology.

Secondary care services are medical services offered by specialized physicians in their offices, clinics, or hospitals. Patients are often referred by the primary care physician who treated the patient first and required the expertise or procedures offered by specialists. Tertiary care medical services are offered by specialist hospitals or regional centers that are equipped with diagnostic and treatment facilities that are not available at local hospitals, clinics, or practices. Patients are usually referred to tertiary care settings by primary or secondary care personnel. Examples of tertiary care services are specialist cancer care, neurosurgery, burns care, and plastic surgery.

There is differentiation between systems that are primary care led and those that are more hospital-based, also called pluralistic systems. To prevent excess utilization of expensive secondary care services, some primary care based countries like UK or The Netherlands have introduced a referral system with the GP in a gate-keeping role. Patients in those countries only have access to hospital inpatient and outpatient services by means of referral. In the US, also primary care led, however, there has been a trend toward self-referral by patients for these services, rather than referral by primary care providers. Countries such as Germany and France (mostly with a social security system) that maintain parallel access to GPs and medical specialists use other means to ration the use of health care services like co-payments and other financial disincentives.

Acute Illness

Acute care covers the treatment of an acute period of illness, the treatment of injuries related to an accident or other trauma, and recovery from surgery. It is provided in a physician's practice or in a hospital by specialized personnel utilizing complex and sophisticated technical equipment and materials. When considering acute care, it can be differentiated into ► outpatient care, ► inpatient care, and self medication/self care. Outpatient (or ambulatory) care includes all health care services that are provided to patients who do not require an institutional bed as inpatients during the time when services are offered. Inpatient care applies to a patient who is formally admitted to an institution for treatment and has to stay for at least one night in the hospital or other institution providing inpatient care.

Inpatient care primarily takes place in hospitals and is provided by physicians, nurses, and other health care

professionals. Some patients only attend the hospital for diagnosis and/or therapy without staying overnight (outpatients), while the majority is formally admitted and stays overnight or for several weeks or months (inpatients). Hospitals are differentiated from other health care facilities by their ability to admit and care for patients. The most common type of hospital is the general hospital, which offers a broad range of medical specializations including an emergency ward to treat patients with immediate threats to health. A general hospital is usually the primary regional health care facility offering a significant share of beds for intensive care and other specialized facilities. There are also specialized hospitals, which include trauma centers, children's hospitals, seniors' (geriatric) hospitals, and hospitals dealing with specific medical needs such as psychiatric problems or pulmonary diseases. Some hospitals are affiliated with universities for medical research and the training of medical personnel. Many hospitals are still non-profit, however there is an increasing trend towards for-profit institutions in many developed countries.

Following an acute illness or operation like e. g. a hip replacement, ► short term rehabilitation is often required, also called sub-acute care. Short-term rehabilitation is considered appropriate when there is reasonable medical expectation of a significant functional improvement within 60 days of initial treatment. The services are usually performed by interdisciplinary teams, often under the direction of a physician. According to the needs and wishes of the patient, the services are either provided in a residential setting, the physician's or therapist's practice, or the patients own home.

Besides consultation with physicians, individuals increasingly take actions to maintain good health or respond to illness on their own. Those actions are summarized as self care, which includes self medication in the form of individual initiation and management of treatment instead of prescription by a health care professional. The increasing pressure on worldwide health care budgets has encouraged more self care as a way of managing demand for health care services. Going forward, it is therefore likely that pharmacists become increasingly involved in managing minor illnesses. Examples of those symptoms and conditions for which the public already regularly treats itself are headache, dandruff, heartburn, migraine, colds, and acid stomach.

Chronic Diseases and Disabilities

Chronic conditions are health problems that require ongoing management over a period of years or decades. Considered from this perspective, ► chronic diseases like ischemic heart disease, cancer, stroke, arthritis, chronic obstructive pulmonary disease, dementia, and depression comprise an enormously broad range of what appear on the surface to be distinct health issues. There is furthermore considerable ► impairment and disability associated with trauma and infectious diseases like HIV/AIDS, tuberculosis, and malaria prevalent in less developed countries. Throughout the world, there are about six hundred million people who live with disabilities of various types, of which around 80% live in low-income countries. Most of these people are poor and have only limited or no access to basic health care and rehabilitation services and facilities. The number of people with disabilities is increasing due to war injuries, landmines, HIV/AIDS, malnutrition, chronic diseases, substance abuse, accidents, environmental damage, population growth, and medical advances that preserve and prolong life.

Chronic conditions and disabilities presently comprise the major health burden in developed countries, and trends for developing countries forecast a similar situation. Non-communicable conditions and mental disorders accounted for around 60% of total mortality in the world and almost 50% of the global burden of disease in 2000. This share will increase to 60% of the global disease burden by the year 2020, with heart disease, stroke, depression, and cancer as the largest contributors. In developing countries, chronic conditions including injuries and mental disorders are even expected to be responsible for almost 80% of disease. Low and middle-income countries are the biggest contributors to the increase in burden of disease from non-communicable conditions. In China or India alone for example, there are more deaths attributed to cardiovascular disease than in all other industrialized countries combined. This implies that health care costs become excessive when the national health care systems do not succeed at efficiently managing and addressing chronic diseases. The costs associated with chronic diseases greatly exceed expenses for medical treatment but affect society as a whole.

Most health care systems have not yet developed and adjusted towards better reflecting the increasing need

for chronic care. The health care is often fragmented and still focused on acute and emergent symptoms. Although the individual's health behavior and adherence to therapies is crucial to treat chronic conditions, the information and skills provided to the patients to optimize handling of these conditions is often not considered essential or comprehensive. This is reflected in the fact that many health care systems usually do not include a long-term, goal-oriented plan for patients with chronic conditions, and relevant and reliable medical information is not available across providers or over time. The organization of health care often lacks the use of existing community programs, which is a particular issue in low-resource settings that cannot be sufficiently served by the existing primary care setups. Although many chronic conditions are preventable, health care professionals still quite often fail to regard their interactions with patients as opportunities to inform, educate, and motivate them about health promotion and disease prevention strategies. This information would enable patients and their families to improve their health, to prevent or delay the onset of chronic conditions, and to prevent and reduce complications related to chronic conditions for patients that already suffer from a chronic disease. Prevention and health promotion should be part of every health care encounter but this is still far from clinical reality. ► Managed care – as exists in the US and is emerging in other countries like Switzerland – has the potential to provide a range of integrated services required by people with chronic conditions, although the managed care industry is just beginning to realize and respond to chronic care needs.

► Long-term care involves individuals with chronic diseases and disabled persons, often elderly members of society. Long-term care refers to a continuum of medical services, social services, and housing designed to support the needs of people living with chronic health problems or disabilities that affect their ability to perform everyday activities. The goals of long-term care are much more complicated and considerably more difficult to measure than the goals of acute medical care. While the primary goal of acute care is to return an individual to a previous functioning level, long-term care aims to prevent deterioration and promote social adjustment to stages of decline. Long-term care includes a broad range of services emphasizing medical as well as social services. While acute care is usually limited to specialty providers, the providers of long-term care are more wide-ranging. They include traditional medical providers such as physicians and hospitals, rehabilitation providers such as physiotherapists, formal community caregivers such as home care agencies, facility providers such as nursing homes and assisted living facilities, and informal caregivers such as friends or family members. It is common for long-term care to provide custodial and non-skilled care, like assisting with normal daily tasks like dressing, bathing, and using the bathroom. Long-term care can be differentiated into institutional care and non-institutional care like ► community care.

Institutional (or facility) care comprises nursing home care and several kinds of supportive housing. Nursing homes provide institutional care for people recovering from an acute illness or for those whose chronic needs require skilled nursing care and significant assistance with activities of daily living (ADL) such as bathing, toileting, or transferring. Supportive housing is designed to provide group living, assistance with daily personal care, and protective oversight for people with long-term care needs. The various types of supportive housing services differ from country to country.

Community care is especially prevalent in Anglo-American countries like the US or UK. It can be either formal care like home health care and hospices or informal care, meaning in-home care and support by friends and family. Home health care, also known as domiciliary care, is health care provided in the patient's home by health care professionals. Home health care differs from home care or custodial care. Home care is non-medical care provided by persons who are not nurses, doctors, or other licensed medical personnel. Home health care may involve a wide variety of medical and social services and providers, depending on the patient's needs.

Hospices provide supportive emotional and spiritual services to terminally ill patients and their families, in addition to medical services. These services usually involve an interdisciplinary team that includes a physician, a nurse or nurse's aide, a social worker, a member of the clergy, and volunteers. Team members provide medical services, social services, and respite care for the patient and their family. The modern hospice is a relatively recent concept that originated and gained momentum in the UK after the founding of St. Christopher's Hospice in 1967. Since its beginning, the hospice movement has grown dramatically. The first hos-

pice in the United States was established in 1974. Hospice care is one form of ► palliative care that still most often occurs in the dying person's home. Palliative care concentrates on reducing the severity of the symptoms of a disease or slows its progress rather than providing a cure. It aims at improving quality of life by reducing or eliminating pain and other physical symptoms, enabling the patient to ease or resolve psychological and spiritual problems, and supporting the partner and family. Palliative treatment methods may also be applied to patients that suffer from side effects of curative treatments like, for example, the nausea associated with chemotherapy. Although palliative care is by no means a new concept, only a few physicians have put much focus on it in the past. Traditionally, the predominant goal of the physician was to cure patients; putting more efforts into making the conditions for the patients more comfortable and increasing quality of life was often interpreted as giving up on them. The concept of accomplishing a good quality of life has gained importance in the recent past; however, there is still a way to go.

In all countries, informal care provided by the family has always been and still is the major source of provision of long-term care. This is true for care of older persons as well as for care of patients with chronic conditions. However, the heavy burden of care cannot be shouldered by families alone. Due to a wide range of social, economic, demographic, and epidemiological factors, family resources are dwindling. In addition, family caregivers need guidance, support, and skills to manage this often complex care. The growing demand for home care means that families that do not have sufficient know-how are often left to deal with the caregiving responsibility and effort on their own. Effective long-term policies are therefore a key challenge for many health care systems around the world. There is no single solution that covers all the national issues and countries are therefore evaluating several different approaches. Yet, they are still not shared appropriately and comprehensively to enable other countries to use the existing knowledge and establish long-term care as an integral part of their health and social systems.

Table 1 summarizes the characteristics of acute and chronic care.

Rehabilitation

With the increase in chronic diseases and disabilities, rehabilitation medicine has emerged and developed in the recent past. Rehabilitation services primarily address disabled and chronically ill persons; ► short-term rehabilitation also covers acute illnesses, as explained above. Rehabilitation is an active and dynamic process by which a disabled person is helped to acquire knowledge and skills in order to

Health Care and Rehabilitation, Table 1 Characteristics of acute care and chronic care

Characteristics	Acute care	Chronic care
Goals of care	Cure: Restore to previous level of functioning	Assistance and care: Maintain independent living Facilitate successful personal and social adjustment Minimize further deterioration of physical and mental health Prevent acute exacerbations of chronic conditions
Providers of care	Specially trained health care and human services professionals in institutions set up for acute care purposes	Multiple caregiver sources and settings, often includes network of relatives, friends, and community services along with hospital, home health care, and social service professionals
Scope of care	Primary care with specialist support if required	Broad scope of social, community, and personal services, as well as medical and rehabilitative care
Quality of care measures	Significant government investment in many developed countries in outcome measures and quality of care standards for most hospital-based acute conditions	Relatively few measures to assess quality of care
Care delivery setup	Typically occurs within one organization	Multiple organizations involved; collaboration required

maximize physical, psychological, and social function, thus promoting activity and participation. Rehabilitation approaches can aim at:

- reducing disability
- acquiring new skills and strategies that reduce the impact of the disability
- altering the physical and social environment to allow for easier functioning with the given disability.

The key benefits of rehabilitation are improved functional outcomes, reduced unnecessary complications, and better coordination and use of resources. One key element of rehabilitation is team work, which involves a wide array of different professionals. ► Rehabilitation teams can work in many different contexts like hospital based, mainly consisting of physicians, therapists, and nurses, or community based, involving local authority employees such as social workers and community occupational therapists. The rehabilitation team has to function as a coherent whole, allowing client-centered goals to be set and monitored. Thus, the team has to be outcome oriented instead of discipline oriented. The rehabilitation core team generally consists of a rehabilitation nurse, a clinical neuropsychologist, an occupational therapist, a psychotherapist, a speech and language therapist, and a rehabilitation physician.

As for health care, there are again different organizational models of ► rehabilitation delivery. There is no single way to develop a rehabilitation service and the physical base, team, structure, scope, and range of the services provided differs from community to community and from country to country. Inpatient rehabilitation takes place in the hospital in a dedicated rehabilitation unit that is usually able to deliver all standard post-acute inpatient rehabilitation. In the case of regional hospitals, the rehabilitation unit often consists of more specialized therapists, physicians, and nurses and will probably contain a more specialized range of equipment and assessment facilities. In many countries, those specialized services are also offered in specific inpatient rehabilitation clinics. Outpatient rehabilitation can be performed at the disabled person's home, in outpatient rehabilitation centers, or at the specialist therapist's office.

The delivery models described are primarily applicable to health systems in the Western World. A large part of the rest of the world, especially developing countries, has less than adequate rehabilitation resources and facilities. Thus, other models had to be developed to overcome those difficulties. The World Health Organization (WHO) initiated the concept of ► community based rehabilitation (CBR) as part of general community development efforts aiming at the rehabilitation, equalization of opportunities, and social inclusion of all people with disabilities. Its implementation is driven though the combined efforts of the people with disabilities, their families, organizations, communities, and the relevant governmental and non-governmental health, education, vocational, social, and other services. CBR has evolved in recent years towards putting more emphasis on human rights, ongoing actions to address inequalities and alleviate poverty, and expansion of the role and influence of Organizations of Persons with Disabilities (DPOs), which have been established and strengthened in many countries.

The objective of the WHO concept of an inclusive community is the adaptation of the structures and procedures of the community to facilitate the inclusion of people with disabilities. It focuses on all citizens and their entitlement to equal treatment, including those with disabilities, and thus benefits all people in the community, not just those with disabilities. A characteristic of CBR and similar programs is the involvement of the disabled people and their representatives. To enforce equal opportunities for people with disabilities, a common, multi-sectoral approach involving communities, DPOs, national policies, different government ministries, NGOs, and other stakeholders is necessary.

Summary

The development of health care in the last century has been characterized by increasing differentiation in the tasks of physicians, resulting in the development of a range of disciplines. On one hand, there are physicians with generalist tasks, mostly working outside the hospitals, who fulfill an important role in prevention and treatment of diseases in populations. On the other hand, there are specialists who are increasingly focused in narrow areas of health care, offering those services mostly in hospital settings and losing the connection to the community. The future society will be an aging one with the concurrent burden of degenerative diseases. The "Health for All" call made in 1978 at the WHO conference in Alma Ata which aimed at achieving this approach to health care has failed in many instances. This is partly driven by the fact that primary care still

needs to further improve and delineate its role in public health care to achieve health for all. The individualist, high-cost hospital-based care system will neither be affordable in the future, nor deal with the problems facing our society. An effective approach to address those newly emerging health problems requires changing the structure of the hospital-based health system towards a public health oriented, community-based structure, as has already been partly implemented in long-term care. Rehabilitation services have to be integrated within this approach given the increasing demand for those services by both disabled and chronically ill people, especially the elderly. This is especially true for developing and poorer countries where, for example, community based rehabilitation points towards the right direction. All of this implies that collaboration between public health and individual health care is required to bridge the gap between the two disciplines and achieve health for all people. The provision of a community-oriented health care system seems inevitable in many countries as the hospital-based health care system will not be able to solve the problems of health care in the future.

Cross-References

- ► Chronic Diseases
- ► Community Based Rehabilitation
- ► Community Care
- ► Health Care Profession
- ► Impairment and Disability
- ► Inpatient Care
- ► Long-Term Care
- ► Managed Care
- ► Medical Specializations
- ► Outpatient Care
- ► Palliative Care
- ► Primary Care
- ► Rehabilitation Delivery
- ► Rehabilitation Teams
- ► Short-Term Rehabilitation

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Health Care Services

Synonyms

Medical care services; Health care

Definition

► Health care services are defined as services aimed at prevention, treatment and rehabilitation of illness through the services provided by different health care professionals such as physicians, nurses, etc.

Health Care System Reforms

► Health Systems Reforms

Health Care Systems

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Synonyms

Health system

Definition

Health care systems are organizations where health services and health care are provided. They can be divided into three subgroups: state health services, social health security systems, and private health insurance systems. There is no overall accepted definition for health care systems. As an interdisciplinary field of research, health care systems aim at promoting and maintaining the population's health. Thus, they have contributed greatly to better health. How they act and are implemented depends on which services are provided and how the health care systems are organized.

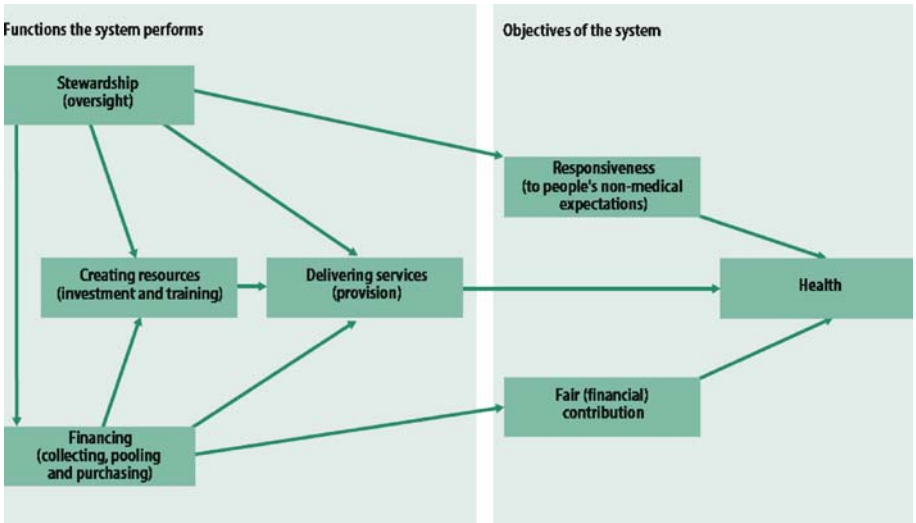
Basic Characteristics

Besides individual behavior and personal circumstances, an individual's health is also affected by health care systems, starting with care during pregnancy and delivery of a healthy baby and up to care of the elderly. As an interdisciplinary field of research, health care systems aim primarily to promote and maintain the population's health. Thus, the lives of most people are dependent on health systems. Intention and overall aims are to improve the well-being of the individual or population, minimize risk factors, and identify and treat diseases (Schwartz and Janus 2006). Health care systems are based in institutional structures, which differ from nation to nation. Financing of these systems is guaranteed by both public (e. g. taxes) and private funds (e. g. donations).

What are Health Systems?

As there are many influencing factors on health, such as nutrition, physical activity, social circumstances, workplaces, and so on, health care systems and the definition of a health care system often vary. This is not only the case on an international and national level but on a regional level too. There is no precise definition existing regarding what health care systems are – neither on a national nor on an international level. According to the definition from the World Health Organization (WHO), there is no specified frame regarding what a health care system stands for, where it starts, and where it ends. Finally, a health system is defined as "*... all the activities whose primary purpose is to promote, restore or maintain health.*" (WHO 2000). This statement includes both health activities that have a direct impact on the individual's health, as primary prevention and health promotion, and also covers activities with a secondary health-enhancing effect, like improving environmental safety. Although the definition of health care systems is not precisely given, these systems "*... today represent one of the largest sectors in the world economy*." (WHO 2000). Development started in 1883 when Germany enacted a law for the health of low-wage workers and thus started the first social insurance model. Many nations worldwide followed and adopted the law on a national level.

In general, health care systems are organizations from which health care is provided. These vary widely from one nation to another. If comparing the systems among different countries, the financing and management of the health care systems are appropriate aspects to compare. Funding can be public or private and control can be led by governmental or public bodies. Thus, health systems are mainly characterized by great dif-



Health Care Systems, Figure 1 Relations between functions and objectives of a health system (WHO 2000)

ferences in organization and funding. These differences often lead to diverse outcomes in health policies and, finally, health within the population itself. It follows that mistakes in investment in a health system have long-lasting consequences for all individuals and systems involved. Health system research therefore aims at developing tools for describing these differences and tries to improve circumstances for better health (WHO 2000).

Much preventable disease could have been prevented by a well-established health system that reaches the whole population and aims at promoting health and preventing diseases. Particularly deprived people are affected by unequal distribution. The intention is to compare health systems by looking at what they achieve and what they really do in terms of realizing their overall goals (Roemer 1991). Figure 1 gives an overview on how functions and objectives of health care systems are related to another.

Three fundamental objectives are recognized for health care systems – improving the health of the population they serve, responding to people's expectations, and providing financial protection against the costs of ill-health (WHO 2000). For implementing these on a national level, the impact of policy and its decisions is fundamental. Individual circumstances within each country lead to different implementation of these objectives. Resources differ and health problems within each country vary. Influences such as distribution of income and wealth or impact of climate constitute no real indicators.

Success in the overall frame of health systems covers the effective control of diseases (WHO 2000). The final aim is the protection and improvement of health of the population; inequalities have to be limited by fairness and without discrimination. Resources in health systems need to be raised appropriately.

Health systems in all nations have a great impact on the health of an individual. With their design, management, and financing they contribute to better health for all by affecting people's lives directly. After undergoing reforms in the past 100 years and concentrating on the extension of the social insurance system, health systems' focus is now on the promotion of primary health care.

A problem that still exists is the unequal distribution of resources within different international health care systems. Generally, they should integrate people's health needs and their expectations. Often, there exists an unbalance between these expectations and reality, particularly with regard to tariffs that people have to pay and the benefits they get in return. Misuse of the health system's power can lead to harm rather than to a well structured and organized system. Thus, the intention of health care systems is not implemented as it is supposed to be and preventable diseases occur that could have been avoided. These aspects lead to a high potential for improvement of health care systems and their funding, starting at the policy level.

An overall objective of health care systems is the health of the whole population from the beginning of their lives. Aiming at implementing this goal requires the

best management and financial distribution with respect to current improvements and political circumstances, influencing whether health care systems do their job effectively or not.

Finally, demographic changes and medical and technical improvements have to be taken into account. This aspect leads to increased expenditures in health care systems, and affects all nations (WHO 2000).

Policy's interest has to be to help health systems to use their own resources for achieving goals. Furthermore, policy-makers need to find out how health systems are structured and how they work. These findings are fundamental for understanding and, thus, for improvement of health care systems, giving support within their resources. On the other hand, it is not only the health care system that influences the individual's health. It is in the population's interest to pursue resolutely their rights and obligations, leading to them being better informed. People should be able to integrate their expectations in order to become an active part of the whole health care system. In addition, through comparisons of experiences from other nations, the individual health care systems can be adopted according to their specific cultural, historical, and social circumstances.

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► Health Systems

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Health Care Teams in Palliative Care

Synonyms

Interdisciplinary palliative care groups; Multimodality hospice approach

Definition

In palliative medicine and hospice care transdisciplinary work is fundamental. Groups of physicians, nurses, social workers, physiotherapists, occupational and complimentary therapists, hospice chaplains, family members, housekeepers and volunteers provide the best chance for successful health care in patients with incurable illnesses. They support the critically ill patient medically on the one hand, and psychologically on the other hand. The caregivers are by themselves under severe emotional stress.

Health Care Utilization

► Health Determinants, Economic

Health Change

Synonyms

Health outcome

Definition

Health outcomes describe the change in the ► health status of an individual due to a clinical intervention or therapy. To measure health outcomes, health professionals establish a list of the end results of a particular health intervention according to the experience of the patients. It includes for example the change of the ability to function in everyday life and the general perception of well-being. The research of health outcomes that links the care patients receive to the outcomes they experience has become an important factor to monitor and improve the quality of health care (► health care quality).

Health Communication

Definition

Health communication is the art and technique of informing, influencing, and motivating individual, institutional, and public audiences about important health issues. The scope of health communication includes

disease prevention, health promotion, health care policy, and the business of health care, as well as enhancement of the quality of life and health of individuals within the community.

Health Control

Synonyms

Health promotion; Healthy public policy; Disease prevention

Definition

Health control includes the policies and processes that enable people to increase control over and improve their health, as is stated in the Ottawa Charter for Health Promotion (1986). These address the needs of the population as a whole in the context of their daily lives, rather than focusing on people at risk for specific diseases, and are directed toward action based on public policies on the determinants or causes of health. The main goal is a progress towards a healthier world.

Health promotion must become an integral part of domestic and foreign policy and international relations, including in a situation of war and conflict. To achieve this, it is necessary to promote dialog and cooperation among nation states, civil society and the private sector. An example of such a successful treaty to improve health of the population is the World Health Organization Framework Convention on Tobacco Control.

Cross-References

- ► Disease Prevention
- ► Health Promotion
- ► Healthy Public Policy

Health Data

Synonyms

Confidentiality; Data protection

Definition

An individual's claim to limit access by others to aspects of one's personal life, notably including one's identifiable health data.

Health Data Management

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Definition

Health data management comprises all activities relating to managing health data as a valuable resource. It encompasses acquiring, entering, processing, coding, outputting, retrieving and storing of data gathered in the different areas of health care, for example at the level of health care providers (physicians, hospitals, pharmacies and other health care facilities) and at the level of health care payers (health insurances, social insurances). Health data management also embraces the validation and control of data according to legal or professional requirements.

Basic Characteristics

Evolution of Health Data Management

As a result of the great progress in information and communication technologies over the last years, the landscape of health care delivery and medical data management has significantly changed. In contrast to former health data management through paper records that stored physically data where it has been produced, there are today more and more health care areas in which data are managed electronically. In many health care provider organizations, information technology plays an important role not only for document management, but also for administrative activities and clinical processes. Electronic data management allows improved physician's access to clinical data, the use of bar coding, computerized prescriptions and numerous software applications supporting health care providers in the ► reimbursement process via ► diagnosis related groups as well as in their quality assessments (► health care quality). With rising cost-consciousness in the health care sector, the need for information automation as well as for transparency of resource utilization

is increasing. As a result, information technology and computer science continue to have a great potential in the health care and medical world. Health care payers, for example, turn increasingly to ► business intelligence tools and analytical data processing systems to evaluate cost, utilization and effectiveness of health care services. The growing efforts towards Integrated Health Care (► integrated health care) led to further developments of ► telemedicine (or ► e-health applications) as an important tool to improve access to services for patients in more remote areas and to offer distance learning for health care professionals. Another popular development, electronic health or patient records are increasingly applied to centralize patients' information of the different services provided in one health care unit or across several health care units. Further developments head towards so-called "patient smart cards" loaded with clinical and demographic information. These developments require organizational, functional and scientific knowledge as well as ethical and legal standards for data quality, information security, access control and privacy.

Challenges: Standardization and Norms

Ethical aspects concerning the secure distribution of sensitive medical information, the balance between groups of patients' needs, expectations of health professionals and the health care industry's requirements are major challenges to the recent development of health data management.

In all countries with well developed health care systems, efforts on national and international levels to set norms for electronic health data management can be observed. Recommendations are formulated to:

- harmonize standards for data exchange, e. g. harmonization of formats, syntax, headers, links, etc.
- protect database access and patient identification, e. g. digital signature for health professionals, unique identification process for patients, etc.
- define the role for health data management and the electronic health record including long term preservation and a set of minimal functions
- evaluate conformity to existing norms and standards on an international level

In most countries governments are setting legal standards for health data management. In Europe, the European Committee for Standardization delivers proposals and recommendations on standards for health informatics and ► e-health (European Committee for Standardization 2005).

Electronic Health Records (EHR)

In all developed health care systems, the introduction, or broader application of, ► electronic health records is a highly discussed topic.

Definition EHR capture and manage the whole history of patient health information. They function as the physician's primary information resource during the delivery of care.

Advantages and Risks EHR enable doctors, administrators and patients to benefit from a rich and sophisticated informational environment. As individual medical records can be electronically linked and aggregated, they promise a more comprehensive and coordinated health care approach for patients. On a community or national level, EHR provide a previously impossible insight into the health of population groups and therefore offer new opportunities for epidemiological studies.

EHR support the monitoring and evaluation of the quality of care provided, the effectiveness of the health care organization's infrastructure and the utilization of practice guidelines (► infrastructure and service delivery). Electronic patient data facilitates the accountability in health care as ► resource allocation, ► reimbursements, ► health outcomes and risks (co-morbidities and side-effects) become transparent. From the epidemiological perspective, EHR offers the possibility to realize new comprehensive studies of population health, risk factors and disease burdens thanks to the provision of appropriately masked long term information on a much broader basis than former survey data. Furthermore, the various scientific research institutes will be able to exploit electronically available patient data in order to improve the overall information about the health care system.

However, electronically available patient records make access and distribution of data easier and could therefore threaten privacy and lead health insurers to discriminate against patients with high-risk disease profiles. The electronic management of health data could be vulnerable to unauthorized access and exploitation.

Conclusion

Despite the advantages of EHR, ethical standards have to be imposed externally on every organization dealing with personal health data in order to ensure respect for the well-being and dignity of patients and to protect their interests. As physicians have the obligation of confidentiality and, generally, patients own their own health records, it is they who decide to authorize physicians to disclose health data or not.

The future of EHR is a question of balance between the protection of individual ► privacy rights and the realization of public benefits from electronic health information. The use of EHR depends ultimately on successful de-identification to make health records anonymous and patients' consent authorizing health data disclosure.

Cross-References

- ► Business Intelligence Tools
- ► Diagnosis Related Groups (DRGs)
- ► e-Health
- ► Electronic Health Record (EHR)
- ► Health Care Quality
- ► Health Outcomes
- ► Infrastructure and Service Delivery
- ► Integrated Health Care
- ► Privacy Rights
- ► Reimbursement
- ► Resource Allocation
- ► Telemedicine

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Health Data Protection

Synonyms

Confidentiality

Definition

A subset of ► privacy that focuses on health data protections arising from a relationship of trust between individuals (e. g., relationships between physicians and patients, researchers and human subjects, genetic counselors and clients).

Health Determinants

Synonyms

Factors that influence health

Definition

The events and environmental factors that give rise to the immediate causal factors are often termed "determinants". Health determinants include physical, biological, behavioral, social, and cultural factors.

Among physical factors the most important ones are climate and geographical characteristics of a particular region.

Biological determinants may be inherited or acquired.

Social determinants of health are very complex. Perhaps the broadest social determinant of health is a country's level of social and economic development.

Cultural factors influence behavioral patterns that in turn may promote or endanger health.

Health Determinants, Economic

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Synonyms

Health care access; Health care utilization; Medical outcomes; Economic evaluation; Health impact assessment; Demand of health care

Definition

Health status is influenced by a multitude of factors. The health status and the health-related quality of life of individuals, or a specific population, are fundamentally determined by the environment and the circumstances (health determinants) of a person, or a population. It can be further assumed that economic circumstances have a considerable influence on the environment. Ironically, not only has the economy an influence on health status but health status has an enormous influence on income and economic growth. Our health status and our ► health-related quality of life is dependent on where we live, the condition of our environment, our individual genetic make-up, our income and educational level and social status. It is obvious that health determinants have to be included in a health economic analysis. Besides genetic prerequisites (biology and genetic endowment), gender and culture it is clear that economic circumstances have an enormous influence on health and health-related quality of life.

- **Social and economic environment:** Health is dependent on income and social status. The bigger the differences between the rich and the poor, the larger the differences are in the health status of a society. Resources should be sufficiently available to guarantee the imbedding of the individual into social support networks and social environments.
- **Physical environment:** An environment which maintains health requires a corresponding infrastructure which maintains a healthy environment (water, air, traffic, and home) and healthy working conditions. Health services which provide prevention, diagnosis and therapy have to be available. Individuals and the society in which they live have to have sufficient financial resources to maintain the desired environment and provide the essential infrastructures.
- **Individual characteristics and behaviors:** People with a low standard of education and literacy tend to be less healthy. Inadequate working conditions, stress and little self-esteem have negative effects on health. People who have secure employment are healthier, particularly if they have control over their work environment and their job. Balanced nutritional habits, physical activity, personal health practices and coping skills have a positive effect too. The fundamentals of healthy living are formed in childhood. It is essential to support individuals and whole populations; sufficient personal financial resources have to be provided.

Basic Characteristics

Health and Economic Growth

The targets of a health care system are the maintenance, support and recovery of the population's health in its group-specific and regional sub-structures. Objectives for political action can be derived from the general and special factors which determine health status and the health-related quality of life. Health policy related decisions can be aligned to the scope of actions mentioned above. Health equals wealth: countries with a high level of health grow faster than countries with a low level of health. There is also a linkage between improved health and the escape from poverty. Health interventions are subject to political decision-making processes since financial and social resources have to be utilized. From the economic point of view, scarce resources need to be utilized optimally; thereby maximizing the benefit for the individual and/or the whole society, thus, the health sector makes an important contribution to the welfare of a society. Despite the constant regrets about increasing expenditures, a paradigm shift is presently taking place in the perception of the health and social sector.

Health can no longer be seen as a dependent variable of economic and social development but has to be recognized as a factor for ► economic growth. This was recognized by the WHO commission examining the interrelations among investments in health, economic growth and poverty reduction (WHO Commission on Macroeconomics and Health 2001). The report on "Macroeconomics and Health: investing in health for economic development" detects several key findings: A worldwide scaling up of health interventions for the low-income countries of $30 to $40 per person will require approximately $27 billion per year in donor grants by 2007 ($38 billion per year by 2015). Around $6 billion per year are currently provided. These investments would save up to eight millions lives and they would translate into hundreds of billions of dollars of increased income. So, besides the expense of maintaining health, which burdens the economic disbursements for social systems and the nation's competitiveness subject to financial plans, the contribution of health care

to economic growth and employment is documented. The health status of the population has a qualitative and quantitative influence on human resources of a society and therefore is an essential input factor for economic growth. The productivity of workers is improved by health (qualitative dimension) and by the reduction of illness the number of workers is increased (quantitative dimension). Also, the market for individual health services with its various products, services and facilities is itself an industry where enormous sales can be made and in which many people can find jobs. The demand for a higher quality of life and a best possible state of health is not just based on an ethical and moral sense of justice; health represents a productive resource and therefore is of social value and promotes the growth of a society as a whole.

International differences in life expectancy provide a cross-national challenge concerning the maintenance, re-establishment and promotion of health as well as the financing of health services. Health-related political targets, outlined above, are dependent on the economic power or the social wealth of a country. Based on extensive literature, there is an obvious link or interrelation between health and poverty. Moreover there is an interrelation between health expenditure, gross domestic product, education and life expectancy. Taking these indicators into account the various health determinants are important parameters in a country's economy.

Health Determinants and Evaluation

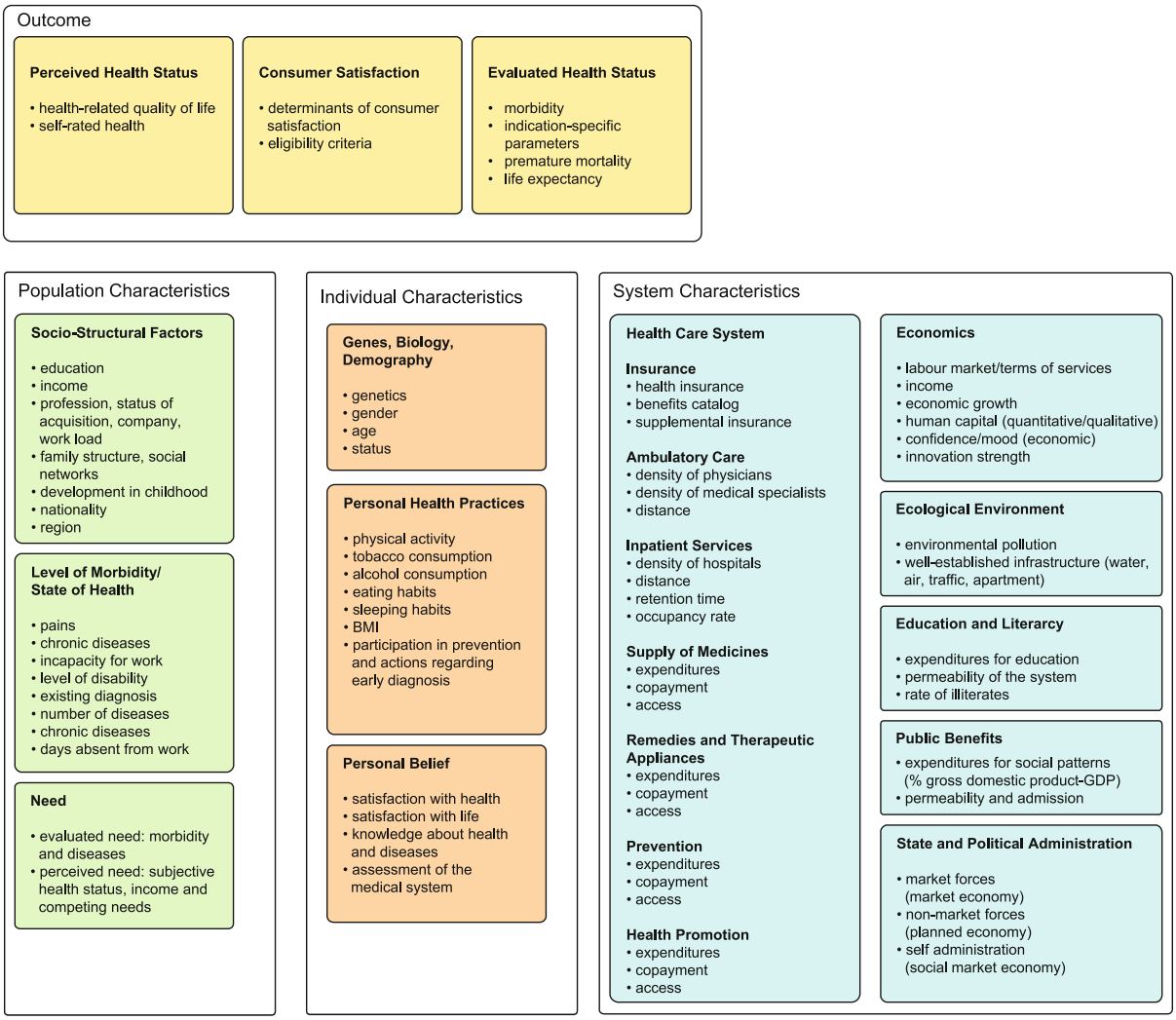
Measures of health promotion and health care interventions aim to affect health determinants. Intervention at both a governmental and a personal level are required. So, substantial environment, social environment and personnel resources need to be provided to promote changes in behavior – with the aim of increasing life expectancy and a health-related quality of life and reducing morbidity and early mortality. In terms of an optimal use of scarce health resources the achieved results (medical outcome and health-related quality of life) must be in relation to the used resources (input factors). Health economics play an important part in the evaluation of health and health care interventions and provide a set of techniques to assist decision making in the health care sector, to promote efficiency and ► equity. Making optimal decisions concerning the allocation of scarce resources can make a big difference in the degree to which health care systems continue to function; ultimately it can mean saving more lives and providing a better quality of life (social benefits). Health economics is about maximizing social benefits obtained from constrained health producing resources.

The ► health economic evaluation makes a comparison between alternative courses of action, therefore the existing options are evaluated in terms of both their costs and their benefits (Drummond 2005). On this basis a ► health impact assessment intends to identify the positive or negative impact, effectiveness, efficiency and eligibility of different populations. Due to complex causal pathways between interventions (projects, programs or political/social strategies) and a potential health impact at the individual or population-related level, a verification is often hardly possible. Numerous confounding factors do influence the outcome and impact (health status) so that the verification of an existing correlation between alternative action and changes of health status and a health-related quality of life is quite difficult (Andersen 1995; Sprangers and Schwartz 1999).

First the health determinants have to be registered and their influence or causal effect chain has to be described. Regarding the documentation of the results sources have to be made transparent and missing or incomplete information has to be pointed out. A comprehensive representation is based on qualitative and quantitative evidence. Therefore a model of demand and production of health-related products/services is required – including predisposing characteristics, enabling resource as well as need's influencing factors.

Demand and Health Care Utilization of Health Goods and Services

Due to the requirements mentioned above two theories out of economics and social sciences should be focused on in the following. Health economics deals with the claims and the production of medical care and health promotion. The supply and demand are described by models which explain the behavior of the interested people and contractors by economical decisions. Regarding the empirical revision of the assumption it has to be noted that the socio-scientific and health economic models are overlapping and develop into multivariate models. Socio-scientific and economic analysis



Health Determinants, Economic, Figure 1 Individual-, system- and production characteristics effecting health status

point out the behavior of individuals or whole populations by means of population-related and system-related characteristics. These can be completed by result-related characteristics of politics and production-related features.

One health economic model for estimating demands or claims on health goods and health services is the so-called Grossman Model (Grossman 1972). According to the basic models for the household productions Grossmann established a periodical model to present the demand for health. In 1986 Wagstaff developed a simplified presentation which is based on periodical presentations of Grossmann 1972 and also represents his three basic assumptions:

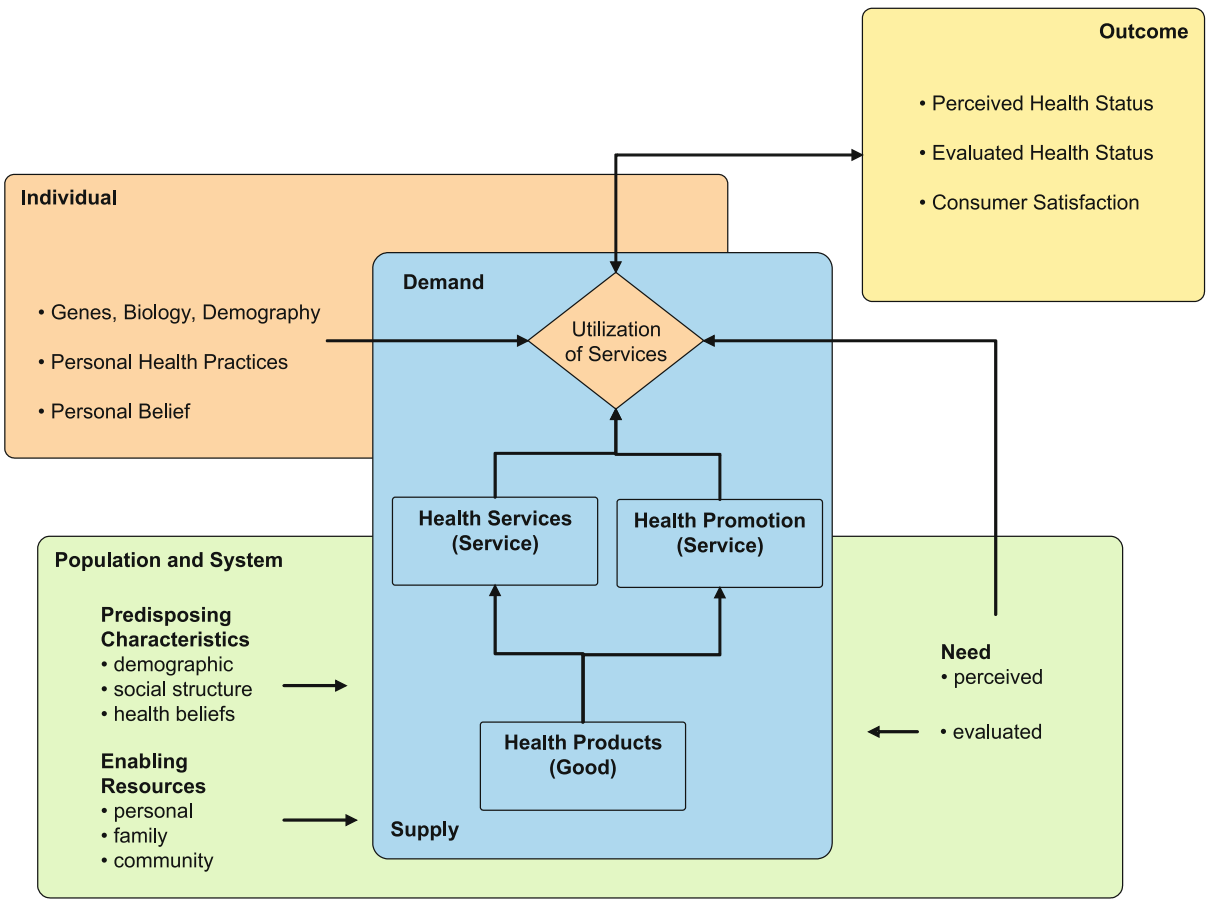
- Health is a human need besides other needs. With no doubt a good health status is the aim of every person; however, health is also competed with other needs. The satisfaction of these needs is competed with health: first by the consumption of scarce resources which could be used by health goods, on the other hand through the direct influence of health (smoking, alcohol etc.). The thesis, that health may be seen as the "uppermost commodity", can be questioned – often harmful behaviors are noticed. The capital stock of health depends on the claims of medical services and a deduction rate which is explicitly defined as a role of age (of capital stock of health) and the intensity of its use. With the help of the

deduction rate characteristics like health behavior or the education level can also be integrated into the model.

- The person's state of health is determined by the consumption of health goods or health services.
- In this model the demand for medical services is interpreted as a derived demand, i. e. the individual asks for health and not medical services. By the use of services (medical and custodial care or services of other professions in the field of cure) or the use of products (drugs, medical engineering, other means etc.) the health of the individual can be kept or restored completely or partly. The target regarding the consumption of health goods is the prolongation of life at simultaneous attention of the quality of life. The consumption of health goods or services takes place with exchange that is connected to costs. A connection between the earned income and the state of health can be established by ascribing an intensive and consumption use to a higher capital stock of health. There are only limited resources that are available for people interested in goods. Apart from an underlying health insurance, the basics of the model can be seen to be that the consumer of health services has to pay for it directly, i. e. he or she has to raise the amount for medical care, services or health products within the limited budget.

Some statements of the Grossman model have been disproved by the empirical evidence. According to the model the state of health and the demand for medical services have to be correlated positively, this has not been confirmed empirically.

Within the production of health services there is a distinction between the service level of the manufactoring of health products (level I: secondary sector) and the establishing of services (level II: tertiary sector).



Health Determinants, Economic, Figure 2 Synthesis of the determinants of the demands and the production of health

In economics, a service is the non-material equivalent of a commodity. The delivery of these services typically involves the following factors: service providers, equipment and physical facilities for service provision, the client and customer contact. During the provision of a health service a high degree of interaction between patient and service provider is required. The patient's cooperation is an additional component of the production (additional input factor). Therefore it is difficult to analyze behavior like utilization of health care services and the resulting outcomes.

A socio-scientific behavioral model was already published by Andersen at the beginning of 1970 (subsuming: Andersen 1995). This basic approach which was steadily developed over the years, contains a wide (potentially complete) spectrum of categories for subsuming of individual and social determinants which can influence the utilization of health services. The model is suitable for putting in an analytical order categories or determinants which can be consulted for the description, explanation and forecast of the utilization. The categories Predisposing Characteristics, Enabling Resources and Need are in the center of the model as magnitudes of influence on the demands of health services.

- **Predisposing Characteristics:** With this underlying item Andersen summarizes all features which indirectly affect the demands. These features include different areas like demography (age, gender), social structure (social status, education, etc.) and health beliefs (attitudes, values and knowledge related to health).
- **Enabling Resources:** These resources describe necessary conditions for the use of health services. It is distinguished between personal (income and the existence of health insurance and additional insurances) and community-related resources (the existence and the reachability of facilities at the habitation and working place).
- **Need:** Interestingly enough Andersen distinguishes between an affected person's need (according to the individual needs) and one by a professional sentence objectified need (subjective sentence of an expert).

Later the model was completed with the components *Outcomes* and *Environment*. Moreover Andersen and his co-workers completed the model with feedbacks of outcomes on ► population characteristics (population-related features) and on the health behavior. There are many international studies which base on the model of Andersen. The empirical explanatory power strength of Andersen's model is about 25% of the interindividual variance. The most important explanatory variable is the subjective assessment of own symptoms (Need) while other factors play a smaller role. Figure 2 gives a summary of the most important factors for the classification of the determinants related to health care utilization.

Cross-References

► Economic Growth
► Equity
► Health Economic Evaluation
► Health Impact Assessment (HIA)
► Health-Related Quality of Life (HRQOL)
► Population Characteristics (Demographics)

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Health Determinants, Environmental

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Synonyms

Environment-related determinants of health; Environmental health determinants; Social and physical factors influencing human health

Definition

The emphasis which research and public discussion are increasingly placing on environment and health is an expression of the growing importance which long-term assurance and improvement of both living conditions and the environment have as indicators and determinants of human health and welfare. The World Health Organization (WHO 1998) uses the term 'environmental health' to include all physical, chemical, biological and psychosocial factors which can have a potentially harmful effect on the health of both the currently living as well as the future generations.

Basic Characteristics

Statement of the Problem

During the 20th century, environmental determinants of human health (e. g., ► workplace hazards and living conditions, health services) and individual lifestyles (Naidoo and Wills 2003) underwent a change in quality mainly in the industrialized nations. Advances in curative medicine and environmental hygiene, improved living and working conditions, socio-economic and technological progress as well as availability of health care structures have contributed significantly to increase the life expectancy and quality of life (Kistemann et al. 2002). Although the environmental conditions have improved greatly thanks to technological progress and legal regulations (e. g., threshold values), the current high level of health is subject to interference from a number of factors which arise from new or recurring questions about the relationship between people and their environment (EEA 2003).

According to estimates, a fourth to a third of the world's ► burden of disease is due to environment-related ► risk factors. The WHO-commissioned Environmental Burden of Disease Study showed that about a third of all health problems in Europe affecting children and adolescents (i. e., from birth to the age of 19) can be traced back to environmental agents (Valent et al. 2004). In children aged 0–5, up to 40% of the total burden of disease is due to environmental risks (EEA and WHO 2002).

The Importance of Multifactorial Determinants of Public Health

While most deaths in developing countries are caused by communicable ► infectious diseases associated with poverty, scarcity of water, sewage disposal and poor hygiene – e. g., malaria, cholera and tuberculosis (WBGU 2005) – the so-called 'modern health risks' predominate in the industrialized nations. These stem from changes in lifestyle, a technological environment and global environmental processes such as climate change which increasingly endanger human beings and the environment beyond the local and the national level (Kevekordes and Mersch-Sundermann 1999). Typically, changes in the illness pattern show a shift towards ► chronic diseases (e. g., cardiovascular or nutrition-dependent diseases, allergies, asthma). On the one hand, these are caused by individual, lifestyle-associated risk factors (e. g., smoking, ► nutrition), on the other hand they are clearly connected to environmental factors. An explicit, causal relationship between exposure and effect can rarely be shown. Using a rough classification, the following must therefore be distinguished:

- multifactorial environment-related diseases (e. g., allergies) (Behrendt et al. 1999);
- diseases where environment involvement is discussed and where environmental factors can act as triggers or co-factors (e. g., some types of cancer) (Nguyen 2002);
- environment-related functional syndromes (e. g., multiple chemical sensitivity [MCS]) where environmental factors are discussed as possible contributory causes (Wiesmüller and Hornberg 2002); and
- ► somatoform disorders (Bullinger 2002).

In addition to their influence on health-related quality of life, these problems also have a significant economic aspect for the public health system (e. g., the burden of disease which is caused by environmental pollution due to road traffic and accidents). The causes of these health problems are likely to be found in various areas of life and in the everyday physical and social environment. Evaluation and assessment of the relevant environmental determinants must therefore base on an understanding of the environment that transcends a strict scientific and technological definition.

The Environment as Seen from the Public Health Perspective

Public Health in the context of ► ecological health promotion and ► environment-related health protection requires a concept of the environment which comprises not only environmental toxins, but living conditions in general. The one-sided biomedical definition with emphasis on pathogenetic factors must be expanded to include the central dimensions of the social, economic and cultural environment (Schmidt-Denter 2002) in the various areas of life (e. g., housing and health; Fehr et al. 2005) where physical, chemical, biological and social factors interact. A comprehensive understanding of the environment depends on a broader definition including psychosocial and ecological aspects and integrating the often neglected potential and resources found in the environment to promote and safeguard human health.

The Effect of the Environment on Human Health: Environmental Factors as Both a Resource and a Health Risk

Since human beings and their environment constantly interact with each other, the influence on human health by environmental factors must be seen as natural and hence unavoidable. Environmental resources like water, soil, air, plants, animals, microorganisms, electromagnetic and other ► radiation can act in two ways: On the one hand, they can promote human health. Contact with nature is able to help relax, alleviate ► stress and generally contribute to the individual well-being (RMNO 2004). Green spaces in residential districts improve the quality of recreation in public areas and have a positive influence on human activities. They encourage ► physical activity, thus indirectly promoting healthier ► behavioral patterns and hence improving the health status (Maller et al. 2005). On the other hand, an artificially altered environment can endanger human health. Potential environment-related threats can stem from a number of factors; e. g., harmful substances can be taken up through various routes, including the gut, the airways and the skin. The main factors are chemical (e. g., gases, particles, fibers, heavy metals, organic compounds, pesticides, estrogens in the environment), biological (e. g., microbial contamination of food, indoors contamination by bacteria and mold) and physical (e. g., ► noise, radiation) (Seidel 1998). Important social determinants (► health determinants, social) (Neuser et al. 2002) include isolation, poverty and discrimination. Human health is affected mainly by these factors acting in combination – also depending on the intensity, degree and duration of exposure – in different areas of everyday life such as home, food, leisure, work, traffic in ► urban environments etc. (Fehr et al. 2005).

The Home and the Living Space as an Important Environmental Determinant of Human Health

The home and the living space is where human beings spend most of their time. The importance of its resources and limitations as environment-related determinants of human health was rediscovered and made a topic of public ► health policy only a few years ago (Jackson 2003). Social ► epidemiology and hygiene research in the 19th century focused on hygiene standards and basic infrastructure. Nowadays, emphasis is on challenges posed by the increasing volume of individual travel, intensified land development (construction) to the detriment of green and recreation areas, as well as growing social problems (Stronegger and Freidl 2004). The home and the living space, who are related in a variety of ways (Schmidt-Denter 2002), are particularly well suited to illustrate the close correlation between the environmental burden, the availability of environment-related public health resources, as well as social status. Since a lower income is associated with a clear disadvantage regarding quality of home (e. g., construction) and living space (e. g., traffic, nearby industries), differences in exposure to physical and chemical factors show a definite correlation with education, income and professional status. Accordingly, the less affluent population shows a greater clustering of health risks and problems (Bolte and Mielck 2004). Unlike the ► environmental justice movement in the USA, in Germany these social inequalities started being addressed and were made a subject of public health research only a few years ago. Considering the potential effects of a high exposure, especially for socially disadvantaged groups and areas, there is a pressing need for action, including ► risk assessment, ► integrated environment-related public health reporting and ► health impact assessment (HIA). Population-related preventive ► environmental medicine – including the basic disciplines environmental hygiene, environmen-

tal toxicology and environmental epidemiology (Kistemann et al. 2002) – is a vital part of public health.

Strategies and Approaches for Promoting Environment-Related Public Health

In view of the scarcity of data regarding the actual risk potential of environmental factors endangering human health; cause-effect relationships; specific groups at particular risk from environmental factors (e. g., children, migrants, pregnant women, the elderly and sick people); ► gender differences in exposure and health effects of environmental burdens; social and regional distribution patterns of environmental burdens; as well as possible (eventually late) health effects of chronic, ► low-level exposure, etc. (Meyer and Sauter 2000), environment-related determinants of human health must be approached with prevention in mind by minimizing the risks and making the most of environment-related public health resources. Keeping an ecological perspective of human health and disease, this requires a holistic view of the environmental media, health-promoting resources as well as environmental toxins and their health effects while taking into consideration populations in their entirety and their interaction with the environment (Fehr et al. 2005).

While ► prevention starts with specific diseases or rather disorders and emphasizes lowering of risks, ► health promotion follows a resource-oriented approach. Despite different perspectives and strategies, prevention and health promotion can complement each other effectively in practice (Altgeld and Kolip 2004). The existing approaches for ► health behavior prevention – e. g., preventing exposure, promoting environmentally sound consumer behavior – aim at disseminating behavior prevention in the people's immediate environment. This would open up the possibility of not limiting environmental awareness in health promotion projects to just preventing danger and reducing risks, but implementing it from a health-promoting angle both in particular ► settings and at the community level. There is great potential for integrated programs which have become established both at the national and the international level in the last few years. They form the basis for an integrated cooperation of health, urban development and the ► urban environment. The most important programs are the 'Local Agenda 21', the German 'Healthy Cities Network' and the Federal-Länder Program 'Socially Integrative City' (Trojan and Legewie 2001). Their special characteristic is to focus on environmental *and* human health determinants and engage in transregional cooperation in different technical fields which shape environmental and living conditions (e. g., urban planning, environmental medicine, social work).

Cross-References

► Behavioral Patterns
► Burden of Disease
► Chronic Diseases
► Ecological Health Promotion
► Environmental Justice
► Environmental Medicine
► Environment-Related Health Protection
► Epidemiology
► Gender Differences and Health
► Health Behavior
► Health Campaigns
► Health Impact Assessment (HIA)
► Health Policy
► Health Promotion
► Infectious Diseases
► Integrated Environment-Related Public Health Reporting
► Low-Level Exposure
► Noise
► Nutrition
► Physical Activity
► Radiation
► Risk Assessment
► Risk Factor
► Setting
► Social Factors
► Somatoform Disorders
► Stress
► Urban Environments
► Workplace Hazards

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Health Determinants, Psychological

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Synonyms

Risk and protective factors of psychological health and well being

Definition

Health determinants follow a broad theoretical framework allowing the consideration of psychological, physical, biological, social and environmental protective and risk factors as well as the interplay of these factors affecting psychological health and general well

being. Psychological health is characterized by a continuum of health related conditions ranging from healthy states to ill conditions. Psychological health and its determinants represent a theoretical framework as well as an applied field for health psychology aiming at health promotion and prevention of illness as well as an approach to clinical treatment for established illness.

Basic Characteristics

Concept of Psychological Health

The definition of psychological or mental health has varied over time in terms of concept and complexity. A movement away from a definition of mental health as resistance to or absence of mental illness emphasizes the way a person felt about himself or herself, other people, and the world, particularly in reference to his or her own place in it, while special significance was attached to the person's feelings about earning a living and their responsibilities towards those who depend on them. This movement became known as positive mental health. In defining mental health, Ginsburg (1955) settled for simple criteria such as 'the ability to hold a job, have a family, keep out of trouble with the law, and enjoy the usual opportunities for pleasure'. A more complex definition is reflected by Jahoda (1958), who suggested six approaches to the concept. These approaches were based on:

1. self-concept and attitudes towards self, including accessibility of the self to consciousness for self-objectification, a correctness of self-report, self-acceptance, and a sense of personal identity;
2. self-actualization and positive growth motivation;
3. integration of personality, including the balancing of physic forces, a unifying outlook on life, and a capacity to withstand stress and tolerate anxiety;
4. autonomy, including a stable set of standards for one's actions and a capacity for relative independence from the social and physical environment;
5. perception of reality characterized by accuracy, freedom from need distortion and accurate empathy towards other people;
6. adaptation and environmental mastery, including the ability to love, to work, to play, to engage in interpersonal relationships, to meet situational requirements, to adjust, to solve problems.

Despite Jahoda's definition being criticized as an unreal expectation of universal bliss, it indicates the ideal of those who insist that mental health is more than absence of mental illness. In addition, this broad and complex definition is suitable for the concept of ▶ mental health promotion. Norman Sartorius, Director, Division of Mental Health, World Health Organization in Geneva states 'promotion of mental health means different things to different people. To some, it means the treatment of mental illness; to others, preventing the occurrence of mental disorders; and to still others, increasing the ability to overcome frustration, stress, and problems and enhancing resilience and resourcefulness' (Sartorius 1989).

Factors Influencing Psychological Well Being

Psychological well being is essentially a subjective construct, and people appear to derive an assessment of their own well being using both external (social and environmental) as well as internal (personal) indicators. Diener (1998) has contended that well being is related to inherited temperament in addition to factors such as person–environment fit, self-esteem, life tasks and goals and the sense of agency in the realization of these goals. This is consistent with the view that a strong sense of psychological well being may indicate an individual's perception of his mastery over life's challenges, especially in relation to that of others (Napholz 1994). A diminished sense of emotional well being may contribute to poorer health status by affecting health behavior and lifestyle as well as the level of risk awareness (Steptoe and Wardle 2001). This suggests that health and psychological well being are intimately related and also impact on socio-economic indicators such as employment since depression and the resultant low level of psychological well being has been shown to decrease the chances of obtaining and maintaining employment (Alexandre and French 2001).

Since life experience is an integral part of well being (Ryff and Heidrich 1997), the interpretation of these experiences in terms of the degree of satisfaction with life must also be important. Since subjective assessments are more influential in determining well being and life satisfaction than objective circumstances (Stedman 1996), it is clearly necessary to distinguish the internal determinants of well being from those that are predominantly social. In terms of public health and social policy, it is important to pay attention to people's perceptions of their own health, partly because of

the interactions between social relationships and physical and mental health. These interactions are even more significant when one considers how well being and satisfaction with life are inextricably linked to social and economic factors. In this larger context of social and economic development, Marsella et al. (1997) has suggested that success is meaningful only when it can be translated into personal well being and an acceptable degree of satisfaction with life. The other direction of this relationship also holds true; that sustainable social and economic development is most likely to occur when the members of a society have a sense of psychological well being and life satisfaction.

The Concept of Psychosomatic Medicine

The term *psychosomatic* emphasizes essential unity of the psyche and the soma, a combination rooted in ancient Greek medicine. Common disorders caused at least partly by psychological factors include childhood ► asthma (http://www.highbeam.com/doc/1E1-asthma.html), certain ► gastrointestinal problems, ► hypertension, ► endocrine disturbances, ► diabetes, and ► heart disease. In most psychosomatic conditions there is some interaction between psychological factors and physiological predisposition to the illness. Sigmund Freud, at the end of the 19th century, laid the scientific groundwork for psychosomatic study, with his theoretical formulations based on new methods of treating hysteria. His methods were reinforced by the psychobiology of the American psychiatrist Adolf Meyer and the research of the American physiologist W. B. Cannon on the physiological effects of acute emotion. The treatment of psychosomatic ailments may involve a medical regimen as well as some form of psychotherapy for the patient. In recent years, psychosomatic medicine has been subsumed under the broader field of behavioral medicine, which includes the study of a wider range of physical ailments. Understanding the psychological causes of various ailments is crucial: studies suggest that a large percentage of deaths are rooted in behavior. In the 1960s, concepts related to conditioning gained prominence, as researchers found that humans and animals could learn to control their autonomic nervous system responses, usually involved in psychosomatic complaints. Emerging from this research came the technique of biofeedback that provides individuals with information concerning their own physiological responses, which they may begin to alter through conscious techniques of control. The newest area of research related to psychosomatic medicine has been called ► psychoneuroimmunology, the study of the interactions of the endocrine system, central nervous system, and immune system. Researchers believe that studies of these biological systems can help to show how an individual becomes vulnerable to illness.

Definitions and Concepts of Prevention and Intervention

Two physicians, Hugh Leavell and E. Gurney Clark (1953) defined three levels of prevention that were applicable to all disorders and dysfunctions. The initial concept of prevention was rooted in a public health (community) perspective, and so pure prevention, specifically 'primary prevention', was aimed at groups and communities believed to be at increased risk for the development of a disorder or dysfunction. The standard epidemiological definitions of prevention appear in Table 1. Primary prevention reduces the prevalence of a disorder or dysfunction by reducing the number of new cases (incidence) that appear in a defined population. The goal of primary preventive interventions is to prevent the onset of a disease or disorder, thereby reducing its incidence (number of new cases occurring in a specific period of time). In essence, primary prevention may be dichotomized into two main endeavors: (1) actions designed to prevent the development of psychiatric disorders; (2) interventions designed to promote well being as an inoculant against dysfunction.

Secondary prevention reduces the prevalence of a disorder by reducing the duration of a disorder or dysfunction in individuals who have expressed signs and symptoms of that disorder. Secondary prevention is defined as early intervention and prompt treatment of the early signs and symptoms of an emerging illness or disorder, with the goal of reducing the prevalence (total num-

Health Determinants, Psychological, Table 1 Epidemiological definitions of prevention

Prevalence	= Incidence *x* duration
Incidence	= Prevalence/duration
Primary Prevention	Reduce prevalence by reducing incidence
Secondary Prevention	Reduce prevalence by reducing duration

H

ber of existing cases) of the condition by decreasing its duration. According to Cowen, there are two distinct pathways to secondary prevention:

1. identify prodromal signs of serious disorders early, so that prompt effective steps can be taken to divert dire psychological consequences;
2. identify signs of dysfunction as soon as possible in a person's life history and use the best available tools to short-circuit later, more serious problems.

Tertiary prevention is the reduction of the prevalence of residual defects or existing disability secondary to the presence of an illness or disorder (often of chronic nature and duration). Tertiary prevention refers to rehabilitative efforts to enable those with longstanding or chronic mental disorders or disabilities to function at their highest possible physiological and psychological level.

Any model for the prevention of psychiatric disorders must allow for many different types of interventions to co-exist in a comprehensive, coordinated, and collaborative program. The types of interventions that are currently being developed, implemented, and evaluated for the prevention of mental disorders and the promotion of mental health are quite broad (Tables 2 and 3), reflecting the multidimensional, multicausal, and multifactorial vies of psychiatric disorders and psychological health.

Cross-References

► Bronchial Asthma
► Diabetes mellitus
► Endocrine Disturbances

Health Determinants, Psychological, Table 2 Preventive interventions at different levels

Intervention Target	Level	Nature of Intervention
Individual and/or family	Case level	Intrapsychic, intrafamilial, interpersonal
Group of individuals or families	Class level	Familial/ subcultural
Local environment (i. e. institutions, agencies, neighborhoods)	Community level	Sociopolitical
Wider environment areas (i. e. national)	Central level	Sociopolitical

Health Determinants, Psychological, Table 3 Types of interventions

1.	Biological (drugs, nutrition, diet)
2.	Physiological (relaxation therapy, exercise)
3.	Cognitive/learning (problem solving techniques)
4.	Behavioral (stress reduction)
5.	Social skills training and competency building
6.	Environmental/ecological (family, workplace, community)
7.	Psychoeducational (coping, adaptation, appraisal and assessment)
8.	Media (TV, radio, magazines, newspapers)
9.	Social support/mutual help
10.	Job training

► Gastrointestinal Problems
► Heart Disease
► Hypertension, arterial
► Mental Health Promotion
► Psychoneuroimmunology

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Health Determinants, Social

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Synonyms

Socioeconomic influences; Social causation

Definition

The analysis of social determinants of health is concerned with how the health of populations is influenced by features of a society and its socioeconomic and sociocultural organization. To understand how the circumstances in which people live and work affect their health, descriptive and analytical knowledge is required, which is largely drawn from social epidemiology, sociology, and related public health disciplines. The largest variations in health between and within countries probably emerge from people's differential standing within in a societal hierarchy: the lower the individual's socioeconomic status, the poorer their health. Social determinants of health are explored both at the individual and aggregate level of data analysis.

Basic Characteristics

Levels and Trends

Throughout history, substantial differences in disease rates and mortality between and within countries existed, and continue to exist even in modern industrialized societies. In addition to a North-South gradient in health – with poorer health in less developed countries – an East-West gradient is observed, in particular between Central, Eastern, and Western Europe, where differences in life expectancy between e. g. men in Russia and Sweden are as high as 20 years.

The influence of ► social factors on health is not restricted to poverty and material deprivation despite their overwhelming impact in less developed countries. With the epidemiological transition from infectious to degenerative diseases as primary causes of mortality, ► health-adverse lifestyles have become major determinants. These lifestyles are shaped by specific cultural norms, economic incentives, and social pressures. A 'Western lifestyle', characterized by consumption of food rich in fat and calories, sedentary life, smoking, and alcohol consumption, among others, is being spread across the world, in particular across rapidly developing countries.

In recent decades, this 'wealthier' lifestyle has become more prevalent among lower socioeconomic groups. Hence, substantial social inequalities in health are observed, resulting in a social gradient: the lower a person's status (in terms of educational attainment, income, and occupational standing), the higher his or her risk of poor health. These differentials are substantial even in most advanced current societies, where mean life expectancy is shortened by five to six years among members of the lowest compared with the highest socioeconomic status groups (Mackenbach and Bakker 2002; Marmot and Wilkinson 2006).

Macrosocial and Microsocial Factors

Every human society is characterized by a set of social values, norms, and institutions that are instrumental for the survival and growth of its members. If these values and norms lose their validity and meaning or if patterns of social exchange become unpredictable and unstable, individuals tend to suffer from states of social anomie (lack of rules and orientations). A number of epidemiological investigations have explored adverse effects on health produced by sociocultural instability, by rapid social change, or by a high level of social anomie.

The majority of these studies found evidence of elevated risks of subsequent physical and mental illness (Berkman and Kawachi 2000). Thus, a stable social network and a particular quality of social exchange, termed social support, may act as protective resources in coping with stressful circumstances. Social support is defined as the experience of, or access to, social relationships that offer mutual understanding, trust, and solidarity, and that recurrently elicit positive emotions. Negative health effects result from social separation, social isolation, or exclusion. These microsocial conditions are reinforced by macrostructural patterns of

social disintegration and a shrinking social capital. Social capital describes reciprocal social exchange in neighborhood and community life, including solidarity and trust. As these conditions are more prevalent among lower socioeconomic groups, they aggravate the burden of disease in less privileged populations (Kawachi and Berkman 2003).

The Role of Work and Employment

Among the macrosocial and microsocial determinants of health, work and employment are of outstanding significance for several reasons. Having a job is a principal prerequisite for continuous income and, thus, for independence from traditional support systems (family, community welfare, etc.). Increasingly, the level of income determines a wide range of life chances. Furthermore, training for a job and achievement of occupational status are important goals of socialization. It is through education, job training, and status acquisition that personal growth and development are realized, that a core social identity outside the family is acquired, and that goal-directed activity in human life is shaped. At the same time, occupational settings produce the most pervasive continuous demands during one's lifetime, and exposure to harmful job conditions is an important determinant of disability and premature death in midlife.

People threatened by job loss, job instability, or downsizing, and people undergoing forced or downward mobility were shown to suffer from increased morbidity and mortality. With the advent of economic globalization and automatization, these conditions are likely to continue to impact on a substantial proportion of working populations. However, even within a stable work force, exposure to stressful work environments contributes to the burden of disease. These social determinants of health are not confined to physical adversity, but concern an adverse ► psychosocial work environment. A large body of evidence indicates that jobs characterized by high demands in combination with low control and employment conditions, defined by an imbalance between high efforts and low rewards in terms of money, esteem, or promotion prospects, adversely affect the health of working populations (Siegrist and Marmot 2006).

Life Course

Much of the social inequality in adult health is due to socially patterned environmental exposure in early life. Poor growth in utero, insecure attachment in early life, and early adversity (e. g. lone mothers, poverty) are more prevalent in deprived social groups and have long-term effects on health (Kuh and Ben Shlomo 2004).

Different developmental trajectories may aggravate the burden of disease later in life through increased vulnerability or accumulation of adversity. Adolescence is one such stage within the developmental trajectories with far reaching health effects, due to the fact that health adverse behaviors are acquired and reinforced during this period, particularly among socioeconomically and socioemotionally vulnerable groups. Exposure to adverse environments continues to affect health beyond working life as recent studies document a continuation of the social gradient of morbidity and mortality into early old age (McMunn et al. 2006).

Policy Implications

Despite the fact that a convincing body of scientific evidence on social determinants of health originates from observational studies rather than from randomized controlled trials, this evidence has direct policy implications at several levels. While it is difficult to target macrosocial levels of societal structures and processes, population health can clearly be improved by changing lifestyle-related behaviors and by modifying microsocial environments. Creating a nurturing environment for children, improving education and social skills, implementing health-promoting working conditions, and strengthening infrastructure and social capital in deprived neighborhoods and communities are examples of public health measures that aim to reduce social inequalities in health.

Conclusion

The world's population is experiencing substantial progress in life expectancy. Yet, adverse social conditions continue to affect health and to result in premature mortality. These conditions include poverty and social disintegration, unhealthy lifestyles, noxious and stressful working conditions, social exclusion from work and participation, and critical conditions during infancy, childhood, and adolescence. It seems unlikely that

these trends will be diminished in the near future. Moreover, pressures originating from population growth and poverty in developing parts of the world, new socioenvironmental risks, and man-made disasters may aggravate rather than moderate this burden. At the same time, with increasing awareness of public health evidence and increasing policy efforts, a sustainable and healthier future is still a realistic goal.

Cross-References

- ► Health-Adverse Life Styles
- ► Psychosocial Work Environment
- ► Social Factors

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Health Disparities

Synonyms

Disparity; Inequality

Definition

A broad term used to describe differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups – in particular those that occur by gender, race or ethnicity, education or income, disability, geographic location, or sexual orientation.

Health Economic Evaluation

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Synonyms

Economic evaluation of health care technologies

Definition

The term health economic evaluation describes the comparative assessment of costs and outcomes of alternative health care technologies or health strategies. The result of health economic evaluation studies is the incremental cost-outcome ratio (► incremental cost-effectiveness ratio), the relation of the estimated additional costs and the estimated additional outcome saved or lost by using an alternative health care technology.

Basic Characteristics

There are two main features of health economic evaluation. First, this kind of economic analysis evaluates the input and the output; the costs and the ► outcomes of health care technologies, respectively. The outcomes are sometimes also called benefits or consequences. The costs per one unit of a definite measure of outcome are defined as the cost-outcome ratio or cost-outcome relation, which expresses the value for money of a defined health care technology. Second, in health economic evaluations, the choice between two or more possible alternatives to improve a defined health problem has to be made. Therefore, health economic evaluations are by definition comparative. They compare at least two different alternatives and attempt to define an explicit set of criteria that may be useful for the decision that must be made in situations with scarce resources. If there is only one existing alternative or the costs or the outcomes of only one alternative are assessed, the study should not be described as a full economic evaluation, but only as a cost-, outcome-, or cost-outcome description (Berger et al. 2003; Drummond et al. 2005). Most economic evaluation studies compare two alternatives to solve a health problem in one defined medical indication. If generic outcome measures are used, it is also possible to compare health technologies used for

different indications and in different settings of health care from a theoretical and methodological point of view. Although in practice it is not yet fully implemented, in theory it is possible to evaluate a large number of possible diagnostic and therapeutic interventions – e. g. the whole catalog of reimbursed items of a sickness fund – and to list them according to their cost-outcome ratio in a league table. The most prominent representative is the QALY (► quality-adjusted life year) ► league table.

One key element of economic evaluations comparing alternative health care programs is the economic concept of "incremental change", which means that only the additional cost of an alternative is compared to the additional outcome gain. Consequently, in contrast to cost of illness studies, only the differences from one alternative to another (= increment) are considered and not the full range of all possible costs and outcomes. The main result of a health economic evaluation study is the incremental cost-outcome ratio (► incremental cost-effectiveness ratio), which expresses the additional costs per additional standardized outcome measure.

The results of economic evaluation studies are demonstrated graphically, in so-called cost-effectiveness planes, which show the incremental costs on the y-axis and the incremental outcome gain on the x-axis (Drummond et al. 2005; Drummond and McGuire 2001). The four quadrants of a cost-effectiveness plane illustrate the four possible relations of costs and outcomes comparing two alternative strategies e. g. a new technology and a standard treatment:

1. The new technology shows higher costs and a lower outcome (north-west quadrant)
2. The new technology shows lower costs and a better outcome (south-east quadrant)
3. The new technology shows lower costs and a lower outcome (south-west quadrant)
4. The new technology shows higher costs and a better outcome (north-east quadrant)

If the incremental cost-effectiveness is located in the north-west or the south-east quadrant, the decision for the less costly and more effective alternative can easily be made. One alternative shows a better outcome for lower costs and is the so-called ► dominant strategy. The decision for or against a new technology is more difficult if their incremental cost-effectiveness is located in the north-east quadrant. This is often the case for innovations because they tend to have an additional medical benefit combined with higher costs. In this case, the crucial question is what is the relation of the additional costs and the additional outcome? In other words, is it adequate value for money to use the new technology?

Establishment of an implicit or explicit ► threshold depends on the ability of the decision makers and the preferences of the society. So far, no official threshold has been established by decision makers, but implicit thresholds derived from reimbursement decisions of 50,000 EUR, 50,000 USD, or 30,000 BPS per life-year gained or per quality-adjusted life-year are discussed in the literature (Rawlins and Culyer 2004).

According to the type of outcome measure, four forms of full health economic evaluations can be differentiated (abbreviations in brackets) (Gold et al. 1996; Drummond et al. 2005; Kobelt 2002; CADTH 2006):

- Cost-minimization analysis (CMA)
- Cost-effectiveness analysis (CEA)
- Cost-utility analysis (CUA)
- Cost-benefit analysis (CBA)

For the description of cost-effectiveness analysis and cost-utility analysis, refer to the corresponding chapters: "► cost effectiveness" and "► value, human life – utilities". Some authors also use the term cost-consequence analysis for a type of study in which the costs and various outcomes are estimated without indicating the relative importance of the components listed; this approach leaves the reader or the decision maker to form their own view (► cost-consequence analysis) (Berger et al. 2003).

Cost-Minimization Analysis

In cost-minimization analyzes, it is assumed that all consequences of the compared alternatives are identical and that there is no additional benefit of the use of one or another of the alternative strategies. An example would be two drugs that lower the blood pressure with exactly the same side effects, quality of life, patient satisfaction, and interactions with other drugs. Consequently, making the assumption of identical outcomes, only the costs of the alternatives are compared.

This kind of health economic analysis is not usually recommended because, in most cases, it cannot be assumed that different alternatives show an identical outcome (Berger et al. 2003; Gold et al. 1996; Drummond et al. 2005; CADTH 2006). There is another sce-

nario in which cost-minimization analyzes can be chosen: if the aim is to demonstrate the dominance of one strategy. If a clear superiority of one alternative compared to another has been demonstrated in clinical studies and, in an additional cost-minimization analysis, the alternative with the better outcome also shows lower costs, there is a situation of dominance in which the decision is definitely made for the alternative with lower costs and better outcome.

Cost-Benefit Analysis

In cost-benefit analyzes, all costs and all outcomes are expressed in monetary units (e. g. EUR or $). The result is given as a net calculation of gain and loss (in contrast to CEA and CUA in which the results are expressed in cost-outcome ratios).

The costs of the intervention are measured. The outcomes and benefits for the patients are also expressed in monetary items using methods of valuation of the patients' observed or stated preferences. The most common approach is to determine the ► willingness-to-pay, meaning that individuals are asked to define the amount of money they would be willing to pay to avoid a certain health state or illness. Willingness-to-pay can be determined either directly by trained interviewers (► contingent valuation) or indirectly by drawing conclusions from the behavior of individuals (► revealed preferences).

The main advantage of cost-benefit analyzes is the generic approach. Due to the fact that no specific outcome measure has to be chosen, very heterogeneous technologies, with any kind of benefit that patients consider beneficial enough to attribute a certain amount of money to, can be compared. Cost-benefit studies are widespread outside the health care sector but, due to the ongoing methodological dispute over measuring and quantifying the medical benefit of health care in monetary terms, they are currently less common and less important for decision makers in health care resource allocation.

For the costing process, refer to the chapters about ► economic measures and ► cost of illness – costing.

Time Horizon

For economic evaluation studies, a time period that covers all relevant consequences of the intervention should be considered (Gold et al. 1996). This so-called ► time horizon is often longer than the follow-up period of clinical or epidemiological studies. This has two consequences: (1) it has to be acknowledged that, for economic evaluation studies, the standards of evidence-based medicine cannot be used in the same strict manner as is common with clinical trials. (2) the time exceeding the follow-up period of randomized clinical trials or epidemiological studies can only be estimated by ► modeling (Buxton et al. 1998).

Data Sources

In health economic analyzes, it is not usually possible to base the complete calculation on primary data individually collected from the included study population. Usually, the primary data of randomized controlled trials or epidemiological analyzes are combined with a number of different additional data sources such as administrative data from sickness funds, routine data sets from official statistics, and reimbursement catalogs or predefined package definitions e. g. from DRG catalogs or treatment guidelines (CADTH 2006). Also in contrast to clinical studies, data collection in health economic analyzes can not only follow the described bottom-up approach but can also use routinely collected large data sets, e. g. of sickness funds or health care organizations (► claims data analysis), as the basis of the analysis in a top-down approach. Following the framework of evidence-based medicine, these retrospective analyzes of routine data, which are quite commonly performed in the US, have less scientific evidence compared with randomized controlled studies (Sackett et al. 1996). However, to gain knowledge about real-life routine care, such studies offer clear advantages by avoiding strict patient selection and an artificial study-determined treatment setting.

Cross-References

► Claims Data Analysis
► Contingent Valuation
► Cost-Consequence Analysis
► Cost-Effectiveness
► Cost of Illness – Costing
► Dominant Strategy
► Economic Measures
► Incremental Cost-Effectiveness Ratio
► League Table
► Modelling

- ► Outcome (Health Economics)
- ► Quality-Adjusted Life Years (QALY)
- ► Revealed Preferences
- ► Threshold
- ► Time Horizon
- ► Value, Human Life – Utilities
- ► Willingness to Pay

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Health Economics (Burden of Disease)

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Introduction

Health economics is the application of economic theory and economic methods to phenomena and problems associated with health (Culyer 2005). A comprehensive taxonomizing framework that systematically includes the various topics of health economics was developed by Alan Williams from the University of York. The "Williams' Schematic of Health Economics" (Culyer and Newhouse 2000) conceptualizes this definition (► health economics, concepts). Topics of health economics include – among others – the meaning and measurement of health status, the production of health and health services, the demand for health and health services, ► cost-effectiveness analysis, economic evaluation, health insurance, health care financing, equity problems, the organization of health care markets, methods of remuneration of physicians, performance management of health care organizations, and economics of comparative health systems (Culyer 2005; Jones 2006).

This synopsis of the field of health economics is divided into two main parts. The first part covers research topics of health economics which are summarized under the heading health care system design. This part includes topics such as methods of health care financing, problems of health insurance markets, regulatory mechanisms, and systems of provider remuneration. The second part of the synopsis covers topics that are related to the economic evaluation of health care technologies and interventions. These topics include costs of illness, and cost-effectiveness and cost-utility analyses, as well as the question whether the value of human life (► value, human life) can be reflected by these concepts. The bridge between the two parts is built by a summary of the ► burden of disease concept of the World Health Organization (WHO). This generic and mainly epidemiological approach should not be seen as an integral part of health economics, although there are clear implications for health economic topics such as health care financing and cost of illness.

Health Care System Design

Economic theory – more specifically neoclassical microeconomic theory – generally assumes that a competitive process of adjusting demand and supply of goods and services will lead to an optimal allocation of scarce resources. This process should be left alone by policy makers and public interventions. If it is not, economic incentives for the modification of supply and

demand will be disturbed and market forces will not be able to reach the allocative optimum.

However, health care systems around the world are heavily regulated – which is even the case for rather libertarian countries such as the US. The reasons for this rather extensive regulation are a number of severe market failures in health care markets. Health economics provides some important tools to analyze the origin of market failures and to develop solutions to deal with them. In this section, the most important market failures on the demand side as well as on the supply side of health care markets are summarized. Moreover, policy tools that have been designed to address them are discussed.

According to microeconomic theory, demand is the mechanism which drives a competitive economy (Rice 2002; Folland et al. 2007). Demand is the key: the amount of goods and services that is produced and consumed is determined by the preferences of consumers. In the long run, supply adjusts to demand. However, demand theory is based on a number of important assumptions. Specifically, the following assumptions need to be fulfilled (Rice 2002) (► consumer choice):

- Individuals are the best judges of their own welfare.
- Consumers have sufficient information to make good choices.
- Consumers need to know the results of their decisions.
- Individuals are rational.

Most of the time, these assumptions are not fulfilled in health care markets. Individual consumers usually lack the medical education needed to execute informed choices on treatment options. The outcome of medical interventions (or non-interventions) is not always clear for consumers of health care services. The rationality of consumers is disturbed by the often very personal consequences of consumption decisions. If the demand for health care services were unregulated and were left to the competitive process only, severe market failures would occur. The economic and medical results of these market failures – most importantly unequal access to health care services – are generally not acceptable to societal preferences. As a consequence, designers of health care systems usually restrict individual choice – e. g. by requiring mandatory coverage of health insurance.

In most microeconomic applications, supply plays a subsidiary role to demand. It is generally assumed that supply adjusts if consumers' preferences change. Again, supply theory is based on a number of crucial assumptions, most importantly that supply and demand are determined independently. Once more, this essential assumption is not fulfilled in most health care markets. Supply and demand of health care services are closely interlinked, which is clearly contradictory to the traditional microeconomic model. Health economics closely studies the question of whether health care providers – particularly physicians – act as perfect agents for their patients or whether physicians are able to induce demand for their services among patients (Rice 2002). Health economists generally agree that physicians – the suppliers – are able to induce demand for their services, at least to some degree. As a consequence, designers of health care systems have come up with a variety of policy measures to reduce incentives to induce demand.

Table 1 summarizes the dimensions of health care system design (► health systems). Policy makers around the world heavily regulate health care financing, demand, and supply as a consequence of market failures in health care markets which are not socially acceptable. The role of health economics in this process is twofold. It analyzes market failures themselves and develops possible instruments for solutions – e. g. justifying universality of access as a consequence of non-rational consumers. Moreover, health economics also analyzes problems that occur due to the introduction of solutions to the original problems – e. g. non-optimal consumption of medical services because of universal coverage. In the remainder of this section, the dimensions of health care system design and the role of health economics are discussed in more detail (► regulatory mechanisms).

Health Economics (Burden of Disease), Table 1 Dimensions of health care system design

Health care financing	Universality of access Tax-financing vs. financing by health insurance premiums Role of private health insurance Single payer vs. multiple payers
Regulation of demand	User charges Basket of health care services
Regulation of supply	Remuneration of physicians and hospitals

Source: Based on (Rice 2002)

The first dimension of health care system design is health care financing (► health financing). With the exception of the US, Organisation for Economic Co-operation and Development (OECD) countries strive for universality of access to health care services. Universality of access can be justified for allocative as well as for distributive reasons. On the one hand, consumers may be willing to buy health insurance but they are unable to buy it if premiums are risk-rated – which will lead to distributive consequences that are socially unacceptable in all OECD-countries outside the US. On the other hand, adverse selection may also result in non-optimal market outcomes. Adverse selection can occur if health insurers set their premiums in relation to the average health risk of a population and consumers have different probabilities of illness. In that case, consumers with low probabilities may refrain from taking out health insurance. They may even consume health care services without paying for them – e. g. if these services are paid for by welfare or social assistance (free-rider behavior). At the same time, consumers with high probabilities of illness will most probably seize the opportunity to take out health insurance eagerly. If this is the case, insurers need to cover clients who incur higher health care expenditures than expected and therefore insurers need to raise premiums, which in turn further decreases incentives for low-risk individuals to take out health insurance. Universality of access is achieved by tax-financing of health care in countries such as the United Kingdom, Canada, or Scandinavian countries. In these countries, residents are eligible to consume health care services that are financed out of general tax revenue. Another possibility to achieve universality of access is mandatory universal coverage by social health insurance. In countries such as the Netherlands, Switzerland, and – for part of the population – Germany, consumers are obliged to take out social health insurance. Premium rate restrictions apply to make sure that individuals with high health risks are able to afford health insurance premiums. The US stands out because consumers in the US are not required to take out health insurance.

Universality of access can be achieved in tax-financed health care systems as well as in health care financing systems that rely primarily on social health insurance premiums. However, there are other policy objectives that may determine the choice between tax-financing and financing by health insurance premiums – notably implications for the redistribution of income and implications for employment. Implications for the redistribution of income in social health insurance systems very much depend on the mode of premium calculation. In tax-financed national health systems, implications for the redistribution of income depend on the design of the tax system (Wagstaff and van Doorslaer 2000).

If health care financing systems contain a direct link between health care expenditures and labor costs, rising health care expenditures lead directly to rising labor costs. Moreover, if there is a direct link, rising health care expenditures increasingly drive a wedge between labor costs of the employer and net wages of the employee. As a consequence, microeconomic labor market theory generally assumes that incentives for the employee to work diminish. What is more, incentives for the employer to substitute capital for labor – or to substitute cheaper labor abroad for domestic labor – increase. Therefore, all other things being equal, employment goes down. The growth of health insurance premiums may consequently result in a drain on employment in employment-based health insurance schemes, such as in group-based private health insurance in the US or social health insurance in Germany (► labor market).

With the notable exception of the US, OECD countries do not rely on private health insurance as a predominant mode of health care financing (► health insurance markets). Private health insurance serves three distinct functions. The first is as an *alternative* to other social health insurance or public arrangements. The second function is to *supplement* basic health insurance or tax-financed health care, providing coverage for services not covered by the public arrangement or to cover the financial risks of co-payments and coinsurance. A third function of private insurance is to provide what can be termed *complementary or double-cover* coverage, in which consumers purchase additional private health insurance even though they have to participate in existing public schemes (Colombo and Tapay 2004).

Tax-financed systems, such as those in the United Kingdom, Canada, and Scandinavian countries, are non-competitive single payer systems. The term single payer system means that in any given region, only one payer organization – such as primary care trusts in the UK – is purchasing care on behalf of patients. In the 1990s, the UK government strived to introduce internal markets (► health systems reforms). The competitive

nature of the market was supposed to provide the necessary incentives for health care providers to improve efficiency and responsiveness of the system. Internal markets were replaced by primary care trusts which emphasize cooperation rather than competition (Oliver 2005). Social health insurance systems may also be non-competitive systems – as is the case in France. However, as a result of a number of health insurance reforms in the 1990s (► health systems reforms), several countries, such as Germany, the Netherlands, and Switzerland, introduced competitive multi-payer systems based on a regulative framework of regulated competition (► competition, health care). A key element of regulated competition is an effective method of risk adjustment in order to neutralize incentives for risk selection by competing health insurers (van de Ven et al. 2003). Consumer choice (► consumer choice) is another key element in increasing competitive pressure for health insurers. Consumer choice is less pronounced in the competitive multi-payer private health insurance market of group contracts for the non-elderly in the US. In most cases, employers purchase a number of options for employees and the employees' choice is limited to these options (Dowd and Feldman 2006).

As noted above, microeconomic theory strongly emphasizes demand as a driving force of competitive markets. This logic is also inherent in most theoretical models of health economics. However, in order to avoid market failures, demand for health insurance and health care services by individual consumers is heavily regulated in most OECD-countries. From an economic point of view, however, universal access to health insurance leads to over-consumption. The rationale behind this argument is quite straightforward: because the marginal price of health care services is lower than marginal utility – the price is zero if there is full coverage without user charges – consumption of health care increases. This effect is called ex-post moral hazard and is generally considered to result in a welfare loss to society. Ex-ante moral hazard refers to the effect that being insured has on behavior – notably, less effort for preventive activities. This theoretical argument has been confirmed empirically. In a unique natural experiment (RAND health insurance experiment), it has been shown that demand for health care services increases as coverage by health insurance goes up (Newhouse and Insurance Experiment Group 1993). Health economists usually suggest introducing user charges at least for health care services that are elastic in price – specifically non-urgent, elective health care services. As a consequence, patients will refrain from using health care services that provide a low marginal utility (Cutler and Zeckhauser 2000). However, the share of non-urgent elective health care services as a share of total health care expenditure is rather small (► health care costs). Moreover, due to severe information asymmetries, user charges may also deter consumers from using health care services that provide high marginal utility. The RAND health insurance experiment has also shown that consumers reduce consumption across all health care services if user charges are introduced, they do not differentiate between services which were considered to be highly or rarely effective (Lohr et al. 1986).

The problems of adverse selection and moral hazard are also important for the definition of the basket of health care services that are provided by health insurance. If the basket of health care services is not standardized – as is the case in most private health insurance schemes in the US and elsewhere – low risk individuals may find it attractive to choose a basket of health care services which provides only very basic coverage. At the same time, high-risk individuals will most probably choose maximum coverage – which results in adverse selection. If regulation mandates an extensive standardized basket for health care services in order to fight adverse selection, problems of over-consumption (moral hazard) will develop. As noted before, user charges will only solve this problem if consumers are able to identify health care services with low marginal utility – which is rather doubtful. Regulation usually attempts to solve this dilemma between adverse selection and moral hazard by the centralized assessment of marginal benefits of health care services. In fact, the economic evaluation of health care interventions, which is performed by the National Institute of Clinical Excellence in England and by other institutions in other countries, seeks to substitute the individual assessment of marginal costs and marginal utility with a collective assessment of marginal costs and marginal utility.

As noted before, traditional microeconomic theory does not put much emphasis on the supply of goods and services. Supply is supposed to adjust to changing preferences of consumers. However, it can also be argued that demand is not determined independently of supply. The suppliers of health care services – primarily physicians and hospitals – do not act as perfect agents of

their principal – the patient. As a consequence, health economics is concerned with the regulation of supply of health care services as well – more so than traditional microeconomic theory is concerned with producers. Health economics aims primarily to develop remuneration systems with the goal of making it advantageous for the physician to behave in a way that is in the patient's and the payer's best interest (► regulatory mechanisms). Traditionally, research was focused on fee-for-services payment systems – which contain incentives for over-utilization of health care services – and on capitation payment systems, which developed primarily in managed care organizations and contain incentives for under-utilization of health care services. Recently, research has been focused on "pay-for-performance" schemes. In these schemes, the remuneration of physicians and hospitals is linked to defined quality performance thresholds (Rice 2006).

Burden of Disease

The term ► burden of disease generally describes the total, cumulative consequences of a defined disease or a range of harmful diseases and their respective disabilities on a community. This approach combines measurement of mortality and morbidity with non-fatal outcomes, such as quality of life aspects. The gap between an ideal situation, where everyone lives free of disease and disability, and the cumulated current health status is defined as the burden of disease.

In the 1990s, the WHO, in co-operation with Harvard University and the Worldbank, developed a methodological concept to quantify the global burden of disease based on statistical measurement of the disability-adjusted life year (DALY). The DALY aggregates the time lost because of premature mortality and the time spent in a limited health state (Homedes 1996). Consequently, the DALYs for a defined disease or health condition are calculated as the sum of the years lost due to specific premature mortality and the years lost due to disability for incident cases of the health condition. Further time discounting and non-uniform age weights give less weight to years lived at a younger age.

The cumulated disease-specific DALYs aggregated according to the country-specific prevalence of the diseases and disabilities considered reflect the burden of disease of a specific society or a country. The Global Burden of Disease concept of the WHO compares a large number of low-, middle-, and high-income countries with regard to their country-specific burden of disease, and offers mortality figures, which refer to the number of people who die and the causes of death. Thus a comprehensive and consistent set of estimates of mortality and morbidity is given, expressed by the single indicator DALY and differentiating by age, sex, and region.

Economic Analyses of Defined Health Care Technologies and Interventions

This field of health economics is characterized by the intention to describe or investigate economic aspects of defined health conditions or the use of defined health care technologies. Health care technology in this case stands for all diagnostic, therapeutic, rehabilitative, or palliative procedures that influence the health of an individual. With relevant influence from medical sciences, the concepts can be subdivided into: (1) mainly descriptive studies with epidemiological elements and the intention to describe real-life health care settings, and (2) study designs derived from the methodological concepts of clinical studies, which focus on clearly defined medical interventions in often highly selected patient groups, typically not only giving an average measure for the costs and the medical outcome of patients but further aggregating the results to a more abstract ratio of the costs per a predefined outcome such as life-year gained. Examples of the first group of study designs are cost of illness studies, decision analytic health policy models, and budget impact analyses. Classic economic evaluation studies such as ► cost-effectiveness or cost-utility studies are examples of the second group (Gold et al. 1996; Drummond et al. 1997). Inclusion of costs distinguishes health economic analyses of defined health technologies from epidemiological or clinical studies. Costs refer not only the costs of the intervention but also the costs of all direct or indirect consequences of the use of the technology. There are some general aspects of the costing process (the measurement of costs) such as the perspective, approaches, sources of data, and the types of costs, which will be described before the different study designs are mentioned (Canadian Coordinating Office for Health Technology Assessment (CCOHTA) 1996; Canadian Agency for Drugs and Technologies in Health (CADTH) 2006).

Time Horizon and Modeling

For many diseases, the medical and economic consequences of a more successful therapy compared to a less successful alternative are relevant for a long period of time, often a patient's lifetime. In many cases, e. g. screening tests or other measures for primary or secondary prevention, the medical and economic benefits often occur a long time after the intervention. For economic evaluation studies, therefore, a time period that covers all relevant consequences of the intervention should be considered (Gold et al. 1996). This so-called time horizon for comparing health economic analyses is often longer than the limited follow-up period of clinical or epidemiological studies. This has two consequences: (1) it has to be acknowledged that the standards of evidence-based medicine cannot be used for economic evaluation studies in the same strict manner as is common with clinical trials; (2) the time exceeding the follow-up period of randomized clinical trials or epidemiological studies can often only be estimated by ► modeling. Widespread modeling techniques such as medical decision tree analysis, Markov models, or discrete event simulation are seen as standard methods for estimating the medical and economic consequences of many health technologies in the patient's lifetime, but it has to be assured that the studies are conducted and described transparently and with high methodological standards (Philips et al. 2004).

Perspective

The perspective of an economic analysis of a health care technology describes the point of view which is taken for the costing and, if relevant, for the outcome measurement. The choice of the perspective is a basic decision to be made for every analysis and can crucially affect the result of the calculation. It especially influences determination of the costs. From a societal perspective, all costs and benefits are taken into account, including productivity loss due to a health state, treatment, or diagnostic procedure. From the narrower perspective of a health insurance or sickness fund (often called the payer's perspective), only their own expenses, expressed as reimbursement rates in different sectors of the health care system, are relevant. From the perspective of an institution like a hospital, only the costs to the institution itself that are incurred during the inpatient stay are considered. The most important perspectives are the societal, the payer's, and the institutional perspective. According to most recommendations for economic evaluations in health care, a societal perspective should be considered at least in addition to other perspectives that have been chosen (Gold et al. 1996; Drummond et al. 1997; Canadian Agency for Drugs and Technologies in Health (CADTH) 2006).

Costing Process

In general, all costs related to the use of a technology should be identified and considered to be relevant. These costs are the monetary equivalent of resources such as goods or professionals' time. The resources are measured in quantifiable physical units e. g. inpatient days or GP contacts, as detailed as necessary for the analysis, and should be differentiated in categories that are appropriate to the decision makers. The measured resources are valued in a second step to express them in monetary units (Canadian Coordinating Office for Health Technology Assessment (CCOHTA) 1996; Gold et al. 1996). For valuing, mainly standard reimbursement or pricing catalogs are used. It has to be kept in mind that these charges are not necessarily identical to the costs according to the economic theory, which requires that the opportunity costs and the benefits that could have been derived from funding the next best alternative should be estimated. With rare exceptions in health economic analyses, the opportunity costs of health care resources can only be approximated using charges, assuming also that charges are the result of a societal process like the price of any other good in a functioning economy.

In health economic analyses, it is not usually possible to base the complete calculation on primary data collected individually from the study population included. Usually, the primary data of randomized controlled trials or epidemiological analyses are combined with a number of different additional data sources such as administrative data from sickness funds, routine data sets from official statistics, reimbursement catalogs, or predefined package definitions e. g. from DRG catalogs or treatment guidelines. Also, in contrast to clinical studies in health economic analyses, data can be collected by a top-down approach, using routinely collected large data sets e. g. of sickness funds or health care organizations as the basis of the analysis, as well as the described bottom-up approach. Following the

framework of evidence-based medicine, these retrospective analyses of routine data that are quite commonly performed in the US are considered a lower grade of scientific evidence compared with randomized controlled studies. However, to gain knowledge about real-life routine care, they offer clear advantages by avoiding strict patient selection and an artificial study-determined treatment setting.

Direct Costs

Direct medical costs are defined as the costs related to the provision of the health care intervention itself, including all side effects and all future consequences on health care diagnosis and treatment in different health care settings (e. g. inpatient hospital treatment, ambulatory care, drugs, rehabilitation). In some diseases, direct non-medical costs, e. g. for transportation or child care during a medical intervention of the parent, can also be incurred.

Indirect Costs

The so-called indirect costs incorporate the loss of productivity suffered by the national economy. Indirect costs can be due to decreased efficiency or total absence from work through illness – either for a limited number of days of absence or due to early retirement – or premature death.

There are two ways of calculating indirect costs: (1) the human capital approach and (2) the friction cost approach. Both approaches are based on the assumption that the lost productivity can be valued by the achievable gross income of the employed population, giving the labor a defined value (► labor market). Using the human capital approach, the entire period of absence from work due to illness is considered and valued by the achievable gross income. The human capital approach is based on economic theory and gives a maximum possible productivity loss (Sculpher 2001). The friction cost method more accurately estimates the actual loss of productivity in western industrialized countries. This method takes two main aspects of criticism against the human capital approach into consideration. First, some part of a short-term work absence, e. g. due to an influenza infection, is compensated for either by colleagues or by the employee when back at work. Second, in societies with a significant percentage of unemployed people, a large percentage of positions will be taken by a previously unemployed individual after a certain time, called the friction period (Koopmanschap et al. 1995). Using the friction cost method, only the shorter friction period is valued by the average achievable gross income.

The human capital approach is considered to be the simpler and more frequently used approach and is therefore recommended by a number of guidelines for economic evaluation studies, although it is also recommended that the friction cost approach in an additional scenario or at least a sensitivity analysis should also be calculated (Gold et al. 1996).

Cost of Illness Studies

The term ‘cost of illness’ has to be seen as separate from the ► burden of disease concept of the WHO. While the burden of disease concept is a generic approach, estimating the burden of all relevant diseases of a large number of populations, cost of illness studies are defined as analyses of the total costs due to one specific disease or health condition in one defined population.

In cost of illness studies, the total economic impact of a disease or health condition on society is estimated by identification, measurement, and valuation of all direct and indirect costs. This form of study does not focus on a particular intervention and does not address any questions regarding treatment efficacy or efficiency. Cost of illness studies usually adopt a societal perspective, measuring the financial burden incurred in different sectors of society such as the state or government, health insurers, and individuals.

The costs of illness can be estimated by taking into account the costs associated with all patients with a defined health state in a specific limited time period (prevalence method) or by calculating the long-time costs associated with those patients whose illness is newly diagnosed during a specific limited time period (incidence method).

Costs of illness calculations create information about the amount of resources spent on the treatment of a disease. This information can be helpful in generating hypotheses for health economic evaluation studies that compare different intervention strategies. Furthermore, the results can be used to set priorities for research activities regarding diseases with a larger potential of cost savings if more cost-effective alternatives would

be preferred. In situations where there are limited resources for health care, this information could be misunderstood as a signal to cut down resources primarily in the treatment of the most expensive diseases. A rational decision for more cost-effective alternatives should be prefered which not only considers the costs but also includes factors related to the medical benefit and therefore has the opportunity to produce more value for money in health care.

Economic Evaluation of Health Technologies

Economic evaluation studies are a systematic method of comparing two or more health technologies that can be used alternatively, by measuring the costs and the consequences (outcomes) of each alternative. As the outcome comparator, disease-specific measures such as time to relapse or events avoided, or generic measures such as life-years gained or utilities, can be chosen.

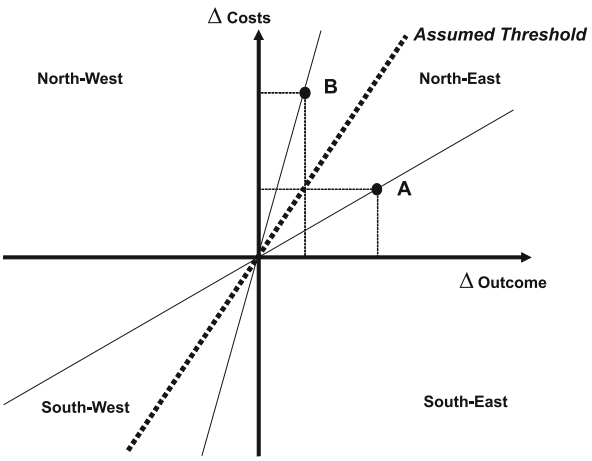
One key element of economic evaluations comparing alternative health care programs is the economic concept of "incremental change" which means that only the additional costs of an alternative are compared to the additional outcome gain. Consequently, in contrast to cost of illness studies, it is not necessary to calculate the full range of all possible costs and outcomes but only the difference (increment) between one program and an alternative.

The central result of a ► health economic evaluation study is the incremental cost-outcome ratio, expressing the additional costs per additional standardized outcome measure. Common examples are the costs per life-year gained or the costs per event avoided.

The results of economic evaluation studies are commonly demonstrated graphically in so-called ► cost-effectiveness planes showing the incremental costs on the y-axis and the incremental outcome gain on the x-axis (Black 1990; Drummond et al. 1997). The four quadrants of a cost-effectiveness plane illustrate the four possible relations of costs and outcome when comparing two alternative strategies e. g. a new technology and a standard treatment:

1. The new technology shows higher costs and a worse outcome (north-west quadrant)
2. The new technology shows lower costs and a better outcome (south-east quadrant)
3. The new technology shows lower costs and a worse outcome (south-west quadrant)
4. The new technology shows higher costs and a better outcome (north-east quadrant)

If the incremental cost-effectiveness is located in the north-west or the south-east quadrant, the dicision for identification of the less costly and more effective treatment is clear. One treatment shows a better outcome for lower costs and is dominant over the other. The decision for or against a new technology is more difficult if their incremental cost-effectiveness is located in the north-east quadrant. This is often the case for innovations because they tend to have an additional medical benefit connected with higher costs. In this case, the crucial question is: what is the relation of the additional costs and the additional outcome? In other words, is a new technology adequate value for money? Figure 1 shows a schematic cost-effectiveness plane. The use of the new technology B is responsible for higher additional costs and lower additional outcome compared with standard treatment than the new technology A. Technology A is more cost-effective than technology B. However, both new technologies are located in the north-east quadrant. Standard treatment is less effective but also less costly. The decision to use an implicit or explicit threshold depends on ability and the preferences of society. So far, no official threshold has been established by decision makers, but an implicit threshold of 50,000 EUR, 50,000 USD, or 30,000 BPS per life-year gained or per quality-adjusted life-year gained, derived from reimbursement decisions, is discussed in the literature (Rawlins and Culyer 2004).



Health Economics (Burden of Disease), Figure 1 Cost-effectiveness plane (adapted from Drummond et al. 1997)

Value of Human Life

Discussions about the interpretation of the results of economic evaluation studies and the legitimization of a threshold value up to which a new health care technology should be reimbursed by public payers also opens up the dispute about the value of a human life (► value, human life). Three main approaches should be considered. The human capital approach estimates the maximum expected future earnings of an individual based on the average achievable gross income. Heavy criticism was made of the use of this measure for valuing a human life and by doing so implying that the value of a human life is reduced to productivity from a national economic point of view. Furthermore, this approach discriminates major parts of the population who do not work for payment, such as children, housewives, the unemployed, old people, and people with chronic illnesses or disabilities. A second, so-called social decisions approach, uses decisions made in the public sector like reimbursement decisions or legal acts. The third approach is based on empirically created data on people's preferences. This can be done directly, by assessing the willingness to pay for a life year or a life-saving health care intervention, or indirectly, e. g. from surveys about the value placed by individuals on reduction of the risk of death due to a particular hazard. The third approach is currently regarded as the most appropriate as it reflects the individual preferences and uncertainty that is characteristic of such estimations.

Comparing the different approaches and also the results of different studies using the same approach, an extremely wide variation can be observed, from a few thousand € up to a few hundred thousand €. Currently, the methodological approaches are in an early stage of development and valid results will not be available for many years, if at all.

In the following chapters, the two main types of ► health economic evaluations, namely cost-effectiveness analysis and cost-utility analysis, are described. The third study type is the cost-benefit analysis (sometimes also misused as a generic term for economic evaluation). In cost-benefit studies, not only the costs but also the outcome is expressed in monetary units using valuations of the patients' observed or stated preferences. The most common approach is to determine the willingness-to-pay, meaning that individuals are asked to define the amount of money they would be willing to pay to avoid a certain health state or illness. Cost-benefit studies are widespread outside the health care sector but, due to the ongoing methodological dispute regarding the measurement and quantification of the medical benefit of health care in monetary terms, they are currently less common and less important for decision makers in health care resource allocation than other studies.

Cost-Effectiveness Analysis

The most common type of economic evaluation is the ► cost-effectiveness analysis. In this type of analysis, the outcome is expressed in adequate medical or epidemiological units e. g. life-years gained or number of events avoided, or specific measures like units of reduction of diastolic blood pressure (Gold et al. 1996; Drummond et al. 1997). The more specific the outcome measure is, the more difficult it is to use cost-effectiveness analyses to compare treatments for different diseases or whole health care programs. The advantage of cost-effectiveness studies is their ability to adopt the most relevant and clinically significant parameter and to compare treatment alternatives for a specific disease. The results are often more of a clinical nature. Therefore, they are often more easily accepted by the medical society than the more abstract results of cost-utility analyses. Cost-effectiveness studies can give useful information concerning the decision between a limited number of treatment alternatives for a clearly defined health problem. This is often the case for diseases where a standard treatment is already available, and the value for money of a new treatment alternative should be estimated based on the results of the first clinical efficacy studies. However, for use in the process of decision making for non-disease or non-indication specific allocation of health care resources, the results of cost-effectiveness studies are less useful. It is not possible to compare the costs per life-year gained of a life-saving intervention like heart surgery with the costs per case detected in a screening program, or the costs per exacerbation avoided in an educational program with COPD-patients.

Cost-Utility Analysis

Cost-utility analyses can be seen as a special form of cost-effectiveness analysis in which the outcome measures are the units of utility gained. In general, utili-

ties are numbers assigned to entities presumed to be the objects of patients' preferences, and thus the entities can be quantified and ranked. Utilities offer a patient-orientated generic measure which allows comparison of the effect of all possible interventions influencing the health state (Feeny et al. 1996).

By far the most widespread and prominent utility measure is the quality-adjusted life year (QALY). The QALY is a generic measure of utility that combines both the quality and the quantity of life generated by health care interventions. A year spent in perfect health is one QALY and a year spent in less than perfect health with a lower health-related quality of life is worth less than one QALY. Death or the poorest imaginable state of health is defined as "0". Aggregating the quality of life and the remaining lifetime, it has to be taken into account that the quality of life fluctuates over time. Quality of life must therefore be measured repeatedly over time (the course between the point measures has to be estimated) with generic instruments such as the EQ5D, the health utility index, or the SF-6D. Alternatively, the quality of life over the total health state path can also be estimated at one time using techniques such as standard gamble or time trade-off.

There is a certain amount of controversial debate about the theoretical foundation of the QALY, especially about its foundation in the welfare theory, as well as about the empirical robustness of the results and ethical implications of a possible use in resource allocation decisions.

League Table

One way of presenting the results of several cost-effectiveness or cost-utility analyses for decision makers is a league table. League tables rank health technologies and interventions according to their relative cost-outcome ratio, starting with the lowest cost per QALY gained (or the gain in another generic outcome measure) and ending with the most unfavorable cost per QALY ratio. In theory, league tables could be used by decision makers to allocate resources within a limited budget e. g. by only reimbursing technologies with costs per QALY gained below a defined threshold. There are major arguments for not making decisions about resource allocation in health care solely on the basis of league tables (Gerard and Mooney 1993; Bleichrodt et al. 2004), but in general the results of ► health economic evaluations can provide helpful additional pieces of information for the process of decision making. Decisions about allocation of health care resources have to be the result of a societal consensus and should never be made on the basis of economic analyses alone.

Summary

Health economics is defined as the application of economic theory and economic methods to phenomena and problems associated with health and health services. Topics of health economics include – among others – the meaning and measurement of health status, the production of health and health services, the demand for health and health services, ► cost-effectiveness analysis, economic evaluation, health insurance, health care financing, equity problems, the organization of health care markets, methods of remuneration of physicians, performance management of health care organizations, and economics of comparative health systems.

Health care systems cannot be regarded as a normally functioning market as this may lead to market failures such as inequity of access to health care services. As a consequence, competition in most health care systems is regulated in several directions. The main dimensions of health care system design are financing of health care and regulation of demand and supply. With regard to health care financing, three main principles, tax-financing, social health insurance, and private health insurance, can be distinguished. Key elements in regulating competition are risk adjustment and consumer choice. To decrease the moral hazard effects leading to increased demand in health care, regulative elements such as user charges can be implemented. An unnecessarily increased supply of health care should be regulated by remuneration systems that modify the incentives for hospitals and physicians.

In a situation of scarce resources available for health care, not all imaginable interventions can be reimbursed by third–party payers. As patients and health care professionals are mostly unable to assess the additional benefit of single health care technologies, collective assessments of the additional costs and the additional medical benefits or utilities are performed. In economic evaluation studies, the cost consequences, as well as the clinical efficacy of alternative interventions, are compared based on cost-outcome ratios. In cost-effec-

tiveness analyses, the chosen comparators are the costs per adequate clinical or epidemiological parameter such as the costs per life-year gained or the costs per event avoided. Utilities, the outcome measure of cost-utility analyses, aggregate the life-time gained by a defined intervention together with the patient's quality of life to a generic measure, which allows comparison of interventions for different indications and in different health care sectors. Key elements of economic evaluation studies of health care interventions are the choice of the perspective, the use of modeling techniques, and the choice of different cost components to consider for the costing process. More generic approaches to describe costs with respect to the effectiveness of health care systems as a whole are cost of illness studies and the burden of disease concept of the WHO.

Cross-References

- ▶ Burden of Disease
- ▶ Competition, Health Care
- ▶ Consumer Choice
- ▶ Cost-Effectiveness
- ▶ Health Care Costs
- ▶ Health Economic Evaluation
- ▶ Health Economics, Concepts
- ▶ Health Financing
- ▶ Health Insurance Markets
- ▶ Health Systems
- ▶ Health Systems Reforms
- ▶ Labor Market
- ▶ Modelling
- ▶ Regulatory Mechanisms
- ▶ Value, Human Life – Utilities

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Health Economics, Concepts

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Definition

The application of economic theory and economic methods to health poses some severe challenges. This is illustrated by a number of assumptions of economic theory and its application to phenomena and problems associated with health – such as externalities of consumption, the extension of traditional welfarist approaches, and agency problems.

Basic Characteristics

Health economics is the application of economic theory and economic methods to phenomena and problems associated with health (Culyer 2005). A comprehensive taxonomizing framework that systematically includes the various topics of health economics has been developed by Alan Williams from the University of York. The "Williams' Schematic of Health Economics" (Culyer and Newhouse 2000) conceptualizes this definition. However, the application of economic theory and economic methods to health poses some severe challenges. This is illustrated by a number of assumptions of economic theory and its application to phenomena and problems associated with health (Rice 2002).

Market Competition and Externalities

Market competition assumes that there are no negative externalities of consumption and no positive externalities of consumption. ► Externalities of consumption exist if one individual's consumption of a good or service has positive or negative consequences for the ► utility of another person. If externalities exist, a competitive market process will not lead to socially optimal outcomes. A positive externality increases the utility of another individual – although he or she does not pay for it. One classic example of a positive externality in health economics is immunization: the benefit of immunization is not restricted to those individuals who have been treated. However, in competitive markets, the direct beneficiary of the immunization will have to bear the full cost. As a consequence, individual consumers would buy too few immunizations. In order to overcome this market failure, governments may subsidize the purchase of immunizations, provide them for free, or make them mandatory. A negative externality decreases the utility of another individual. A classic example of a negative externality in health economics is smoking. Smoking by one individual decreases the utility of another individual. As a consequence, governments will either raise the price of smoking or restrict individual opportunities to smoke in the presence of non-smokers.

Demand Theory: Information Asymmetries and Extra-Welfarism

Economic demand theory assumes individuals are the best judges of their own welfare and consumers have sufficient information to make good choices. Moreover, demand theory also assumes consumers know the consequences of their decisions with reasonable certainty and that individuals are rational. Finally, demand theory assumes social welfare is based on the sum of individual utilities, which in turn are determined by the goods and services consumed (Rice 2002).

Most of the time, these assumptions are not fulfilled in health care markets. There are several examples that illustrate that regulation overrides the right of individuals to be the best judge of their own welfare – e. g. the obligation to wear a helmet while riding a motorcycle or the obligation to wear a safety belt while riding in a car. Moreover, individual consumers usually lack the medical education necessary to execute informed choices

on treatment options, which results in severe information asymmetries in the patient–physician relationship. The outcome of medical interventions (or non-interventions) is not always clear for consumers of health care services. The rationality of consumers is disturbed by the often very personal consequences of consumption decisions.

Finally, the "welfarist" approach of economic theory – social welfare is based on the sum of individual utilities, which in turn are determined by the goods and services consumed – is under close scrutiny in health economics (► welfarism). If the welfarist approach is applied to health, it means that health is a source of utility – both directly and indirectly – through the effects good health has on the individual's capacity to enjoy other goods and services. However, this approach is rather limited. Therefore, the concept of "► extra-welfarism" has been developed in health economics (Hurley 2000). Extra-welfarism acknowledges that a wider range of characteristics is relevant for individual welfare – not just the consumption of health care services and health in itself; it also refers to relative changes in consumption or work patterns as direct sources of utility or disutility. Extra-welfarism "*acknowledges the processes and transitions of life*" and "*makes no heroic assumptions about the ability of sick people to make rational utility-maximizing decisions on their own behalf*" (Culyer 2005: 127).

Supply Theory: Agency Problems

In most microeconomic applications, supply plays a subsidiary role to demand. Generally, it is assumed that supply adjusts if consumers' preferences change. Again, supply theory is based on a number of crucial assumptions, the most crucial being that supply and demand are determined independently. Once more, this essential assumption is not fulfilled in most health care markets. Supply and demand of health care services are closely interlinked, which is clearly contradictory to the traditional microeconomic model. Patients rely on health care professionals to reduce ► information asymmetries and to support them in order to make informed choices. This assumes that health care professionals act as perfect agents for their patients and refrain from pursuing self-interests that might be divergent from the interest of the patient. However, in practice, physicians are quadruple agents. They pursue the interest of the patient, their own self-interest, the interest of the third-party payer, and the interest of society as a whole (Rice 2006). Health economists generally agree that physicians – the suppliers – are able to induce demand for their services, at least to some degree. As a consequence, designers of health care systems have come up with a variety of policy measures to reduce incentives for ► supplier-induced demand (► regulatory mechanisms).

Cross-References

► Externality of Consumption
► Extra-Welfarism
► Information Asymmetry
► Regulatory Mechanisms
► Supplier-Induced Demand
► Utility
► Welfarism

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Health Economics in Dentistry

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Synonyms

Medical economics; Economic evaluation; Health services management

Definition

Health economics is an independent branch of economics that is concerned both empirically and theoretically with the economic aspects of healthcare and more particularly with the production and distribution

of scarce health goods. The justification for a specifically economic consideration of the non-economic good represented by health is that many healthcare problems (a) are connected with economic phenomena and conditions, (b) can be described and quantified in economic categories, and (c) either can be solved by economic means or, in view of the ► scarcity of the resources required, call for a strategy based on economic considerations. In addition, of course, other, non-economic, approaches (e. g. evidence-based medicine/evidence-based dentistry, social medicine or social law) can be applied, the results of which can contribute on an interdisciplinary basis to analyses in the field of health economics.

History

The genesis of health economics as an economic discipline in its own right is closely bound up with the trend of healthcare costs and the consequent realization that not everything desirable in the field of health is affordable. In view of this somewhat gloomy state of affairs, health economics for a long time enjoyed a reputation as a "dismal science". Yet health economics is not a mere policy instrument for containing costs, but in fact an indispensable aid to rational policy-making.

In the particular field of dentistry, the subdiscipline of "dental health economics" has now come into being, albeit hesitantly. In 1973 the American economist Paul J. Feldstein published the first systematic consideration of health-economic issues in the dental field, *Financing Dental Care: an Economic Analysis* (Feldstein 1973). Dental health economics is still relatively undeveloped in the German-speaking countries as compared with the United States, the United Kingdom, the Netherlands and Scandinavia.

Basic Characteristics

The specific methods used in health economics are characterized by systematic comparison of the costs and benefits of given actions and the balancing of alternatives against each other. According to the World Health Organization's standard definition, the function of health economics is "inter alia to quantify over time the resources used in health service delivery, their organization and their financing; the efficiency with which resources are allocated and used for health purposes; and the effect of preventive, curative, and rehabilitative health services on individual and national productivity" (World Health Organization 1975).

Research Issues

Health economics in the sphere of dental care is concerned in particular with the analysis of issues in and aspects of the following fields:

- **Allocation**: Is the allocation of resources to dental treatment inadequate or excessive compared with those provided for other areas of demand such as nutrition or education? Within the field of dentistry, should more or less be spent on prevention relative to expenditure on curative treatment (Räbiger 1989)?
- **Efficiency**: Are dental services rendered at the lowest possible cost for a given quality of care (in accordance with the "► minimum principle"), or are as many dental services as possible at the highest possible quality rendered for a given level of resources? And how can economic incentives contribute to increased efficiency, for instance with regard to the remuneration of dentists (Tiemann, Klingenberger, Weber 2003)?
- **Distribution of health goods and services**: How are the benefits of the dental healthcare system distributed to different sections of the population? Is good-quality care received only by those who can afford the services, or is there an entitlement to good healthcare irrespective of income, age, etc.?
- **Creation of value**: What is the significance of the dental care sector as a factor of growth and value in the economy and as a source of income for those working in the sector?

Levels of Analysis

Health-economic analysis can be applied at different levels. On the *micro-level* it concerns the actions of individual actors (e. g. aspects of dentist-patient communication, or effective practice management), the emphasis being placed on microeconomic elements. This level is sometimes referred to as "health services management". The *meso-level* examines the actions of the intermediate actors in the health system (e. g. associations of statutory health insurance funds, or regional associations of statutory health insurance dentists). Owing to the German tradition of strong corporatist structures, "intermediate-level control" is comparatively important in this country (Tiemann, Klingenberger,

Weber 2003). Finally, the *macro-level* is that of analysis of the characteristics of the system as a whole. The macro-level arises by the aggregation of individual actors into collectives such as "the dental profession", or "patients". "Health system analysis" is conducted from the macroeconomic point of view, and examines such issues as dental overprovision, underprovision and malprovision (SVRKAiG 2002).

Methods of Health-Economic Evaluation

For practical purposes, perhaps the most important aspect of health-economic evaluation in the dental field is assessment of the costs and effects of different therapies and/or preventive strategies. These are examined from various points of view, such as that of the individual patient, that of the health insurance sector, that of the dental industry or indeed that of society as a whole. The outcome parameters used are epidemiological data, such as the DMFT value for caries or the Community Periodontal Index (CPI) for periodontal status. To ensure that the results of health-economic evaluation studies can be validly interpreted, minimum requirements as to methodology and transparency must be observed (Drummond 2005). The most common types of studies are enumerated in Table 1.

A strikingly large number of evaluation studies in the dental field are devoted to comparison of the costs of preventive strategies with their effectiveness (CEA). Preventive care concepts have a relatively long tradition in dentistry. The principal landmarks in the prevention of dental pathology in Germany are the placing of group-prophylactic measures for children on a statutory basis in 1989 and the introduction of the system of individual prophylaxis in the statutory health insurance scheme in 1991. A comparison of the economics of various prophylactic measures (Saekel 2002) shows that all current measures of prophylaxis and tooth conservation are cost-effective and hence to be recommended in terms of health economics (Table 2). Apart from vaccination, no other field of healthcare has such high efficiency as dental prophylaxis, and in particular fluoridation for the prevention of caries (Räbiger 1989).

Similar studies have been carried out for a number of dental prosthetic treatments (Kerschbaum 1997; Walter et al. 1999). The usual method of calculating the cost of the alternatives is "decision tree analysis". This is a methodological approach to the systematization of decision-making processes that uses what are known as transitional probabilities to predict the occurrence of various health-related states (e. g. secondary caries or tooth loss), sometimes extending over relatively long periods. In the case of long-term predictions, the costs of medical measures must be not only added together but also discounted. In the dental field, a long-term perspective is appropriate mainly in connection with the survival rates of restorations, prostheses and implants, and with the biomedical compatibility of various dental materials.

With regard to the development of cost utility analysis (CUA) and cost benefit analysis (CBA), health-economic research is still in its infancy, as investigation of the benefits of dental measures is enormously more complex in terms of methodology than determination of their costs. Owing to the relative non-availability of empirical data in the field of dental health-

Health Economics in Dentistry, Table 1 Systematization of types of health-economic evaluation

Non-comparative studies	
Cost of illness study (CIS)	Determination of the direct and indirect costs of an illness without consideration of effects.
Comparative studies	
Cost minimization analysis (CMA)	Determination of the costs of two or more alternative courses of action assuming equality of effects.
Cost effectiveness analysis (CEA)	Comparison of two or more alternative courses of action in terms of cost and effectiveness. This calls for a uniform effect dimension defined clinically or epidemiologically.
Cost utility analysis (CUA)	This combines different effect dimensions within the single effect dimension of "quality-adjusted life years" (► QALY), so that the relative value of therapies can be determined even where indications differ.
Cost benefit analysis (CBA)	This considers effects in terms of monetary units, thus providing a common dimension for costs and effects. The inputs and outputs of different courses of action can then be compared and balanced against each other.

Health Economics in Dentistry, Table 2 Economics of selected measures of prophylaxis and tooth conservation

Measure	Benefit : Cost (B/C)
Home use of fluoridated iodine salt	> 70
Group prophylaxis (age range 4–12 years)	5.1
Fissure sealing of permanent molars	2.3
Risk-based intensive prophylaxis as group prophylaxis	2.9
Risk-based intensive prophylaxis at the dental practice	1.2
Root canal treatment	16.7

care, ► willingness-to-pay analyses bear great difficulties. Yet research on the quality-of-life aspects of dental care has made significant progress with the development of the Oral Health Impact Profile (OHIP) for the determination of the benefit, or utility, of alternative dental treatments from the patient's point of view. There is now a validated German-language short form of the OHIP questionnaire with 14 items (John et al. 2006), which allows problem-free assessment of patients' oral-health-related quality of life at the dental practice or in appropriate studies.

Conclusion

The significance of health economics as an instrument of rational policy-making is likely to increase further in the future, as health – including oral health – is in economic terms a ► superior good, which means that the demand for it increases disproportionately as incomes in society as a whole rise. The fact that medicine is a growth market is evident from the proportion both of the labor force (1970: 2.9%; 2004: 10.6%) and of GDP accounted for by the healthcare sector: in 2005 health-related spending averaged 9% of gross domestic product in the OECD countries, compared with only just over 5% in 1970.

Health economics, then, is fundamentally a science not of minimization but of optimization. Economic evaluations facilitate the choice of alternatives in dental practice in a situation of scarce resources. It would therefore be negligent to eschew health-economic approaches to issues in the field of dentistry.

Cross-References

► Minimum Principle
► Quality-Adjusted Life Years (QALY)
► Scarcity
► Superior Good
► Willingness-to-Pay Analyses

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Health Education

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Definition

Health education is defined in the context on health promotion as follows: Health education comprises consciously constructed opportunities for learning that involve some form of communication designed to improve health literacy, including improving knowledge and developing life skills that are conducive to individual and community health (WHO 1998).

Basic Characteristics

Health education deals with mediating health information that influences social, economic, or environmental related determinants of healthy lifestyles, health promoting behavior, and use of health services. Health education aims primarily at learning experiences and the voluntary actions people can take, individually or collectively, for their own health, the health of others, or the common good of the community. Defining health education as any combination of learning experiences designed to facilitate voluntary actions conducive to health emphasizes the importance of multiple determinants of behavior (Green and Kreuter 1999).

In addition, health education comprises the development and strengthening of ► life skills. Health education plays a significant role in health promotion and is needed for implementation of ► intervention strategies of primary, , and ► tertiary prevention.

The regional European office of the ► world health organization (WHO) describes health education as strengthening knowledge and experiences of individuals on health and illness and the organism and its functions, as well as disease prevention. It emphasizes the strengthening of knowledge and experiences of individuals regarding the utilization of health services and understanding of their functions. The objective of these efforts is to give individuals the responsibility for their health and the ability to use the offerings of health care systems. Health education is a systematically planned activity, and can thus be distinguished from incidental learning experiences. Further, this description of health education draws attention to voluntary behavioral actions taken by an individual, group, or community with the full understanding and acceptance of the purposes of the action – either to achieve an intended health effect or to build capacity for health.

Furthermore, the idea of health education is based on principal human rights to gather complete information in the field of health and illness. Health education contributes to fostering the motivation, skills, and confidence necessary to take action to improve health (BzgA 2003). Health education paves the way for ► health literacy, which is understood as the concept of well-informed humans, giving them autonomy in their health-related behavior.

Actions on health education might be carried out by individuals, groups, or communities; or policymakers, employers, teachers, or organizations whose actions or practices control or influence determinants of health. Health education can be described in the following contexts:

- Health education in traditional context
- Health education
- Health counseling
- ► Peer Education.

Health Education in Traditional Context

Health education developed from the educational work in hygienic issues at the end of 19th century and at the beginning of the 20th century. This kind of education aimed to educate humans in important aspects of health and diseases, which was the objective of historical education in ► hygiene. It was directed to the whole population or parts of it. At that time, health education was mainly disease-related. It was realized through mass media in order to educate the population in essential aspects of health and medical conditions. Subsequently, this approach of health education was replaced by the following principles that were outlined by the WHO:

- Strengthening of knowledge and experience on health, diseases, and about the physiology of the human organism
- Strengthening of knowledge and experience in regard to the structure of health services and their utilization
- Increasing awareness about social and environmental factors and health determinants.

Further Developments in Health Education

The development of health education was shaped by methods of social medicine, public health, and psychology that are based on concepts of risk factors and the ► health belief model. This model is still used as an assessment tool to understand why persons participate in programs for the prevention or detection of

diseases. Modern methods of psychology were considered after it was revealed that positive effects in health education were not achieved by education using the "wagging finger". Traditional health education aimed at increasing participation in interventions such as early recognition measures of diseases and vaccination campaigns, reduction of risk factors of diseases and addiction, and improvement of physical and mental health. The meaning of isolated health education campaigns decreases since the knowledge and cognitive abilities do not change sustainable health risk behavior to the extent that is desirable. Complex approaches promise more success.

Since the beginning of the 1970s, the main focus of educational measures has been directed towards risk factors of chronic diseases like smoking habits, obesity, lack of physical activity, and mental balance as well as high blood pressure and high blood sugar. For individuals in these risk groups who suffer from chronic illness, measures are intended to motivate them towards more healthy living. This development was supported by the possibility of medical monitoring of risk factors (BzgA 2003).

Currently, modern health education is shaped by the concept of designing and strengthening ► life skills. The WHO demands the promotion of communication offerings that contribute to the improvement of health literacy. Health education contains more than dissemination of information and knowledge transfer on health issues. Competences in health topics that are achieved by health education support the aim of a health promoting lifestyle for individuals and therefore support the strengthening of community actions in health promotion.

Actions on health education might be carried out by individuals, groups, or communities; or policymakers, employers, teachers, or organizations whose actions or practices control or influence determinants of health.

General health education measures like ► mass media campaigns using methods of mass communication may be also carried out in an organized form in adult education centers or at night schools. This kind of health education is characterized through voluntary participation and participation related, social and self-determined learning and integrated educational concepts on health topics. Measures of health education are also offered by health insurers and other different educational institutions. In this context, it is also termed health training or health counseling. Such facilities also offer information on health and depict a special form of health education but the information is only given to individuals or a small group of individuals. It is orientated on individual circumstances and differs from traditional health education.

In addition, a special kind of health education uses the concept of peer education. Peer education in the sense of health promotion means learning and mediating information, behavior patterns, and ethical qualities on health through the participants of the education group themselves, especially in population groups of youths and adolescents. The approach of peer education is used widely in the United States and is part of the academic curricula. Positive experiences exist for the following topics: Primary prevention of smoking and substance and alcohol abuse; counseling and information on eating disorders; HIV prevention and prevention of unintentional pregnancy; and coping with stress.

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Cross-References

- ► Health Belief Model
- ► Health Literacy
- ► Hygiene
- ► Intervention Strategies in Prevention
- ► Life Skills
- ► Mass Media
- ► Peer Education
- ► Prevention, Secondary
- ► Prevention, Tertiary
- ► Primary Dentition
- ► WHO

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Health of the Elderly

► Aging and Health

Health Enhancement

► Health Promotion, Ethical Aspects

Health Facility

► Health Care Facility

Health of the Female Population

► Women's Health

Health Financing

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Synonyms

Health care financing

Definition

Designers of health care financing systems—at least in high-income countries and with the notable exception of the US—rely on either social health insurance premiums or taxes as the primary source of health financing. Both provide a high degree of risk solidarity and comprehensive coverage. In contrast, private health insurance premiums and out-of-pocket payments are usually considered to be secondary sources of health care financing.

Basic Characteristics

Sources of Health Care Financing

Health care systems are financed by a variety of sources. The most basic source of health care financing is ► out-of pocket payment. Usually, out-of-pocket payments are a secondary source of health care financing, since health care expenditures are highly skewed and out-of-pocket payments do not provide any risk-spreading (► health insurance markets). The second source of health care financing is premium income from ► private health insurance. Private health insurance is characterized by ► risk-related premiums. Due to ► adverse selection in unregulated private health insurance markets, private health insurance premiums in most countries—with the notable exception of the US—do not serve as a primary source of health care financing (Colombo and Tapay 2004; Reinhardt et al. 2004). In most industrialized countries, the primary source of health care financing is either ► social health insurance premiums or taxes (for empirical information on the share of different sources of health care financing see ► health systems). In the remainder of this section, we will discuss the implications of private health insurance, social health insurance, and tax financing for risk solidarity and income solidarity.

Implications for Risk Solidarity

Societies in most industrialized countries place a high priority on *fairness or solidarity* as a policy objective in health care financing (Wagstaff and van Doorslaer 1992; Wagstaff and van Doorslaer 2000). Two dimensions of solidarity need to be distinguished (van de Ven and Ellis 2000). The most basic dimension of solidarity is ex-post ► risk solidarity between the healthy and the sick. This means that there is a limited redistribution of resources from the unexpectedly healthy towards the unexpectedly sick. Risk solidarity is limited to health risks that become apparent after establishing the insurance contract. Risks that had been visible before the contract are accounted for by higher health insurance premiums. If the regulator does not intervene, private health insurance therefore provides ex-post risk solidarity between the healthy and the sick only.

However, with the notable exception of the US, most high-income countries do not rely on private health insurance as a predominant mode of health care financing (Gottret and Schieber 2006). Instead, designers of health care financing systems prefer to implement modes of financing which provide an enhanced degree of solidarity and redistribution (Mossialos et al. 2002; Wasem et al. 2004). Both social health insurance and

a ► national health service that is based on tax funding provide ex-ante risk solidarity as well as ex-post risk solidarity between the healthy and the sick. Ex-ante solidarity between the expectedly healthy and the expectedly sick implies that health risks are covered at any time. In social health insurance, premium rate restrictions apply—health insurers have to refrain from charging higher premiums for high health risks. In tax-financed systems, tax payments are not related to health risks.

Although both tax-financed schemes and social health insurance schemes provide comprehensive risk solidarity between the healthy and the sick, there are important differences between the two modes of financing. In tax-financed health systems—such as the English National Health Service or Canadian Medicare—solidarity is based on residence. There are few opportunities to opt out of the system. Thus, comprehensive coverage—and therefore comprehensive risk solidarity between the healthy and the sick—is easy to obtain. In contrast, social health insurance systems restrict solidarity to the members of the risk pool. Compared to private health insurance contracts, membership to social health insurance is easy to obtain. However, if it is not mandatory to take out social health insurance for the entire population, selection problems will follow: good risks may try to opt out of the social insurance system. They either will take out private health insurance—if it is available—or may rely on the provision of public services in the case of need. As a consequence, fewer good risks will be in the risk pool to subsidize bad risks. An effective instrument to neutralize incentives for opportunistic ► free rider behavior is the obligation for the entire population to take out social health insurance (Rice 2002).

Implications for Income Solidarity

Comprehensive risk solidarity between the healthy and the sick is an indispensable property of social health insurance. Moreover, ► income solidarity—solidarity between the rich and the poor—may be a fundamental feature of social health insurance as well, but not necessarily so. If social health insurance calculates ► community-rated premiums, these premiums are independent of income. As a consequence, social health insurance in this case does not redistribute resources from the rich to the poor. What is more, the consequences of community-rated premiums are regressive: the higher the income, the smaller the share that is spent on social health insurance premiums. In most OECD-countries that use social health insurance as the predominant mode of health care financing, these consequences are not socially acceptable. Therefore, designers of health care financing systems either implement a system of tax-financed and needs-tested premium subsidies as a complement to community-rated premiums or use income-dependent premiums as the primary mode of financing.

In tax-financed national health systems, the implications for the redistribution of income depend on the design of the tax system. The consequences on the distribution of income can be progressive, regressive, or proportional. Direct taxes on income may be equivalent to social health insurance premiums in terms of income solidarity. Thus, the consequences of direct taxes on income distribution are proportional if the tax rate is uniform across all income categories and across all income groups. The consequences are progressive if the tax rate is not uniform across all income groups but goes up as income goes up. However, direct taxes are only one important component of general tax revenue. Indirect taxes on consumption are another component. The consequences of consumption taxes on income distribution are usually regressive: the higher the income, the smaller the share that is spent on indirect taxes. This is a consequence of the fact that low-income groups have a lower savings rate than high-income groups. A popular instrument to attenuate this regressive effect of indirect taxes is to exempt basic consumer goods from indirect taxes or to apply lower tax rates to these goods.

Cross-References

► Adverse Selection
► Community-Rated Premiums
► Free-Rider Behavior
► Health Insurance Markets
► Health Systems
► Income Solidarity
► National Health Services
► Out-of-Pocket Payments
► Private Health Insurance
► Private Health Insurance, Alternative
► Private Health Insurance, Complementary
► Private Health Insurance, Supplementary

- ► Risk-Related Premiums
- ► Risk Solidarity
- ► Risk Solidarity, ex-ante
- ► Risk-Solidarity, ex-post
- ► Social Health Insurance

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Health Goals

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Definition

Health goals are general statements of intent and aspiration, intended to reflect the values of the community in general, and the health sector in particular, regarding a healthy society (WHO 1998).

Basic Characteristics

In General

Goal statements are clearly articulated, general statements that describe the future state of affairs and provide general direction, purpose or intent of what needs to be accomplished. In the context of health promotion, Nutbeam defines health goals as a summary of ► health outcomes which, in the light of existing knowledge and resources, a country or community might hope to achieve in a defined time period. On the basis of firm evidence, health goals are used for creating recommendations and a catalog of measures in special sectors and population groups. The involved participants commit to implement health goals in their field of authority. The implementation and sustainable development of health goals is applied in a long term process (WHO 1998).
Numerous countries have adopted an approach to setting health goals and ► health targets as a statement of direction and intent with regard to their investments for health. The World Health Organization (► WHO) has supported the development, and has promoted the use of health goals and targets at global and regional, national and local levels. One of the most known health goals is the general WHO statement "► health for all."
The prioritization of health risks and health problems formed the background for the development of health goals, related to citizens in general and patients in particular, in order to forward the political discussion about the advancement of health promotion, disease prevention and rehabilitation. Moreover, in order to achieve a high percentage of these health goals and energize both managers and suppliers of health promotion, available resources and funds should be used in a fast and efficient way.

Historical Development of Health Goals

In the 1970s health goals were developed from the reorientation of ► health policy with its new aims in health promotion and disease prevention. The World Health Assembly aimed at enabling the "Health for All" policy whereby every citizen would have the opportunity of leading a full productive and social life. This overall goal was adopted as the general strategy "Health for All" in 1979 and it has so continued (Declaration "Health for All in the 21st Century", adopted 1998). The global strategy "health for all" was followed by the European program with the title "Health for All 2000"

in 1984. It encompassed 38 health goals amongst other overall goals like "for a better health" or "for promoting healthy life styles." It was also agreed to measure the reaching of health goals regularly and to publish the results of this measurement. Therefore, 65 indicators were developed as standard measurements of achievement.

By 1991 health goals had undergone further development. After that the program was transferred to the health goal program, "Health for All in 21st Century – Health 21." An additional updating was carried out in 2005. The program does not provide explicit goals for any given region since the complex social economic and health conditions vary within the European Regions which make up the WHO. In this regard, it is necessary that each member state formulates its own concrete description of implementation and benefit of health goals at both national and regional levels. The priority goal of the WHO to reach health for all is supported by the following three fundamental aspects:

- Health as a one of the fundamental ► human rights.
- ► Equity in health and solidarity in action between countries, between groups of people within countries and between genders.
- ► Participation by and accountability of individuals, groups and communities and of institutions, organizations and sectors in health development.

The following four main strategies for action have been chosen to ensure health as fundamental human right:

- Multisectoral strategies to tackle the determinants of health, taking into account physical, economic, social, cultural, and gender perspectives and ensuring the use of ► health impact assessments.
- Health-outcome-driven programs and investments for health development and clinical care.
- Integrated family- and community-oriented primary health care, supported by a flexible and responsive hospital system.
- A participatory health development process that involves relevant partners for health, at all levels – home, school and worksite, local community and country – and that promotes joint decision-making, implementation and accountability.

On the basis of the mentioned principles of the WHO, the following 21 health goals depict the currently framework for health policy in the European region. These 21 health goals are regarded as standard for the assessment of progress in health situation improvements, preventive health care systems and the reduction of ► health risks and hazards (WHO 1999).

- Solidarity for health in the European region.
- Equity in health.
- A healthy start in life.
- Health of young people.
- ► Healthy Ageing
- Improving ► mental health.
- Reducing ► communicable diseases.
- Reducing noncommunicable diseases.
- Reducing injury from violence and accidents.
- A healthy and safe physical environment.
- Healthier living.
- Reducing harm from alcohol, drugs and tobacco abuse.
- ► Settings for health.
- Multisectoral responsibility for health.
- An integrated health sector.
- Managing for ► quality of care.
- Funding health services and allocating resources.
- Developing human resources for health.
- Research and knowledge for health.
- Mobilizing partners for health.
- Policies and strategies for health for all.

The 21 health goals of the program "Health for All" was taken into the health policies of almost all members of the European Union (WHO 1999). Numerous member states of the Organization for Economic Cooperation and Development (► OECD) adopted the idea of health targets and a large number of health goals were developed both at national and regional level. Since the beginning of the 1970s health goal programs have spread worldwide. For example, health goals were defined in Australia, Denmark, Finland, France, Great Britain, Ireland, Italy, Poland, New Zealand, United States and Sweden. Programs on the issues were also drafted at the regional level in many countries.

Cross-References

► Communicable Diseases
► Equity
► Health for All
► Health Impact Assessment (HIA)
► Health Outcomes
► Health Policy
► Health Risk
► Health Targets

- ► Healthy Ageing
- ► Human Rights
- ► OECD
- ► Participation
- ► Public Mental Health
- ► Setting
- ► WHO

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Health Impact Assessment (HIA)

Definition

Health impact assessment provides decision makers with information about how any policy, program or project may affect the health of people. HIA seeks to influence decision makers to improve the proposal. WHO supports the use of HIA because of its ability to influence policies, programs and/or projects. This provides a foundation for improved health and well being of people likely to be affected by such proposals (WHO Definition).

Health impact assessment (HIA) comprises detection and assessment of the impact a planned measure, project or program (e. g., expansion of an airport, street building) could have on the health of the population (e. g., ► noise, air pollution). In the context of ► prevention, HIA must aid the decision-making process by providing transparent and clear data on possible public health consequences for the various population groups as well as buildings and other structures involved. HIA can thus contribute to health being considered in other, not immediately health-related areas of politics such as municipal and residential planning.

In view of the different countries and bodies of law, implementation of HIA will be quite heterogeneous and not comparable between countries. Despite long-standing calls for implementing HIA alongside the legally mandated testing for potential environmental hazards. Currently, public health aspects are being incorporated in some countries only within the context of the legally mandated cooperation of the lower public health authorities in planning the course of environmental safety testing. One of the hurdles for implementing HIA is that environment-related aspects of health are not included in planning at the communal level, a lack of standards for implementing HIA, and no cooperation between the environmental and public health authorities.

Cross-References

- ► Health Determinants, Economic

Health Improvement

- ► Health Promotion, Ethical Aspects

Health Indexes

- ► Summary Measures of Population Health

Health Indicators

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Definition

Health indicators are quantitative or statistical measures or instruments used for the measurement of health status of an individual or defined group. They are variables that can be used to measure the changes in the level of health target achievement, or as indirect or partial measures of complex situations. ► Indicators can be numerical (rations, proportions, rates), or qualitative (existence or absence of an event). Health indicators

are divided into several main domains: demographic and socio-economic factors, indicators of health status, health determinants, indicators of health systems, and indicators of health policy, etc.

Basic Characteristics

Characteristics and Criteria for Design

Health indicators are constructed to measure health status (i. e. the occurrence of a disease or other health-related event) or a factor associated with health (i. e. health status or other risk factor) among a specified population. (Pan American Health Organization 2001) Furthermore, health indicators are markers of health-care system performance. They are used for ► health monitoring and ► health surveillance. Health indicators are selected and defined based on scientific principles and by their quality (► quality of health indicators). An ideal indicator must be: (PAHO 2001; European Commission 2001)

- Valid – effectively measures only what it attempts to measure, and it represents a true expression of the phenomena it is measuring;
- Reliable / objective – results of the measurement should be the same when the measurement is performed by other people or under similar circumstances;
- Sensitive – the indicator should have the capacity to measure changes of the phenomena of interest;
- Specific – it should reflect changes only of the situation/phenomenon it is related to, and not of similar or unrelated events;
- Measurable – data should be available or easy to obtain;
- Policy-relevant – the indicator should be capable of providing clear responses to key policy issues;
- Cost-effective – results of the use of an indicator should justify the investments in its implementation;
- Understandable – information users must be able to understand it and it should be easy to use and interpret by analysts.

Under the Health Monitoring Programme, the European Commission has proposed several strict criteria for the design of indicator sets:

1. Comprehensive and coherent – an indicator set should cover all domains of the public health field, but at the same time be consistent in structure, refer to the integrity of all data, and the values of all indicators within the set should be realistic and not contradictive.
2. Taking account of earlier work in the area of indicator selection and definition, an indicator set should follow rather than duplicate the previous efforts of international organizations, such as World Health Organization, in the establishment of good health indicators; furthermore, only standardized operational definitions, measurements, and calculation procedures should be used to guarantee the quality and comparability of the indicators.
3. Indicators should cover the priority areas that Member States of European Community currently pursue and meet the needs of Community Policies. Health indicators are expected to facilitate monitoring of health objectives and goals, strengthen the analytical capacities of health teams, and serve as a platform to promote the development of interconnected health information systems. (European Commission 2001)

Classification of Health Indicators

Various classifications of health indicators have been proposed. (OECD 2005; European Commission 2005; WHO 2005a; WHO 2006) Despite great advances in the development of indexes and complex health indicators, conventional health indicators, based on mortality and morbidity, are still being used as a base point of public health policies in practice (the so-called "pathologic" approach to health measurement). Introduction of methods oriented toward quantifying health rather than quantifying disease have led to the establishment of novel indicators, and turned the whole viewpoint toward a "generic" or positive approach to the measurement of health status. Based on various resources, health indicators can be summarized in the following groups.

Indicators of Health Status of the Population

1. Positive health indicators: low birth weight, low weight for age, low height for age, low weight for height, and low arm circumference for age;
2. Negative health indicators: perinatal mortality, infant mortality, maternal mortality, under 5 mortality, life expectancy, mortality rates by causes of death, incidence and prevalence rates (previously morbidity – HIV/AIDS incidence, cancer incidence,

prevalence of chronic illness, incidence of congenital anomalies, and incidence of communicable diseases), prevalence of long term disabilities, prevalence of injuries in road traffic accidents or at the workplace, average number of days lost due to illness per year for school, work, homemaking, and other social roles;
3. Perceived general health – satisfaction is measured as the proportion of the population aged 15 and over that report being dissatisfied with their social life; quality of life is measured as the proportion of the population that report perceiving themselves in fair or poor health (► health status indicators).

Demographic and Socioeconomic Indicators Related to Health

1. Indicators of population: rate of birth vs. death, internal migration rate (natural population growth per 1000 population), live births, crude birth rate, total deaths, crude death rate, abortion rate, total fertility rate, percentage annual increase or decrease in population, and median age of the population (► demographic indicators);
2. Indicators of socioeconomic development: national income per capita (in international dollars per capita), average annual growth of national income, gross national product, annual growth of gross national product; average income per working adult, and the allocation of income by geographical region or by profession group (► socioeconomic indicators; ► health determinants, social);
3. Employment and working conditions: total unemployment, total labor force, rate of unemployment of women, index of the dependence of the population, population by employment type, population by occupational class, and deaths due to work-related accidents;
4. Indicators of education: percentage of illiterate persons aged older than 10, percentage of primary, secondary or high school education, expenditures on education per student, average number of students per teacher, education attainment, and education enrolment;
5. Household conditions: total size of residence per person, rate of building, percentage of comfort apartments, and percentage of the population with a home connected to the water supply system;
6. Lifestyles and environmental indicators: average energy value of daily food intake, average content of macro nutrients, estimated consumption of fruits and vegetables (kg/capita/year), alcohol consumption (in liters of pure alcohol per capita), regular adult smokers aged 15 and over, first admissions to drug treatment centers, and average annual concentration of particulate matter $<10\mu$m (in $\mu g/m^3$). (► environmental health indicators; ► health determinants, environmental)

The indicators referring to the physical and social environment, genetics, and human behavior are also known as ► determinants of health.

Indicators of Health Policy

1. National health policy and strategy – the indicator is the adoption of national health policy and its implementation in the constitution and legislation of a state (► health policy indicators);
2. Allocation of resources in health – measured by the proportion of national income that is used for the funding of health protection of the population (total health expenditure as percentage of gross domestic product, or total expenditures on health in international dollars) (► health economics);
3. Health expenditure by sources of funds: social security, out-of-pocket payments, private insurance, or other private funds;
4. Community involvement – measured by its relation to decision making for health care and the presence of mechanisms to meet patients' health needs.
5. Presence of organizational setting and management process – measured by the existence of communication and cooperation between various departments and organizational units within the health service, as well as committees, expert groups, councils for health development, and non-governmental organizations.

Indicators of Health Care Provision

1. Provision of primary health care – can be estimated by provision of primary health care in a community (per total population), by immunization rate (percentage of the population immunized), provision of maternal, child and elderly health care (per total number of women, children and elderly, respectively), food and water supply, and health education

and promotion (► health care provision indicators; ► health care quality);
2. Availability of health care – number of people in the population divided by number of health workers or health institutions;
3. Accessibility of health care – percentage of people who will be using health services considering barriers – geographical, economical, and cultural, etc;
4. Utilization of health care: number of services per resident; rate of hospitalization; hospital beds per 100,000 population; number of nurses, physicians, or other health workers per 100,000 population; number of nurses and midwives per physician; in-patient care admissions per population; average length of stay in hospital (in days), discharge rated by diagnostic categories; and number of surgical procedures and transplantations, etc;
5. Health expenditures: total health expenditure (as percentage of gross national product or in international dollars per capita); expenditure on prevention and public health; expenditure on health administration and insurance; expenditure on medical services; expenditures on in-patient, out-patient and home care; and expenditure on pharmaceuticals, therapeutic appliances and medical goods;
6. Medical technology in health care: number of computed tomography scanners, magnetic resonance imaging units, and amount of radiation therapy equipment etc;
7. Education in health: number of health graduates, number of organizations and institutions to promote health, and implementation of health education in school activities;
8. Health workers' performance: availability (absence rates and waiting times), competence (prescribing practices, readmission rates, and rates of cross infection), responsiveness (patient satisfaction and assessment of responsiveness), and productivity (occupied beds, outpatient visits, and interventions delivered per worker or facility);
9. Quality of health care – can not easily be estimated; however, indicators include: accessibility of health care (physical access, availability, and affordability of health care), effectiveness of care, efficiency, acceptability, equity, continuity, qualifications of physicians, consumer satisfaction, and cost of care, etc. (Campbell 2000). (► health system indicators; ► health systems)

Summary Measures of Population Health

► Summary measures of population health combine information on mortality and non-fatal health outcomes to represent the health of a particular population in a single numerical index. Summary measures can be used for ► health reporting – comparing the health of different populations and monitoring changes in health status of the population over time. Such estimations are, in turn, used for the identification of priorities for health service delivery and planning, and research and development in the health sector. (Murray 2000; Mathers et al. 2004; WHO 2005b; Etches et al. 2006)

1. Disability-adjusted life years (DALY) is one of the indexes measuring the total economic burden of a disease. It refers to time lived with disability and time lost due to premature death and ill health in terms of the equivalent of the healthy years that did not happen, or the health debit. Simplified, it can be calculated as the sum of years of life lost due to premature death (YLL) and years of life with disability (YLD).
2. Healthy life expectancy (HALE) represents the number of healthy years people can expect to live under current conditions.
3. Potential years of life lost are estimated for every specific cause of death by adding estimated years of life up to 75 for every person who dies from birth until the age of 75. This indicator is important for the estimation of preterm mortality and is useful for assessing priorities in preventive activities in health.
4. Quality-adjusted life years (QALY) are an indicator of the quality of work of health service. This indicator summarizes the improvements in length and quality of life that occur as an outcome of health interventions or programs. Every year gained as a result of an intervention or program is standardized according to social value of the gain for that person. Good health is referred to as 1, whereas poor health causes a decrease in quality years of life of up to 0.5.
5. The physical quality of life index represents the combination of mortality rate of the newborn, lifetime expectancy for children aged one, and the rate of literacy in the population. (► health-related quality of life; ► health determinants, psychological)

Conclusions

The fact that environmental, socioeconomic, and early life conditions, together with individual actions and medical care, all interact to affect health has been known for a long time. Improvements in data collection, regular censuses, disease reporting, and statistical analysis have further helped to integrate information on the health status of the population. In turn, health professionals have been given a chance to act on several levels of prevention in order to improve conditions affecting health and health status itself.

Cross-References

- ▶ Child Health Indicators of Life and Development (CHILD)
- ▶ Demographic Indicators
- ▶ Determinants of Health
- ▶ Environmental Health Indicators
- ▶ European Community Health Indicators (ECHI)
- ▶ Health Care Provision Indicators
- ▶ Health Care Quality
- ▶ Health Determinants, Environmental
- ▶ Health Determinants, Psychological
- ▶ Health Determinants, Social
- ▶ Health Economics, Concepts
- ▶ Health Monitoring
- ▶ Health Policy Indicators
- ▶ Health-Related Quality of Life (HRQOL)
- ▶ Health Reporting
- ▶ Health Status Indicators
- ▶ Health Surveillance
- ▶ Health System Indicators
- ▶ Health Systems
- ▶ Indicator
- ▶ Leading Health Indicators (LHI)
- ▶ Quality of Health Indicators
- ▶ Socioeconomic Indicators
- ▶ Summary Measures of Population Health

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Health Informatics

- ▶ Medical Informatics

Health Information

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Introduction

This is an era of informatics where the quantity and quality of information is increasing exponentially – a phenomenon commonly referred to as "information explosion" or "information epidemic". As a consequence, users face the problem of managing the variety

of information they are covered by, known as the "information barrier", which in turn causes frustration named "informatics anxiety" (Greenes 1990).

Health information needs are universal. Health care professionals, health managers, statisticians, decision-makers within the health system, health insurance organizations, public health providers, and consumers – they all need health information. The ever-increasing amount of available information makes it even more important to manage the flow of knowledge. The multidisciplinary nature of public health disciplines makes it especially hard to capture useful updates without becoming overwhelmed by the diversity of information.

From Information to Informatics

Information is a result of the events taking place inside a material system; it is the output of a system of interest. The words information and data are used interchangeably in many contexts, which may lead to their confusion; however, they are not synonyms.

Data is the carrier of information, and is defined as given facts from which others may be inferred; it can also be described as a message that has not been developed with relation to its value in the specific situation. Data is further organized into meaningful unions, or accessed or interpreted to obtain specific information. **Information** is defined as data endowed with relevance, purpose, and meaning. It represents data that has been developed, and can therefore be valued by its capacity to increase our knowledge. Nevertheless, the process of creation does not stop there. **Knowledge** is developed from using or applying information. Knowledge is defined as the awareness or familiarity gained by experience, a person's range of information, a theoretical or practical understanding of a subject or language, etc., or the sum of what is known. **Wisdom** flows from the accumulated experience of applying and using knowledge, or as experience and knowledge together with the power of applying them. Obviously, the process of creation and transformation from data to wisdom is characterized by increasing interactions and complexity, supported by the human capability of understanding relations, patterns and principles on every level. This continuum is called the **Data, Information, Knowledge Ladder** (► data, information, knowledge) (The Knowledge College 2001). Today, many forms of human knowledge can be recorded and used in electronic information systems. Wisdom, however, remains essentially human at present.

Information, as well as energy and other natural reserves, has become one of the key resources available today. In order to fulfill this important role, information must be timely and correct, available at the moment of decision-making, acceptable, of adequate quality and quantity, at a fair price, easy to update, and of multiple uses.

Information can be observed from several **aspects** (Van Bemmel 1997):

- The syntactic aspect refers to the grammar or syntax used for the description, storage, or transmission of messages. The syntactic aspect of information is strongly related to the carrier of the information, that is, the specific language, type of image, or biosignal. The purely syntactic aspect of information is data.
- The semantic aspect of information refers to the meaning of the message, in terms of its significance for interpretation and decision-making. The meaning can often be derived only if we know the context of the message.
- The pragmatic aspect of the information refers to the value of the information, the media that carries it, the resolution and precision that it was written with, and the quantity in which it was produced, transferred, and received. From the perspective of human behavior, information was created with a certain purpose and a certain effect, such that a concrete action or state of mind occurs after we receive it.

Information can be created, transferred, stored, retrieved, accepted, copied, processed, and destroyed. But, in a digital world, written information must be coded before it can be transmitted over a digital system. The quantity of information transmitted by any message can be **measured**. The measurement of information is the measurement of the uncertainty of a situation. That measurement is called entropy. If entropy is large, then a large amount of information is required to clarify the situation. If entropy is small, then only a small amount of information is required for clarification. The unit of information is called a bit (binary digit), which represents the quantity of information needed to make a difference between two events with same probability. By reducing entropy per bit, coding can reduce transmission errors (uncertainties) due to the transmission medium.

Health care information is used for different **purposes**. The primary purposes are those directly linked to the work of professionals and patients; secondary purposes are in administration, management, education, research, etc. Information can be classified by the time of production, as periodical or non periodical; or by its material format, information can be in paper, electronic, or film format (signals, waves), etc.

Information is contextual by **nature**. This means that information can not be seen outside of the context of its production – without its context, information is often useless. For this reason, the use of primary medical information for secondary purposes without its context is associated with several problems such as misuse, inadequate coding and transfer, and waste or misinterpretation of valuable information. With its context, data can be used for advanced functions within health care, but not always. This has been translated into the First Law of Medical Informatics: "Data shall be used only for the purpose for which they were collected. If no purpose was defined prior to collection of the data, then the data should not be used." (Van der Lei 1991)

The scientific discipline that explores the structure and characteristics of information is called **informatics.** The name originates from the French phrase *information automatique*, defining the science of automatic processing of information. It is one of the youngest scientific disciplines but has the most dynamic and dramatic development, with important implications on the development of society and other sciences. Informatics encompasses analysis of the structure; properties and organization of information; information storage and retrieval; information system and database architecture and design; library science; project management; and organizational issues such as change management and business process reengineering.

Health care informatics is the science that addresses how best to use information to improve health care. Health informatics is an essential and pervasive element in all health care activity. It is the field where health, information and computer sciences, psychology, epidemiology, and engineering intersect, and proposes to improve the quality of patient care, increase productivity, and provide access to knowledge (Mullner 2006).

This field includes several areas: bioinformatics, medical informatics, public health informatics, and consumer health informatics, as well as clinical informatics, nursing informatics, imaging informatics, dental informatics, clinical research informatics, and pharmacy informatics. These specialties can be defined following a similar pattern: bioinformatics involves the use of informatics and computer science to solve biological problems; dental informatics investigates the application of informatics in dentistry; pharmacy informatics in pharmacy, nursing informatics in nursing, etc.

► Medical informatics is the scientific discipline that investigates the laws of creation, transfer, processing, and use of information, data and knowledge in order to solve medical problems, or more precisely it is a discipline related to cognitive tasks, tasks of processing of information and communication in medical practice, and education and research, including scientific methods and technology supporting these tasks (Hersh 2002).

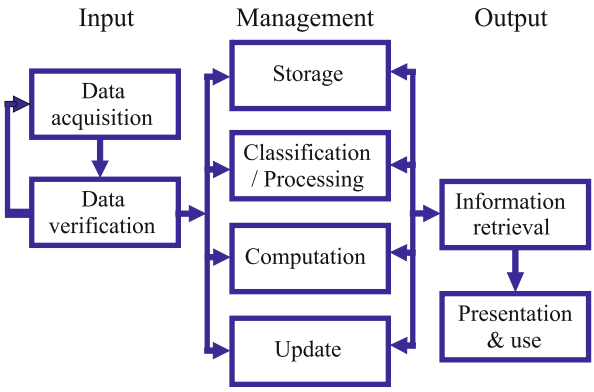
► Public health informatics is a scientific discipline that involves the systematic application of information, computer science, and technology to public health practice, research, and learning. Public health informatics is differentiated from other informatics specialties as its primary focus of concern is health prevention in populations or communities, rather than the health of specific individuals; thus, its health improvement strategy is oriented toward prevention rather than on treatment, and it has a wide range of interventions and operations within a governmental context (O'Carrol 2003).

► Consumer health informatics analyzes consumers' (i. e. patients') needs for information; studies and implements methods of making information accessible to consumers; and models and integrates consumers' preferences into medical information systems (Eysenbach 2000).

Evolution of Data into Information

All health care activities involve gathering, analyzing, and use of data. In the health information system, data usually, but not necessarily, follow a specific sequence (Fig. 1) (Dinca-Panaitescu 2003)

The main scope of **data acquisition** is to provide health professionals with information as a basis for further activities and a crucial tool in the process of decision-making. The physician can then apply his own knowledge on the specific condition or disease, and decide what intervention would be most suitable in that situation. Beside this obvious application, data are the basis of the whole process of decision-making in health care,



Health Information, Figure 1 Data in the Health Information System. Reproduced with the permission of Prof. Serban Dinca-Panaitescu

especially for health service planning and evaluation, and as indices of health service provision, usage, needs for health services, etc. Data acquisition includes data collection and data generation. The process of ► data collecting involves gathering data from various sources, whereas data generation refers to input of standard code formats.

Data can be divided into the following groups by the type of data collected and by the type of data source (Abdelhak 1996):

1. Administrative data – all data generated in an interaction between a patient and a provider in the health care delivery system: demographic, socioeconomic, legal, financial, and data from the provider.
2. Clinical data on a patient whether admitted to a health care facility or treated in a primary health care environment: main condition or principal diagnosis, medical history, physical examination and assessment, diagnostic tests, medications, operative procedures, and disposition.
3. Non-inpatient data – data collected for an emergency patient, outpatient, clinic, or aid post medical/health record: patient identification, history of presenting illness and physical findings, clinical observations, reports of tests and procedures performed, and the outcome of the visit.
4. Hospital census data – data on inpatients, emergency patients and ambulatory patient attendance that are collected daily by health care facilities and processed by the admission office staff: daily inpatient census, daily number of admissions, daily number of transfers in and out of wards, daily number of discharges, and deaths.
5. Secondary health care data collection – abstracted data from the daily inpatient census are used for: monthly and annual statistics such as the length of stay of inpatients and the inpatient occupancy rate; calculation of the gross and net death rates; autopsy rates; maternal, fetal, newborn and neonatal death rates; hospital infection rates; completion of morbidity statistics; vital statistics (births and deaths) for the production of national death and birth rates; and special registries related to patients with a specific diagnosis, condition or procedure (diabetes, HIV/AIDS, birth defects, infectious and contagious diseases, and organ transplants).

In collecting data, users are often faced with sometimes considerable anomalies in the data, such as incomplete or incorrect answers from the patient, noise on biosignals, or errors in biochemical analyzes. Information only exists to support decisions and actions; if it fails to do this, it is irrelevant noise. If the data are full of errors or incomplete, refer to past rather than present situations, or cannot be interpreted by the user then they are unlikely to help. More subtly, if useful data items are present but vital context is omitted (e. g. estrogen and progesterone levels present, but context, e. g. day of menstrual cycle, omitted), it is still hard to use the data.

The importance of ► data quality in the phase of data collection can not be underestimated. **Validation** of gathered data in the early phases of data processing reduces the cost of system data errors.

In order to reduce errors at the point of data entry, data should be entered as closely as possible to the information source, avoiding multiple independent points of unverified data entry, and the person doing the task should know the correct information. Furthermore, health professionals collecting and processing data should check for ► data errors, namely syntactic errors – are data presented in the right format and value; and semantic errors – are data possible and plausible.

It is often said that the quality of health care is measured by the quality of data in the medical record. In order to improve the quality of data, several steps can be taken (WHO 2003):

- An on-going quality assessment plan must be developed, supported both by managers and health staff;
- Staff responsible for quality control should be involved and deal with quality reports properly by

reading and acting upon recommendations in a timely manner;
- Performance indicators can be developed as a guide to monitor and evaluate the quality and appropriateness of care;
- Staff must be properly educated in order to clearly understand what quality means to the health institution, what is expected of them, and what benefit they get from high quality data;
- The data collection system needs to be simple and user-friendly;
- Quality activities need to focus on practice and not individual workers;
- Confidentiality needs to be maintained.

According to Fig. 1, once collected, data must be adequately managed. This management involves ► data processing and storage – classification, computation, coding, and eventual updates.

Most of the data collected in health care nowadays is **stored** as paper documentation. **Documentation/records** are defined as a group of techniques necessary for harmonized presentation, organization, and communication of the specific knowledge stored within (► record). The main purpose of documentation is to provide maximal accessibility and use of the information it contains (Van Bemmel 1997).

Medical documentation/medical records represent the notes of doctors and nurses about the patient's health status at the moment of contact with, and use of, the health service. It comprises anamnesis history, laboratory findings and results from other diagnostic procedures, and information on the applied therapies. The data within can be in various formats: textual format – natural language (medical history, consultation reports, and therapeutic protocols), numbers (measured variables, e. g., blood pressure, pH or temperature, and integer numbers e. g. heartbeats per minute, or number of hospital visits per month), images (radiography, CT scan, MNR scan, etc.), biosignals (ECG, EEG, etc.) and codes (diseases or drugs) (Van Bemmel 1997).

Stored data are usually organized chronologically as "time-oriented medical records". This structure of medical documentation means that users must go through all parts of the documentation in order to learn about a patient's current status or to find data they are interested in, which makes their use much more difficult. Computers can facilitate data collecting, storage and use, at least by enabling other types of data organization within a medical record, such as "sources-oriented medical records" and "problem-oriented medical records" (Van Bemmel 1997).

A collection of data is called a ► database. Data within a database are structured according to their similarity or affiliation with the same group. A file is a collection of records arranged in a database, which can be created, searched, updated, processed, reorganized, and destroyed. A special software system that enables manipulation of data is called a database management system. It is used for data storage, modification, retrieval, and control, as well as for data modeling on demand by the users. Using this system a user can access data easily and modify them for various purposes.

Paper records are physically stored in archives; in the computer, data are organized in files and directories, and physically stored in internal computer memory, or on external memory storage devices (magnetic, optical, and magneto-optical storage).

The rapid development of **electronic medical documentation** has enabled simultaneous access to documentation from various places (ambulance, hospital unit, and even operation theater), access to data from different viewpoints (by chronology, by organ systems, by medication, or by decisions made), highly structured data input, easy access to data, support to data analysis, and rapid electronic data exchange. A great challenge for electronic documentation is data stored in the format of free text that can not be coded, such as physician's observations on patient status, and which are sometimes more informative than coded, standardized information. This is why traditional paper documentation still has some advantages: it can be easily transported; data input is not highly structured enabling great freedom in writing data; medical staff need only basic education; it is a source for supporting patient care, research, and educating clinicians; it forms a basis for healthcare management and services; and it represents a legal report of medical actions (Van Bemmel 1997).

Crude, unprocessed, direct data collected from patients are not always represented in a way that enables information production. In order to generate information from data, we need data **processing**. This process is usually referred to as **coding/classification**. Medical records are coded to enable reporting, compiling, and comparing of health care data. Coding is defined as classifying data and assigning a representation for that data; it is the assignment of a specific code to a nar-

rative statement of diagnoses and procedures (WHO 2003). Data **computation** means mathematical or statistical analysis of the data (e. g. computation of Body Mass Index from body weight and height). Finally, we must bear in mind that health data are dynamic, that old values are changing, and new data are generated. Therefore, the process of data **update** must be performed regularly.

The final step in the evolution of data into information (Fig. 1) is ► data dissemination and utilization. Information does not exist without its users. **Users** of information are (WHO 2003):

- Physicians, nurses, and other health care professionals, who use information in the process of decision-making on the health status of patients and the population;
- Citizens – patients themselves, whose information forms the main part of their medical records;
- Health insurers, who require information to reimburse the health care facility for services rendered for every patient;
- Ministry of health, to review vital statistics and the incidence and prevalence of disease in a city, state, or country. The provision of accurate and reliable aggregate data is important for public policy development and funding of health care services;
- Legal representatives and courts, to protect the legal interests of the patient, physician and other health care professionals, the health care facility, and the public;
- Health educators and researchers, to analyze and interpret data to determine causes, prevention methods, and treatments for diseases, injuries, and disabilities;
- National governments who use the information to develop health care policy and provide and regulate funds;
- Media reporters, whose activities account for a considerable amount of the dissemination of information.

If useful information can not be retrieved then its acquisition can not be justified. ► Information retrieval systems are large, complex, heterogeneous, and loosely structured systems (such as journal articles, book sections, images, audio or video clips, and executable programs), in comparison to database systems that tend to be small and simple (birth dates, diagnostic codes, lab results, and drug prescriptions) (Gardner 1997).

Data and information can be **presented** in several forms: as tables, graphics, images, video, sounds, signals, etc. Creation of information from complete, correct and up-to-date data is not the last step in the evolution process described above. Once it evolves, information needs to be distributed, presented, and used. Furthermore, by synthesizing information from different sources to produce a concept or idea we create knowledge.

As mentioned above, we are living in an era in which the main world resource is knowledge, as expressed by Peter Drucker (2001): "In today's economy the most important resource is no longer labor, capital or land – it is knowledge" (The Knowledge College 2001).

The distribution of knowledge worldwide is enabled by the development of **communication technologies**. ► Communication represents the process of exchange of information, thus supporting contact between various users of information.

Although the most common type of communication in health care is mail, and in some countries the only type, this kind of communication is slow, and doesn't satisfy the need for accurate, up-to-date information. However, the flow of information is getting faster with the use of e-mail, electronic data interchange, and network technology. Advances in information and communication technologies make the global distribution of knowledge seem effortless. Technology, specifically the World Wide Web, enables information to be made available to multiple users the instant it is produced.

The process of delivery of health related services and information via telecommunication technologies is defined by the term ► telehealth (Wikipedia). In clinical medicine, telehealth technologies are used for the transmission of medical images for diagnosis (store or forward telehealth), transmission of medical data for diagnosis or disease management, exchange of live health services or education via videoconference (real-time telehealth), etc. Non-clinical uses of telehealth technologies include: distance education (continuing medical education, patient education, etc.), administrative uses such as meetings among telehealth networks, presentations, supervisions, and research.

The development of telehealth enables access to any knowledge, anytime and anywhere, speeds up the availability and spread of information, saves time, enables cooperation among colleagues and groups, and improves the quality of decisions.

► Telemedicine can be generally defined as "**medicine at a distance**" (Wootton 1996). Since telehealth is understood as the integration of telecommunication systems into the practice of protecting and promoting health, telemedicine is the incorporation of these systems into curative medicine.

The primary purpose of telemedicine is to enable access to specialized health services to people in distant and isolated places – teleconsulting (► teleconsultation). Teleconsulting has recently been used in surgery, for transmitting angiograms to vascular surgeons for consultation; and ophthalmology, for transmitting retinal images to the ophthalmologist using a retinal camera. Other examples of telemedicine include teleradiology – transmission of radiographic images to a radiologist for interpretation; telepathology – transmission of pathohistological samples for evaluation; teledermatology – transfer of images of pigmented skin lesions, including clinical and anamnestic data; and telepsychiatry – transmission of diagnostic and treatment information via audio-visual communication.

The terms ► e-Health and telemedicine are at times used interchangeably with telehealth. Like the terms "medicine" and "health care", telemedicine often refers only to the provision of clinical services, while the term telehealth can refer to both clinical and non-clinical services such as medical education, administration, and research. e-Health is used as a term that includes telehealth, electronic medical records, and other components of health information technologies.

e-Health is sometimes defined as "the use of the Internet or other electronic media by patients and the public to disseminate or provide access to health and lifestyle information or services" (Wyatt 2005). This differs from telemedicine, in which there is a health professional at one or both ends of the communication.

It appears that, in the United Kingdom, the development of e-Health has enabled better information to be available for patients and the public and better communication of patient information within the primary health care team, leading to fewer phone calls and appointments, and improved adherence to treatment (Wyatt 2005).

In the near future, e-Health implementation will be facing various challenges. Since e-Health provides simple, easy access to health information, support services, and goods, will it lead to the loss of the general practitioner's role as a mediator in health care? For example, a patient and specialist could email each other directly, or a patient could seek advice on the Internet rather than visit a physician; however, this risks possible exposure to false or incomplete information. Another issue might be the responsibility of the physicians to respond to patient emails promptly, raising questions concerning the moral or professional grounds of such responsibility and what sanctions would be enforced if this duty was neglected, as well as how the duty would be handled during holidays (Eng 2001).

Several societal issues will also need to be addressed: the quality of e-Health information and communication, privacy and confidentiality, clinical appropriateness, public policy, cost and financing, and resource distribution. Public services must clearly define the implications of these technologies for health care and public health systems in terms of quality, access, and cost, and must establish and adopt standards and guidelines for their appropriate use (Eng 2001).

There is a clear potential conflict of interest between patients, about whom information is collected, and health care providers, stakeholders, and society, who might benefit from access to information for commercial and purchasing reasons (Department of Health and Human Services 2000). ► Consumer protection measures will have to be undertaken in order to protect patient from commercial suppliers who can influence and even mislead them. The fact that patients have trouble accessing their medical information while that very information is being used for unregulated secondary uses has exacerbated worries about the confidentiality and proper use of medical records. Wyatt has proposed the term "e-Health nightmare" to describe a consumer's irrational fear of information technology and e-Health care. This fear, sometimes supported by the media, might even lead to the rejection of information technology advances in health care (Wyatt 2005).

Giving patients control over allowing permission to view their records – as well as over their creation, collection, annotation, modification, dissemination, use, and deletion – is key to ensuring patients' access to their own medical information while protecting their privacy. Patients have the right to understand and control their health information in several forms (Department of Health and Human Services 2000):

- Patient education on privacy protections. Health care providers are required to give patients a clear written

explanation of how they can use, keep, and disclose their health information.
- Ensuring patient access to their medical records. Patients must be able to see and get copies of their records, and request amendments. In addition, a history of most disclosures must be made accessible to patients.
- Receiving patient consent before information is released. Patient authorization to disclose information must meet specific requirements. Health care providers who see patients are required to obtain patient consent before sharing their information for treatment, payment, and health care operations purposes. In addition, specific patient consent must be sought and granted for non-routine uses and most non-health care purposes, such as releasing information to financial institutions and parties determining mortgages and other loans, or selling mailing lists to interested parties such as life insurers. Patients have the right to request restrictions on the use and disclosure of their information.
- Ensuring that consent is not coerced. Health care providers can not condition treatment on a patient's agreement to disclose health information for non-routine uses.
- Providing recourse if privacy protections are violated. People have the right to complain to a covered health care provider about violations of the provisions of this rule or the policies and procedures of the covered entity.

Health Information System

An information system is a technologically implemented medium for information recording, storing, and dissemination, as well as for drawing conclusions from such information. The ► health information system (HIS) is an information system for processing data, information, and knowledge in health care environments. The goal of a HIS is to use computers and communication equipment to collect, store, process, retrieve, and communicate patient care and administrative information for all hospital-affiliated activities, and to satisfy the functional requirements of all users. Therefore, a HIS has several functions (Van Bemmel 1997):
- support of day-to-day activities;
- support of the planning and organization of these day-to-day activities;
- support of the control and correction of planned activities and their costs, in view of agreements on medical and financial policies (management control);
- support of clinical research through use of the HIS database, which is particularly important for university hospitals.

Health information systems should address several domains (AbouZahr 2005):
- health determinants (socioeconomic, environmental, behavioral, and genetic factors), and the contextual and legal environments within which the health system operates;
- inputs to the health system and related processes, including policy and organization, health infrastructure, facilities and equipment, costs, and human and financial resources;
- the performance or outputs of the health system such as availability, quality, and use of health information and services;
- health outcomes (mortality, morbidity, disability, well-being, disease outbreaks, and health status);
- health inequities in determinants, coverage and use of services, and outcomes, including key stratifiers such as sex, socioeconomic status, ethnic group, and geographical location.

The classification of information systems is made by size, complexity level and fields of application (Van Bemmel 1997):
1. by size – systems can be local, institutional, regional, national, and international;
2. by structure – centralized or distributed;
3. by field of application: health information systems, medical research information systems, and medical education information systems.

Health information systems can be further divided into primary care information systems and hospital information systems, according to the levels of health care organization, and even further divided by subsystems into information systems of specific departments (radiology, laboratory, intensive care units, etc.)

A ► primary care information system has been developed in the Netherlands, Great Britain, and Scandinavian countries, where more than 80% of physicians use personal computers to communicate with colleagues and other levels of health care. Since primary health care is the point of first contact of the patient with the health care system, information systems on this lev-

el must fulfill the requirements for several tasks: electronic record keeping, organization of everyday administration, financial activities, reporting, statistics, and research.

The main purpose of the ► hospital information system is to support hospital activities on an operational, tactical, and strategic level. This system should enable more efficient use of limited resources in the health system, improvement in the quality of services offered by the health facility, support to research, and support to the undergraduate and postgraduate education of health professionals.

In order to satisfy these functions, hospital information systems must be equipped with electronic databases; applications for data access, retrieval, presentation and distribution; communication technologies; and terminals for data use. The future of these systems will be a detachment from isolated hospital information systems, moving toward "broad-spectrum" health information systems, created, accessed, and used by all providers of health services.

► Medical research information systems enable health professionals to stay up to date with current medical investigations. One of the well known databases of biomedical literature is Medline, updated by the National Medical Library of the USA. It indexes over 600 000 papers a year, published in medical journals. Intense flow and exchange of information in recent decades has resulted in the development of "evidence-based medicine". A new discipline, evidence-based medicine is based on systematic searches for evidence in medical investigations. As a consequence, the process of decision-making can not be based on intuition and the non-systematized clinical experience of a physician. Evidence-based medicine demands new skills from the physician who must be trained for efficient searching of medical literature and application of formal rules in the process of offering evidence based on critical evaluation of such literature.

► Medical education information systems provide easier learning and assimilation of knowledge from various fields of medicine and health care. They were enabled by the development and availability of multimedia (the Internet), and decrease in the price of computer technology (hardware and software) and printed publications (encyclopedias, dictionaries, handbooks, textbooks, and journals).

Advanced Applications of Health Information

Public health has been defined by the World Health Organization as "the art of applying science in the context of politics so as to reduce inequalities in health while ensuring the best health for the greatest number" (WHO 1998). Broadly speaking, the practice of public health may be defined as the organization and analysis of medical knowledge in such a way that it may be utilized by society for decision-making in health related questions.

► Public health departments play an important role in the collection and dissemination of national health statistics, which must be accurate, clear, concise, and understandable. The core activities of public health include (WHO 2003):

- collection, analysis, and dissemination of quality statistical information on the health status of the population, the availability of health services, and community-based immunization and health screening programs;
- development of public health policy at state, province and national level;
- development of quality assurance programs to monitor the collection of accurate and appropriate data and policy decisions;
- compilation and publication of statistics on the health of particular population groups, such as children (including infants and babies), women, indigenous people, and ethnic groups; and
- analysis of trends in mortality within the community and country.

Public health agencies are mandated to protect and improve the health of all people within their legal jurisdiction through surveillance of health trends, regulation, health promotion, and disease prevention. These highly information-dependent functions are generally performed in partnership with health care providers and organizations, which themselves depend on public health surveillance and guidance. Public health participation in health information exchange is likely to result in reduction of the costs and increase of the speed of health services.

Many countries have their own government agencies, usually Ministries of Health, which should respond to domestic health issues. In the United States, the frontline of public health initiatives is the Centers for Disease Control and Prevention in Atlanta.

The ten essential services developed by the National Public Health Performance Standards Program for the Centers for Disease Control and Prevention are (Centers for Disease Control and Prevention 2006):

1. Monitor health status to identify and solve community health problems,
2. Diagnose and investigate health problems and health hazards in the community,
3. Inform, educate, and empower people about health issues,
4. Mobilize community partnerships to identify and solve health problems,
5. Develop policies and plans that support individual and community health efforts,
6. Enforce laws and regulations that protect health and ensure safety,
7. Link people to needed personal health services and assure the provision of health care when otherwise unavailable,
8. Assure a competent public and personal health care workforce,
9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services,
10. Research for new insights and innovative solutions to health problems.

Based on these essential services, this program identifies public health activities that should be undertaken in all communities.

Health protection is everything that a state or community, as well as social services, do in order to protect and improve the health of the population. The main task of the health system is to provide health services. The human, financial, information, and technical/material resources of a health system merge to provide health services. Ensuring equitable, universal access to health care – whether preventive, promotive or curative – is a key objective of health systems (WHO 2004).

► National Health Service delivery is usually divided into various levels of health protection. Generally, the classification of health protection is on three levels: the first level of health protection is primary prevention, referring to health promotion, protection, and prevention of disease; the second level is secondary prevention referring to early diagnostics and in-time treatment; and the third is tertiary prevention, related to rehabilitation after disease.

Activities and measures provided by the National Health Service according to the levels of health protection include:

1. On the level of health promotion and protection – general and personal hygiene, adequate food and water supply, physical activity, environmental protection, avoidance of risk behavior, and general and health education,
2. On the level of disease prevention – immunization, disinfection, pest eradication, occupational and environmental health prevention, and genetic counseling,
3. On the level of early diagnostics – screening and selective examinations,
4. On the level of disease treatment – pharmacological and surgical treatment, etc.,
5. On the level of rehabilitation – social integration, professional re-education, re-employment, and occupational therapy in hospitals.

The National Health System provides other important services specifically for vulnerable population subgroups:

1. For women during pregnancy and after childbirth – obligatory physical and ultrasound examinations during pregnancy, assisted childbirth in hospital units, medical examination after delivery, patronage visits, laboratory examinations, and genetic counseling;
2. For newborns and infants – systemic examinations in the 3rd, 6th, 9th and 12th month of life; screening for phenylketonuria and hip dislocation, and obligatory active immunization;
3. For young children – systemic examinations in the 2nd, 4th, and 6th year of life, and screening for hearing loss and eyesight impairment;
4. For school children – obligatory systemic examinations at the age of 7, 9, 11, 13, 15, and 17;
5. For students – systemic examination at enrollment, and reproductive health counseling;
6. For the elderly – patronage nurse visits, home care, and clubs for the elderly;
7. For disabled persons – prevention of injuries and accidents; prevention of stress and mental disorders; prevention of chronic degenerative disorders; early diagnosis and treatment of chronic diseases; rehabilitation, social integration, re-education, re-qualification, and employment; provision of orthopedic

facilities, physical therapy, psychological counseling, and social worker services; and special education of deaf, blind, and mentally retarded persons.

► Health indicators are instruments used for the measurement of health status. The World Health Organization has defined health indicators as "a construct of public health surveillance that defines a measure of health (i. e., the occurrence of a disease or other health-related event) or a factor associated with health (i. e., health status or other risk factor) among a specified population." (Pan American Health Organization 2001). In general terms, health indicators represent summary measures that capture relevant information on different health attributes and dimensions, and the performance of the health system. Taken together, these measures attempt to reflect and monitor the health status of a population. Most indicators are quantitative (represented by absolute or relative numbers), but there are also qualitative indicators (statements that something exists or not, or the gradations of an event – good, neutral, or bad, etc.). The Health Monitoring Programme under the European Commission has financed a project to establish a health indicator set with the primary purpose of measuring health status, its determinants, and the trends therein throughout the European Community (EC) in order to facilitate the planning, monitoring, and evaluation of EC programs and actions, and to provide member states with appropriate health information to make comparisons and support their national health policies (European Commission 2005).

Main categories for the ECHI (European Community Health Indicators) indicator set are (European Commission 2005):

1 **Demographic and socioeconomic factors:**
   - 1.1 Population: birth and death rates, net migration, total fertility rate, mother's age distribution, annual in(de-) crease of population in %, median age of population, etc.;
   - 1.2 Socioeconomic factors: national income per capita, total unemployment, total labor force, population by employment type, population by occupation, population by education, population in poverty, etc.

2 **Health status:**
   - 2.1 Mortality: life expectancy, infant mortality, perinatal mortality, mortality of children aged 1 to 5, specific mortality rates by causes of death;
   - 2.2 Morbidity: incidence and prevalence rates, disease-specific morbidity, prevalence of long term disability;
   - 2.3 Generic health status;
   - 2.4 Composite health status measures: Quality Adjusted Life Years (QALY); Disability Adjusted Life Years (DALY), Healthy Life Expectancy (HALE), Potential Years of Life Lost (YLL).

3 **Determinants of health:**
   - 3.1 Personal and biological factors: body mass index, blood pressure, breastfeeding;
   - 3.2 Health behaviors: regular smokers, total alcohol consumption, intake of fruit and vegetables, physical activity, use of illicit drugs;
   - 3.3 Living and working conditions: total size of residence per person, rate of building, percentage of comfort apartments, adequate food and water supply.

4 **Health systems:**
   - 4.1 Prevention, health protection and health promotion: immunization coverage, breast cancer screening, preventive activities, treatment of the most common diseases, provision of medicines;
   - 4.2 Health care resources: availability of health care – number in the population divided by number of health workers or health institutions;
   - 4.3 Health care utilization: number of services per resident; rate of hospitalization; hospital beds per 100000 population; physicians per 100000 population; number of nurses per 10000 population; number of health workers, nurses and midwives per physician; in-patient care admissions per 100 population; average length of stay in hospital;
   - 4.4 Health expenditures and financing: insurance coverage, expenditures on health;
   - 4.5 Health care quality/performance: end product of health service, consumer satisfaction.

The term ► international health service refers to all activities in the field of prevention, diagnosis, and treatment of diseases, requiring the combined discussion and actions of more than one country. The multifaceted nature of health and the multisectoral interactions that influence it have induced an increasing number of organizations to become active in the health field.

The need for international health cooperation has been recognized for years due to the fact that diseases are enhancing the borders of single countries, such as epi-

demic infective diseases and non-communicable diseases. Globally speaking, the health status of many populations has been significantly improved in the 20th century, following the improvement of socioeconomic standards, and technological and pharmacological developments in the field of health care. Still, the need for international cooperation exists due to occurrence of similar problems in some countries: poverty, malnutrition, infective diseases, and early death. Health services need international guidelines for diagnosis and treatment of diseases, standards for drug and medication registration and trade, and international regulations for quarantined diseases, etc.

International health services can be organized into several categories (Frenk 1997):

- Surveillance and control of diseases that represent a regional or global threat, including exchange of information about the incidence of epidemic diseases, provision of uniform regulations about quarantines, and uniform medical documentation;
- Promotion of research and technological developments related to problems of global importance, including establishment of mechanisms for exchange of information and experiences;
- Development of standards and norms for international certification and other global issues, such as standardization of vital statistics, trade with biological tissues, and hazardous drug registries, etc.;
- Assistance for health services in solving problems, including epidemics control, health service planning, and training of health staff;
- Advice to governments and health ministries related to international health issues such as malaria, AIDS, hemorrhagic fever; development of social medicine, improvement of living conditions, sanitation, nutrition, and water supply;
- Protection of international refugees.

Many international agencies, both governmental and nongovernmental organizations, are involved in international health services: the World Health Organization (WHO), the United Nations Children's Emergency Fund (UNICEF), the International Labor Organization (ILO), the United Nation's High Commissioner for Refugees (UNHCR), and the Council for the International Organizations of Medical Sciences (CIOMS), to name just a few.

The WHO is taking a proactive role in defining actions that will ensure tangible improvements in the health of populations. Since the first International Conference on Primary Health Care in Alma Ata in 1978, the WHO has been committed to the health movement "Health for All". The Regional Office for Europe adopted a long term European strategy "Health for All" in 1980, and expanded it in 1998 into a policy named "Health21 – health for all in the 21st century" (WHO 1998). The two main aims of this policy are to promote and protect people's health throughout their lives, and to reduce the incidence of the main diseases and injuries and alleviate the suffering they cause. Twenty-one targets for Health for All have been set, which spell out the needs of the European Region and suggest necessary actions to improve the situation. They are not meant as a prescriptive list, but together they make up the essence of the regional policy. They provide a framework for action for the region as a whole, and an inspiration for the construction of targets and development of health policies in the countries of the European Region.

From the outset, the WHO's closest collaboration has been with UNICEF. The role of UNICEF in health programs is to provide the required supplies and services in practically every field of interest to child health – e. g. the campaigns for BCG vaccination, the program for the supply of streptomycin and malaria projects, the projects on maternal and child health, nutrition, environmental sanitation, aid to hospitals, and milk hygiene, etc. The United Nations Educational, Scientific and Cultural Organization (UNESCO) is collaborating with the WHO on studies of education combined with community development, including studies of school health, health training for teachers, and teaching of social sciences (WHO 1998).

New partners on the health scene, both from the United Nations nongovernmental organizations, have brought new challenges to the WHO, which now has to maintain its role as the directing and coordinating authority in international health work. New challenges make it essential for the WHO to strengthen its leadership role in the new millennium.

Summary

Health informatics is a rapidly evolving discipline. The primary goal of health informatics is to solve scientific and practical problems. One of the greatest challenges is to simplify the process of data collection and creation, its transformation into useful information, and

finally the conversion of information into knowledge. A second task is to produce usable standards to represent data, information, and knowledge in such forms that enable their adequate application. Health informatics must provide good communication and interactions between users and the computer that would be free, informal, and safe at the same time. Since we do not fully understand the process of decision-making based on knowledge on one side and medical data on the other, the creation and modeling of knowledge represents both a scientific and a practical challenge. Implementation of hardware and software technology and the integration of existing systems is yet another challenge (Greenes 1998).

The main purpose of health informatics should be the improvement of health, addressing the needs of individuals, the population, health services and health professionals. This goal can be achieved in several ways: when applied in clinical practice, health informatics is used for the creation of electronic medical documentation, for monitoring devices that record vital signs, for image processing and analysis, for computer support to medical documents, and for hospital information systems.

Its application in health administration enables tracking of patients within the hospital, automated staff scheduling, cost analysis, managing materials and inventory, automatic billing for supplies, quality assurance, and outcome analysis.

Informatics supports the continuous education of health professionals, including web-based education, enables distance learning via teleconferencing, and supports the development of evidence-based medicine. Health informatics is also applied in research, analyzing the outcomes associated with treatments and procedures, performing quality assurance, and in the implementation of various treatment protocols, etc.

The use of valuable information improves health services, especially preventive services, and, furthermore, information provided to consumers guides their choice of health plans. With regards to clinical systems, informatics supports the process of decision-making for both healthcare providers and patients (O'Carroll 2003).

All in all, health informatics serves to improve health. The main cornerstone of this science is information, highly supported by computer technology that improves its flow, making it accessible, usable, and meaningful.

Cross-References

- ▶ Consumer Health Informatics
- ▶ Consumer Protection
- ▶ Database
- ▶ Data Collecting
- ▶ Data Dissemination and Utilization
- ▶ Data Errors
- ▶ Data, Information, Knowledge
- ▶ Data Processing and Storage
- ▶ Data Quality
- ▶ e-Health
- ▶ Health Indicators
- ▶ Health Information System
- ▶ Hospital Information System
- ▶ Information Retrieval (IR)
- ▶ Interchange
- ▶ International Health Services
- ▶ Medical Education Information System
- ▶ Medical Informatics
- ▶ Medical Research Information System
- ▶ National Health Services
- ▶ Primary Care Information System
- ▶ Public Health Departments
- ▶ Public Health Informatics
- ▶ Record
- ▶ Teleconsultation
- ▶ Telehealth
- ▶ Telemedicine

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Health Information and Education

► Public Health Law, Information and Communication

Health Information Management

Definition

Health information management is the job of handling the information requirements of a health care organization, including development, integration, evaluation and quality assurance of ► health information systems in health care.

Health Information System

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Synonyms

Healthcare information system; Patient-care information system; Medical information system

Definition

A health information system (HIS) is an ► information system for processing data, information, and knowledge in health care environments. It can be defined as an integrated effort to collect, process, report, and use health information and knowledge to influence policy-making, program action, and research.

Basic Characteristics

Development of Health Information System

Branches of health information systems are ► primary care information systems (information systems supporting primary health care), ► hospital informa-

tion systems (information systems supporting clinical work), public health information systems, geographic information systems, ► medical research information systems, ► medical education information systems, ► medical management information systems, etc. (► health information).

To initiate the development of new information systems, the World Health Organization proposes the following steps: first of all, the organization must identify the goals, desired outcomes, and the functional requirements of the system needed for healthcare. The information management team must set the technical program of information requirements, specify the criteria of the information technology architecture, and determine how the information technology will be implemented. Furthermore, all key stakeholders must be included in the project in order to ensure that the system will meet all their needs. And finally, the team must commit to a long term project with appropriate budget funding (WHO 1993). However, during the process of development, the information management team is faced with a dilemma—whether it is better to use a home-grown information system that will be sustainable in the long run, or to apply a system already available on the market without any changes. This issue might be solved by considering the main characteristics of the systems available on the market, including their costs or applicability to the present needs, and if these requirements are not met, development of a new information system must be considered (Berg 2004).

Healthcare and health services are constantly changing. Paper-based medical documentation is being abandoned while computers and new technologies are being included in healthcare; therefore the need for functionality in using patient data or medical knowledge for decision making has become predominant. Furthermore, since patients' rights have been recognized and are now respected, a new challenge for health information systems is that they must switch orientation from the healthcare system toward the health ► consumers (Haux 2006).

Implementation of a Health Information System

In the process of implementation of a system, the Public Health Information Institute recommends some guidelines to be followed (Public Health Information Institute 2004):

1. Engagement of all work process experts—everyone affected by a health information system must participate in the program of developing a HIS—public health program experts, information technology experts, healthcare providers, administrators, policymakers, and the business community, as well as the people in the community.
2. Analyzing the logical principles of information systems—understanding the processes and defining system requirements before physical implementation are the most important steps in developing or acquiring any information system.
3. Assuring interoperability—exchange of health information between all users of the system: public health departments, medical care providers, hospitals, laboratories, pharmacies, community agencies, etc.
4. Management for accountability—analyzing the capability of the system to meet the requirements of all users, accounting for the requirements in financial resources and time needed to complete the project.

Successful implementation of a system has many dimensions: effectiveness, efficiency, organizational attitudes and commitment, worker satisfaction, and patient satisfaction, and must be understood as a dynamic process. When implementing a health information system, health professionals must keep in mind that:

- Implementation is not only the technical realization of the system—the technology will inevitably affect the distribution and content of work tasks (change the recording practices), change information flows, and alter the relationships between healthcare professionals and other staff (raising the question of access to data). Physicians may feel oppressed by the need to be more structural and precise in their work.
- Implementation should not be managed by the information technology department—it is important for all users to understand the system, and to express their needs for the design, implementation, and improvement of the system.
- Implementation can not be fully planned and controlled. Health services might change, the mode of data collection might change, and the needs of health professionals might change, and so a system must have the capacity to be redesigned and reengineered in order to survive for years (Berg 2004).

Evaluation of Health Information Systems

The process of evaluation should follow several steps, and each step must be carefully planned and accomplished (Ammenwerth et al. 2003; Wyatt 2003; Berg 2004):

1. Goal of the evaluation—the goal of the evaluation is comparison of the situation before and after implementation of the HIS.
2. Time of the evaluation—recommendations are that the general intention of the evaluation and the starting point should be decided early in the life cycle of information technology.
3. Domains to evaluate—the areas of evaluation should be restricted to aspects which can be measured with the available resources. A complete evaluation of all aspects of a system is usually not feasible. Systems include many domains: the technical performance of the system—compatibility with other systems, upgradeability, maintenance, adaptability, etc; the professional domain—the impact of the system on professional work, user-friendly applications, supporting professionals' needs, and making work easier; the organizational domain—impact on the work process and organization as a whole, impacts on organizational strategy and health services provided, adjustments of the organization needed for implementation, and unexpected negative effects; the economic domain—the costs of buying the system, training personnel, and maintenance, and the expected benefits; the ethical point of view—effect of the system on the doctor-patient relationship and decision making, and the data security issue; and the legal features—legal status of patient data.
4. Study approach of the evaluation—when issues to be evaluated are determined, and when all stakeholders agree on the goals of evaluation, then the evaluators should define the most appropriate design of the study, relevant study questions, and outcome variables in detail.
5. Analysis and reporting—data interpretation depends on the material collected. It is recommended that different reports are produced for different stakeholders, reflecting their needs and perspectives.
6. Recommendations for further actions—both positive and negative results must be published in order to stimulate improvements and further development.

Failure of Implementation of Health Information Systems

Defining failure or success of the information system may be difficult because failure may look like success from one perspective, and vice versa from another. When an information system is implemented and major goals are met without the occurrence of any undesirable outcome for a long time, then implementation of the system must be considered successful (Littlejohns 2003; Heeks 2006). Failure may be attributed to several reasons:

- Failure to include healthcare professionals in the process of design and implementation, so that the system does not meet all of their needs.
- Failure to recognize the need for quick implementation in the healthcare sector, where management and responsibilities are changing.
- Failure to take into account the social and professional cultures of health organizations, or failure to provide adequate training and education of healthcare professionals.
- Failure to motivate healthcare professionals to adapt to the system in the atmosphere of anxiety and time pressure they are in, especially if the system is difficult to operate.
- Failure to learn from previous mistakes, usually as a consequence of failure to grasp an "overall view" of healthcare interventions in terms of cost, effectiveness, professional satisfaction, etc. When only selected professionals (e. g. information technologists, economists, etc.) are assigned to develop an information system they may not be able to take an objective view of other aspects of the system. They may be able to comprehend only the positive aspect of the system, rather than its disadvantages or negative aspects; this phenomenon is referred to as "my baby" syndrome (Littlejohns 2003).

Public Health Information Systems

Public health is a discipline that has made dramatic advances in recent years. Thanks to developments in public health, many health problems can be analyzed and understood from the perspective of the population. Public health is in great need of information systems that can be used for continuous monitoring of public health events, planning and surveillance of public health programs, financing and management in public

health, and health research (► public health information system) (AbouZahr 2005).

Geographic Information System

A ► geographic information system (GIS) is computer software developed for the input, analysis, and use of geographic data in public health. In the field of public health, GIS systems have provided a means to analyze data from a much more sophisticated perspective. In addition to being able to assess disease of the population by location, these systems have provided the means to analyze spatial and temporal relationships between variables, allowed users to identify spatial patterns in data, and have provided the means to integrate databases on the basis of geography (Richards et al. 1999). An example of the use of a geographical information system is for the assessment of exposure to environmental health hazards. A main advantage in using a GIS for exposure assessment is the possibility of modeling exposure geographically, so that individual exposure may be estimated without the need for time-consuming and expensive measurements (Jarup 2004).

Community Health Management Information System

The need for integrating all health systems into one information network has resulted in the development of the ► community health management information system (CHMIS), an electronic network linking all community stakeholders—healthcare providers, consumers, providers, purchasers, payers, and researchers—in a given community. Its main purpose is for the aggregation and exchange of information across the community in order to assure better performance in the health sector (O'Carroll et al. 2003).

Conclusions

Health information systems are rapidly increasing in variety, size, complexity, and sophistication. Health information systems are not limited to ► hospital information systems, but are expanding to worldwide networks, whose users can be patients, healthcare professionals, system operators, administrators, or researchers. With an increasing pressure on health services, public health, and health policy makers to improve population health with limited financial resources, health information systems can provide strong support to their activities in primary health care, clinical work, research, and education.

Cross-References

► Community Health Management Information System (CHMIS)
► Consumer
► Geographic Information System (GIS)
► Health Information
► Hospital Information System
► Information System (IS)
► Medical Education Information System
► Medical Management Information System
► Medical Research Information System
► Primary Care Information System
► Public Health Information System (PHIS)
► Risk Factor Information System

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Health Insurance

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Synonyms

Medical insurance; Medical cover

Definition

Health insurance is a system of protection which provides financing of health care (hospital, physician or medical expenses and treatment) in case of sickness or injury. Among other types of financing health care (for example taxation and ► direct payments), the insurance principle is employed in many countries through various forms. The organization of health insurances, their membership and funding mechanisms as well as their scope of financing varies from country to country. However, two types of health insurance models are predominant: the social health insurance characterized by the presence of sickness funds receiving a contribution of their member's wages and the private health insurance receiving premiums according to the risk profile of the insured.

Basic Characteristics

Health Insurance in the Context of Health Policy

In a majority of countries around the world, policymakers are concerned by an issue of paramount importance: how to ensure that all people in a country have access to health care when they need it? There are three main options for policymakers to design a system of health care:

1. tax-based health care system:
   In tax-based health care systems, individuals contribute to the provision of health services through taxes on income, purchases, property, capital gains and a variety of other items and activities. These taxes are typically pooled across the whole population. The government is in charge of the provision of health care services, usually from a mix of public and private providers and allocates the existing resources to the different areas of health care. Examples for health care systems mainly based on taxation are the United Kingdom, Ireland, Spain and Portugal, Denmark, Sweden and Finland.
2. social health insurance system:
   In social health insurance systems, contributions from workers, the self-employed, enterprises and the government are pooled into a single or multiple sickness funds on a compulsory basis. These so-called statutory sickness funds are either run by the government or by independent non-profit organizations. They typically contract with a mix of public and private providers for the provision of a well defined health care benefit package. Examples of countries with a social health insurance system are Germany, France, the Netherlands and Belgium.
3. private health insurance system:
   In private health insurance systems, premiums are paid directly by individuals, employers or associations to insurance companies, which pool risks across their membership base. Private health insurance can be a complete substitute for social insurance, typically found in market-based systems such as the US. They can also supplement an existing social insurance system as it is the case in France, Belgium and the Netherlands. Private health insurance is in general voluntary in contrast to social insurance that tends to be compulsory. However, in some countries private insurance may also be compulsory for certain segments of the population (for example the formal, employed sector).

To reach universal coverage, many countries opt for a mix of tax-based and private insurance health care systems or a mix of social and private insurance, mostly together with ► direct payments or so-called ► co-payments for services that are not covered by the insurance.

Comparison of Social and Private Health Insurance

Social health insurances and private health insurances are the two main types of health financing systems that

see the idea of insurance as superior to the idea of general taxation.

However the two types differ in many aspects:

(a) Contributions: The social insurance is organized along the ► principle of solidarity as contributions represent a percentage of the income that is generally paid partly by the employee and partly by the employer. Children or unemployed family members are typically free of contribution. The system aims to balance the different economic situations of their members. The private health insurance calculates its contributions with respect to the individual risk situation of the insured according to the ► principle of equivalence. Children and other family members contribute individually. The economic situation of the insured is not taken into account.

(b) Provision of health care: The social insurance works on a 'payment in kind' or third party payer principle, i. e. the insured do not have to pay the received health care services as long as they stay in the negotiated framework and social insurance contracts with providers of health care. Private insurance always reimburses the patient's expenses or co-payments. Some private insurance companies contract also with their providers and pay them directly. The scope of the health care provisions is typically higher with private health insurances because the choice of doctors and hospitals is free.

(c) Organization: Social insurance is mostly organized by the presence of several social sickness funds being either governmental agencies or independent non-profit organizations. Private health insurances are private for-profit organizations or companies often providing a wide range of other insurances.

(d) Financing model: The social insurance is typically based on a pay-as-you-go system, which means that all money that is paid into the health insurance system by its members and their employers, is being spent in the same year. The contributions have to cover the benefits in the same period. Private health insurances are typically fully-funded systems which means that the individual premium of the insured is calculated to cover the potential risk of illness for this individual over the whole contract period. Therefore private health insurances are less sensitive to the ratio of contributors to beneficiaries.

Health Insurance in the Context of Rising Medical Expenses and Limited Resources

Health care expenses are rising in almost every country with a health care system of universal coverage due to three main factors:

1. ► medical progress and improvements in technology
2. expansion of coverage by public health systems
3. aging populations in the industrial world with higher levels of ► chronic diseases and ► disability

The funding for the upward spiral of medical expenses is limited in all health care systems: In tax-based health care systems governments are unable to continuously raise the taxes. In social insurance based systems the compulsory contribution has to stay bearable for employees and employers. Private insurance models depend on the willingness of the individual to spend for health care especially if the private insurance comes as a supplement to compulsory social insurance (e. g. France).

In the context of rising medical expenses and limited resources, health insurances are obliged to define a number of measures on the demand and the supply side aiming to reduce medical expenses if a growth in the contribution rate becomes unbearable for the insured.

Demand side measures:

- The benefit package is restricted by the health insurance.
- Patients are asked for ► co-payments that may concern drugs, dentistry charges, spectacles and charges for visits to doctors.
- Health insurance improves the cost-awareness of their members by giving incentives not to consume health care (e. g. premium rewards).

Supply side measures:

- Health insurance sets budgets for hospitals and doctors operating under direct contract.

Global Examples

In some high-income countries general taxation replaced social insurance and in most countries the role of voluntary private health insurance increased moderately. Only a few countries offer private health insurance as a substitute for compulsory social insurance

or a taxed-based health system. In the USA, Germany, Switzerland and the Netherlands, private health insurance is the primary coverage for certain population groups. In these countries, private insurances offer also additional services for those who want to supplement their compulsory social insurance scheme. Countries like France and Belgium offer private health insurance only as a complement to the existing social insurance in order to insure the co-payments.

Most of the low- and middle-income countries have health care systems with very low or incomplete coverage of the population. Some of them are interested in extending their existing health insurance for specific groups to eventually cover the entire population. To reach a higher level of health insurance coverage, some factors are very important: the socioeconomic and political context, the level of income, the structure of the economy, distribution of the population and the possible role the government can play in facilitating the transition to universal coverage.

Cross-References

- ► Chronic Diseases
- ► Co-payments
- ► Disability
- ► Health Care Plan (US)
- ► Medical Progress
- ► Principle of Equivalence
- ► Principle of Solidarity

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Health Insurance Markets

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Synonyms

Health insurance programs; Health insurance schemes

Definition

Since the distribution of medical spending is highly skewed, health insurance is an important tool for spreading risks. This property of health insurance is considered to be of considerable value, both for individuals and for societies. This value is somewhat reduced by incentive problems of health insurance. Evidence on the health outcome of health insurance is surprisingly scarce. However, research from the US shows unambiguously that lack of health insurance leads to inferior health outcomes.

Basic Characteristics

The Value of Health Insurance

The value of health insurance is derived from the uncertainty and unpredictability of medical spending. Of any given population, only a very small fraction of individuals incurs a very large fraction of medical spending. The distribution of medical spending at any given time (and over time as well) is highly skewed. Although individuals have some information about their health status and their needs for medical spending, the exact amount is highly uncertain. As a consequence, health insurance is an important tool for spreading risks. This property of health insurance is highly valuable for individuals. Moreover, it is highly valuable from a societal perspective as well. In most developed industrial countries – with the notable exception of the US – comprehensive coverage against the financial risk of medical spending is highly valued by society. Moreover, comprehensive mandatory coverage avoids market failures such as ► adverse selection (► consumer choice).

However, the value of health insurance that is created by the spreading of medical risks is somewhat dimin-

ished by incentive problems caused by health insurance. There is a substantial body of literature in health economics which presumes that the existence of health insurance leads to overspending (Pauly 1968). Individuals with health insurance will use more medical services than they would if they were paying for these medical services themselves (► moral hazard). The term 'moral hazard' does not refer to some moral failure of individuals. It simply implies that individuals adapt their behavior to incentives set by health insurance: "the response of seeking more medical care with insurance than in its absence is a result not of moral perfidy, but of rational economic behavior" (Pauly 1968: 535). Economic analysis of the welfare implications of moral hazard actually led to the conclusion that moral hazard substantially reduces the value of health insurance and consumers might even incur a negative value from health insurance if the ► co-insurance rate is very low (Manning and Marquis 1996). This welfare loss occurs because, under health insurance, patients consume additional services that provide little benefit to them (Rice 2002).

A rather famous natural experiment has found that (higher) coverage of health insurance indeed leads to higher utilization rates of medical services. The RAND Insurance Experiment randomized about 6,000 individuals in six areas in the US into different insurance programs. The insurance programs differed by co-insurance rates – between 0 and 95 percent. Without co-insurance, total medical spending per capita was considerably higher than with some degree of co-insurance (Manning et al. 1987; Newhouse and Insurance Experiment Group 1993). However, the RAND Insurance Experiment also found that individuals are unable to distinguish between highly effective and less effective treatments (Lohr et al. 1986).

The design of health insurance involves a trade-off between spreading risk and appropriate incentives. More generous health insurance spreads risk more broadly but also leads to more overspending due to moral hazard. Several studies simulate optimal co-insurance rates, which range between 25 percent and 58 percent (Cutler and Zeckhauser 2000). From a societal point of view, these co-insurance rates are – at least outside the US – not acceptable. Therefore, most countries accept some degree of moral hazard in order to gain the benefits that are due to risk spreading: "Perhaps the most persuasive empirical evidence regarding the values of health insurance is purchased voluntarily, or provided to the citizens of democratic states. This evidence, represented by the high proportion of US consumers who are insured and the high proportion of developed democracies that have some form of national health insurance, suggests that the value of health insurance is overwhelmingly positive" (Nyman 2006: 102).

Health Insurance and Health Outcomes

It is quite evident that the health consequences of not having insurance at all can be quite dramatic. Research about the consequences of being uninsured in the US has shown consistently that individuals without health insurance receive fewer preventive and diagnostic services, tend to be more severely ill, and receive less therapeutic care. More importantly, having health insurance would decrease the mortality of the uninsured in the US significantly (Hadley 2003).

Evidence on the health consequences of different health insurance programs is scarce and rather ambiguous (Cutler and Zeckhauser 2000). The RAND Health Insurance Experiment has found some relationship between the level of co-insurance and health outcomes – although the findings were less dramatic and less conclusive than the relationship between the level of co-insurance and medical spending. Health outcomes did not differ across plans for most individuals. However, "health among the sick poor – approximately the most disadvantaged 6 percent of the population – was adversely affected … In particular, the poor who began the experiment with elevated blood pressure had their blood pressure lowered more on the free care plan than on the cost-sharing plans. The effect on predicted mortality rates – a fall of about 10 percent – was substantial for this group. In addition, free care marginally improved both near and far corrected vision … and increased the likelihood that a decayed tooth would be filled" (Newhouse and Insurance Experiment Group 1993: 339).

Evidence regarding the health outcomes of managed care insurance is also ambiguous. A review of the empirical literature comparing health outcomes of ► managed care health insurance and ► fee-for-service indemnity insurance did not find clear differences. About half of the studies found that managed care improves health outcome (quality of care) while the other half found that managed care has a negative impact on health outcomes (Miller and Luft 2002).

Cross-References

- ► Adverse Selection
- ► Co-insurance Rate
- ► Consumer Choice
- ► Fee-for-Service Indemnity Health Insurance
- ► Managed Care Health Insurance
- ► Moral Hazard
- ► Moral Hazard, ex ante
- ► Moral Hazard, ex post

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Health Insurance Plan

► Indemnity Insurance Plan

Health Insurance Programs

► Health Insurance Markets

Health Insurance Schemes

► Health Insurance Markets

Health Knowledge, Traditional

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H

Synonyms

Indigenous health knowledge; Traditional medicine

Definition

Traditional health knowledge is a dynamic system of distinctive knowledge of health maintenance in indigenous communities developed over centuries through empirical observation, spiritual insight, and traditional teaching. It is used by the majority of the world indigenous population for its affordability, accessibility, cultural beliefs, and efficacy of treatment. Indigenous people have a holistic (► holistic medicine) view of health that takes into account physical, mental, spiritual, social, and ecological dimensions. The value and importance of ► traditional knowledge for public health needs are recognized and evaluated. Traditional knowledge should be protected from disappearance and misuse.

Basic Characteristics

General Description

Traditional health knowledge in general refers to the unique health care experience and practices of indigenous communities. These practices uphold the specific concept of health and disease in a certain community. Local wisdom has accumulated and developed over centuries through naturalistic trial-and-error or investigation, application, modification, and innovation by indigenous and local communities to meet the health needs of their people. Importantly, unlike many Western models of health (► Western medicine), indigenous people's notion of health is often not individu-

al but one that encompasses the health of the whole community and the health of the ecosystem in which they live (Stephens et al. 2005). The indigenous communities tend to accentuate the spiritual, cosmological, and ancestral connection to their knowledge. While this knowledge may be acquired from a teacher and improved through experience, it eventually may be derived through direct communication with the spirit world through dreams, intuition, and visions. Aboriginal knowledge is often conveyed in narrative or metaphorical language.

Traditional health knowledge is highly influenced by the culture and historical conditions within which it first evolved, and as such eludes a precise definition, often containing diverse characteristics and viewpoints. The World Health Organization has adopted a very general definition which describes ► traditional medicine as knowledge based on the theories, beliefs, and experiences indigenous to different cultures, either codified in writing or transmitted orally and used in the maintenance of health as well as the prevention, diagnosis, improvement, or treatment of physical and mental illness. Traditional medicine includes diverse health practices, approaches, knowledge, and beliefs incorporating plants, animals, and/or mineral based medicine, spiritual therapies, manual techniques, and exercises applied singularly or in combination (WHO 2002).

Because of the holistic view of health, indigenous peoples have pluralistic solutions to their health problems that take into account physical, mental, spiritual, social and ecological dimensions of health. Treatment is based in the belief that each individual has his own constitution and social circumstances; therefore, it is designed not only to address the symptoms but also to restore the state of equilibrium within oneself and the environment.

The vast majority of the world's indigenous peoples (about 70%) live in Asia. Two kinds of system in traditional medicine are described in this area. One is the highly developed academic system with rich experience in disease therapy and prevention with theoretical basis, research institutes and established literature. The examples are Chinese medicine or Ayurveda, Unani or Siddha medicine in India, which are already institutionalized. On the other hand, there is a large pool of simple systems practiced by traditional healers in small ethnic groups. However, they are often marginalized, and they lack the respect and recognition from authorities.

Use

The majority of the indigenous population use traditional medicine to meet their primary health care needs. The main reasons for this are *affordability, accessibility, and cultural beliefs*, which are determined by a range of social, economic, geographical, and cultural factors as well as by efficacy of treatment. In some rural areas of Africa the ratio of traditional healers to population is 1:200 in contrast to the availability of allopathic (► allopathic medicine) practitioners, for which the ratio is 1:20 000 or less (WHO 2002). Traditional healers play an important role in the community. Payment for treatment differs, but most healers consider their ability to heal as something given by God, and they cannot accept any money.

In the poor countries, traditional knowledge becomes the only source of health care for the indigenous population. For instance, in Peru, where over 40% of the total population is indigenous, modern health care in many rural areas is completely unavailable. However, the indigenous population still has intimate knowledge of their traditional medicine, which has a history going back at least two thousand years. Elder healers from high altitude villages of the Peruvian Andes and elder shamans and native healers from the Amazon jungle are often sought by poor families for health care and help in need. The role of traditional birth attendants is also extremely important as more than half of all births in rural areas take place in the mothers' own homes. Recently, traditional treatment of infectious diseases is sought even in cases with possible access to pharmaceutical drugs due to a rise in antibiotic resistant bacteria and increasing resistance of the malaria parasite to ► conventional treatment. A successful treatment of drug addictions was achieved by a combination of Western health knowledge and indigenous spiritual healing in the Takiwasi Rehabilitation Centre where the rate of full recovery is around 60%, which is much higher than the recovery rate in the West.

In the wealthy countries, where access to modern health care is available, cultural beliefs play the most important role in the use of traditional knowledge. For example, in Canada at the Withehorse General Hospital, the First Nations innovative program integrates traditional knowledge to ensure quality and culturally sensitive care. The Elders, highly respected for their knowledge and recognized by their communities, are involved in

all aspects of the program, and patients can choose to receive a traditional treatment in a special healing room. With the imposition of ► Western medicine came the criminalization of the practice of traditional Inuit midwifery, and expectant mothers are still evacuated thousands of miles to give birth in the hospital. However, this is linked to a decrease in birth weight or an increase of birthing complications, and currently there is an interest in the reintroduction of traditional midwifery and "bringing birth back to the community" (NAHO 2005).

In traditional Chinese medicine, as in aboriginal culture, there is no clear distinction between food and medicine. Indigenous peoples have extensive knowledge about the benefits of ► traditional food. A recent study suggests that when aboriginal people return to their traditional ► diet and lifestyle, they can actually begin to reverse the effects of Western problems such as diabetes, hypertension, and poor cardiovascular health (Milburn 2004).

WHO Initiatives

The first international symposium entitled "Traditional Medicine – Its Contribution to Human Health in the New Century" was convened in 1999 and since then many international institutions, universities, research institutes, and regional NGOs have organized workshops, seminars, and conducted research on traditional medicine. In 2002 the WHO elaborated "TM Strategy 2002–2005" concentrated on four main objectives: policy; safety, efficacy and quality; access and rational use of traditional medicine. By 2006 the WHO published over 25 reports on traditional medicine, among them a National Policy on Traditional Medicine and Regulation on Herbal Medicines and a Global Atlas of Traditional, ► complementary medicine and ► alternative medicine. The WHO established a network of the WHO collaborating centers for traditional medicine, of which there are currently nineteen.

Protection

Traditional health knowledge has to be protected for two main reasons:

- possibility of disappearing;
- threat of ► biopiracy.

Despite its importance, traditional health knowledge is rapidly being lost due to a reduced capacity of indigenous communities to conserve their knowledge for future generations. Among the reasons are, for instance, that the younger generation does not want to retain knowledge from the older generation (especially in areas where modern medicine is available) or indigenous knowledge is regarded as a secretive art, and it is not passed between herbalists and traditional healers.

Since the mid 1990s the interest in the potential of traditional knowledge especially for pharmaceutical product development has dramatically increased. The medicinal value of plants is very significant, and indigenous people have traditionally been the ultimate resource for retrieving this extensive range of knowledge for the purpose of application to modern medicine. So far, 25% of drugs used by modern medicine are derived from rainforests; nonetheless, fewer than 5% of tropical forest plant species have been examined (Butler 2005). This leaves great potential for discovery but also the potential for biopiracy – unauthorized patenting of genetic resources.

The protection of traditional knowledge, including traditional medical knowledge, arises under Article 8(j) of the Convention on Biological Diversity (1992) – an international treaty signed by 188 member states of the United Nations by 2006. The World Trade Organization (WTO) and the World Intellectual Property Organization (WIPO) play important roles in protection of traditional knowledge. One problem is that this knowledge, being community-owned and handed down through generations, clashes with international property rights, which view knowledge as owned by an individual or a company.

Both the disappearance and misuse of traditional knowledge could be protected through its systematic collection and documentation organized on a national or a community level.

Here are a few examples:

- In India the Traditional Knowledge Digital Library was developed and 36 000 ancient medicine formulations were translated from Sanskrit to many languages.
- The American Association of the Advancement of Science (AAAS) is working to create an international database of traditional plant knowledge.
- TRAMIL (Traditional Medicine in the Islanders) collected information on the Caribbean ethnomedicines through direct contact with individuals who rely largely on home remedies.

However, very few traditional systems have a fair level of documentation in place and some forms of traditional medicines have largely become extinct.

Conclusion

Considering the growing awareness of the value of traditional health knowledge, and of its importance for public health needs, there is need for significant investment of human and economic resources in the further enhancement of traditional medicine to ensure its efficacy and reliability and to improve delivery. Promoting awareness of the reality behind traditional health knowledge, its importance, the challenges for its promotion, and the need for protection of the populace against malpractice is a task that is being addressed by a number of international organizations.

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Health Knowledge, Western

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Synonyms

Medical knowledge, modern

Definition

Western health knowledge is scientific medical information thoughtfully applied in the health care delivery system in a community. This is achieved through knowledge translation and knowledge transfer. Health knowledge translation is the adjustment of health information into a language accessible to a targeting population group. Knowledge transfer is accomplished after identifying data dissemination strategies that enable information to be shared effectively to meet the needs of different groups.

Basic Characteristics

Western Health Knowledge and Indigenous Health

Knowledge is "information combined with experience, context, interpretation, and reflection. It is a high-value form of information that is ready to apply to decision and actions" (Davenport et al. 1999). Health knowledge transferred into action serves as a tool for health promotion and improvement of people's lives.

Western health knowledge is based on solid evidence, efficacy, safety and rational use. It is developed through scientific research: identifying problem, making diagnosis, articulating treatment and raising effective responses. It means that clinical strategy in western medical care is based on the best available scientific evidence (► evidence based medicine). Medicine based on biomedical principles and practiced by holders of a medical degree (M.D.) or doctors of osteopathy degree (D.O.) and by their allied health professionals, such as physical therapists, dentists, psychologists and nurses is called conventional medicine (► conventional treatment), ► allopathic medicine, ► western medicine, mainstream medicine, orthodox medicine,

regular medicine or biomedicine (PAHO 2006). At all levels, modern medicine is an evolving medicine that is open to knowledge and advancement through conventional research.

In the 20th century science has led to dramatic improvements in health worldwide; for example, among public health successes is the global eradication of smallpox or the Framingham Heart Study delineating risk factors for cardiovascular diseases. In spite of these advances, health statuses within most indigenous groups remain poor.

Persistent existence of poor health knowledge, poor quality health service, shortage of professional health care staff and medication shortage are common in many of the remote locations in which indigenous peoples live.

The major health indicators show the significant inequities and the widening health gaps between countries and between the richer and poorer groups within countries. Most vulnerable population groups such as indigenous peoples have less access to health resources, get sicker and die earlier than people in more privileged social positions. Despite the diversity of indigenous people, it may be noted that they share common problems regarding health status and suffer from high child and maternal mortality, infectious diseases and malnutrition. In recent years, the incidence of chronic diseases (cancer, diabetes, obesity and cardiovascular disease), drug and alcohol addictions, sexually transmitted diseases and suicides have notably increased. Health is particularly poor for communities whose original ways of life were destroyed and replaced with a western lifestyle, inadequate housing, unemployment, and high rates of addictions.

Even in the wealthy nations, most studies show alarming health disadvantages for indigenous peoples. In Canada, tuberculosis is affecting Aboriginal Peoples at a rate six times that of the national average, and diabetes rates are as much as four times that of the mainstream population. The life expectancy for Inuit is on average 10 years less than the Canadian average (UN 2005). Pan American Health Organization experts noted that 40 percent of indigenous people in the Americas still lack access to conventional health care services (PAHO 2006).

Most illnesses, especially infectious diseases, are either preventable or to some extent treatable with a relatively small number of medicine. Combined with appropriate public health interventions, appropriately prescribed essential medicines and vaccines could, in principle, massively reduce the impact of disease of communities (UN 2005).

Biomedical discoveries (developing new interventions, drugs, vaccines, devices and other applications) cannot improve people's lives without research on how to apply these to diverse population groups. At present, there is overwhelming dominance of biomedical and clinical research compared to research into social determinants of health and health system research. The main contribution of research to health system is the translation of knowledge into action – using research to shape policies, health practices and public opinion (UN 2004).

Knowledge Translation, Transfer and its Use in the Indigenous Population

Health knowledge translation can be described as alteration or adjusting of health information into a language accessible to a targeting population group. Knowledge transfer can be accomplished after identifying data dissemination strategies that enable information to be shared effectively to meet the needs of different groups. Effective use/application of health knowledge enables to improve health service delivery.

Health knowledge translation and transfer to a variety of indigenous peoples (370 millions, in 70 countries, 5000 languages) are challenging because of their vast diversity including different levels of health literacy. Indigenous communities preserve at least in part their cultural, linguistic and social uniqueness that explains their sensitivity to accept different knowledge. Importantly, unlike many western models of health, indigenous people's notion of health is often not individual, but one that encompasses the health of the whole community and the health of the ecosystem in which they live. Because of this holistic view of health, indigenous peoples have pluralistic and holistic solutions to their health problems, with mix of traditional and allopathic medicine (Stephens et al. 2005). Western health knowledge translation activities have to account for this significant cultural differences including contrasting philosophy of what knowledge is. Biomedical health measures may not be compatible with local understanding of health and local ways of sharing knowledge. Therefore, indigenous communities often reject the imposed

modern health services only because they are misunderstood.

Barriers to uptake and use modern health knowledge are either specific to particular indigenous groups, or are commonly experienced by many such groups. They may exist in the:

- *cultural environment*: cultural belief about appropriate care; traditional beliefs and practices
- *social environment*: low literacy level, health behavior, influence of social trends, inappropriate influence of the media, distrust of western influence (may be related to previous adverse experience of innovation and exploitation), continual marginalization and discrimination, persistent poverty
- *political environment*: political corruption, different priorities
- *health care system:* lack of financial resources, inadequate human resources, lack of access to health care, failure to provide practitioners with access to appropriate information;
- *practitioners*: obsolete knowledge, poor practice organization, beliefs and attitudes
- *patients*: perceptions or cultural beliefs about appropriate care, health literacy

Regarding indigenous groups, any attempt to implement western health knowledge without community support may fail. After developing an appropriate message based on research knowledge it is essential to use credible messengers and proven approaches to transfer message. The message has to identify community beliefs and concerns. The effective way of conveying this knowledge to indigenous communities and establishing mutual understanding is facilitated for instance by:

- special events that bring together researchers, traditional healers and village elders (facilitate communication and bring mutual understanding)
- cultural brokers or indigenous health workers (they have trust of the community and serve as guides of incorporating culturally and linguistically competent health principles, values and practices).

In areas with Internet access e-learning technology assists to improve health knowledge.

Various international organizations, institutions, universities, or NGO's demonstrate the concern for improved health care access, health promotion and endorsement of health literacy of indigenous peoples.

WHO's regional offices play an important role for developing a comprehensive action plan to meet the goal of the Millennium Development Goals (MDG) and organizing activities for western health knowledge dissemination and its implementation in their respective regions.

A few examples:

PAHO (Pan American Health Organization) carried out several events, among them: "Health of indigenous peoples of Americas: Achievements and future directives" (December 2005 Nicaragua) or "The evaluation of the Health of the Indigenous Peoples Initiative within the framework of the International Decade of the Indigenous Peoples of the World", where only 5 of the 19 participating countries reported having scholarships specifically for indigenous students to pursue tertiary education. Most countries described the existence of local networks on malaria, children's health, maternal mortality, HIV/AIDS, and water and sanitation; however, coordination among different indigenous health networks and programs is limited (PAHO 2006).

The UNFPA (United Nations Population Fund) organized a project in Equator, Otavalo through local Jambi Huasi health clinic. Its services were upgraded to provide reproductive health education and information to women, men and adolescents and introduce a referral system for obstetric complications. The education is carried out in a culturally sensitive fashion, taking into account the special needs and concerns of Quechua-speaking natives. This way they are more receptive to the messages and services and, as a result, the contraceptive prevalence rate has climbed from 10 to 40 per cent. Both the infant and maternal mortality rates have fallen (UNFPA 2006).

"Health Unlimited", established in 1984, is the British charity that supports indigenous communities, and today they work in 15 countries across Africa, Asia and Latin America. 95% of their staff are indigenous people. The results of their work clearly illustrate that people can benefit from developing their skills as indigenous health workers and their ability to organize and take action to improve their health.

E-learning technology: "Health Academy", launched by the WHO, provides the general public with health information to create basic health knowledge; it promotes equality based on gender, nation, culture and education.

Conclusion

In conclusion, the appropriate and sensitive application of western health knowledge in indigenous population can undoubtedly advance the health of indigenous people. However, an intercultural approach and close cooperation with communities to develop mutual understanding is essential. The beneficial co-existence of traditional and modern medical system was already established in many cases.

Cross-References

- ► Conventional Treatment
- ► Evidence Based Medicine
- ► Health Knowledge, Traditional
- ► Western Medicine

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Health Literacy

Synonyms

Understanding of good health

Definition

According to a definition of the American Medical Association, health literacy is the ability to obtain, process, and understand basic ► health information and services needed to make appropriate health decisions and follow instructions for treatment. Health literacy incorporates a range of skills: to read, comprehend, and analyze information; decode instructions, symbols, charts, and diagrams; weigh risks and benefits; and, ultimately, make decisions and take action.

Health literacy includes the capacity to understand instructions on prescription drug bottles, to interpret test results, to understand medical education brochures, to give patient history, to articulate health concerns and describe symptoms accurately, to analyze relative risks and benefits, to understand informed consent forms, and to negotiate complex health care systems. With the development of the world wide web as a source of health information, health literacy may also include the ability to search the Internet and assess the quality of websites.

Studies show that people from all ages, races, income and education levels are challenged by this problem. Limited health literacy has negative implications for ► health outcomes, ► health care quality, and ► health care costs. For example, low literacy adversely impacts cancer incidence, mortality, and quality of life. It also affects glycemic control in diabetes, or blood pressure control in patients with hypertension, etc. Poor health literacy proves to be a stronger predictor of a person's health than, for example, age, income, or education level.

Improving the health literacy is a core aim of ► health promotion. Health literacy activities include creating easy-to-read, culturally appropriate health information materials, advocating for readers with limited skills, or enhancing access to health services.

Health Lobbying

► Advocacy

Health Locus of Control

Definition

The locus of control construct emphasizes the importance of perceptions of control, including mastery, self-efficacy and personal competence. It overlaps with concepts that focus on the causes of events. Although locus of control beliefs to some extent are based on causal attributions, there is a clear conceptual distinction between locus of control beliefs and causal beliefs. Causal beliefs focus on the causes of past events, whereas locus of control beliefs focus on expectancies for future events. While causal attributions in response to serious illness such as cancer has been investigated in sufficient detail, there has been little work applying attributional theories to health behavior among healthy populations.

Health Maintenance

► Health Care

Health Maintenance Organizations (HMOs) (U.S.)

Definition

Health Maintenance Organizations (HMOs) are a type of managed care organizations providing ► health insurance coverage and health care services through a number of contracted hospitals, physicians and other health professionals. They have been introduced in the United States during the 1970s. Patients being insured by a HMO receive all necessary health care services including disease prevention from one specific provider group within defined contracts. Patients generally receive a primary care physician who coordinates all medical care and acts as a gatekeeper for specialty services. HMO-providers receive fixed amounts per person (capitation payment) and therefore have no incentives to deliver unnecessary care, focus on prevention rather than costly hospitalization.

Health Management

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Introduction

While health policy focuses on defining health goals and creating the surroundings of a desired health system, health management focuses on achieving those goals. Since there is a broad variety of health goals which are partly competing against each other, such as reducing cost while improving the quality of health, health management deals primarily with the allocation of limited resources towards health oriented goals.

In any health care system, there are numerous ► stakeholders focusing on different health care related goals. The main stakeholders in health care are:

- Patients
- Inpatient health care providers: ► hospitals
- Outpatient health care providers: e. g. doctors, laboratories, etc.
- Health insurance companies
- Pharmaceutical industry
- Government

The variety of actors and goals in health care systems leads to a variety of health management practices being applied. Health management can further be defined as a systematic approach to optimize organization and processes in order to achieve predefined health related goals.

Patients

One of the primary targets of health management is to improve public health for individuals (patients) within a health system. This target includes, amongst various other targets, the improvement of a health-induced quality of life and a growing life expectancy. While life expectancy is easy to measure, it is much more difficult to measure the improvement in the quality of life. Various approaches have been made to find a method of measuring the quality of life. However, no comprehen-

sive system has been established on a global basis that has been consistently used by countries to manage the outcome of health care on a comparable basis (► health care quality).

Besides setting goals for health care and ► health insurance providers, and besides being a major source of funding for most health systems, patients also have significant control over health-related factors themselves. These areas can be categorized into preventative actions and compliance, which can have a strong impact on a patient's health status. In the preventative actions area, various measures of caution and 'healthy' life-style can be maintained (i. e. not smoking, exercising regularly, health-oriented diets) in order to manage one's personal health risk better. Compliance refers to how closely a patient follows instructions during and after a treatment or surgery. Various studies have shown that a lack of compliance, especially in the area of medication, can have a high impact on the recovery rate of a patient. In this sense, patients play a role in their own health management which is not neglectable.

But at present, only few health care systems educate their patients and apply incentives accordingly. Besides informing people about their ability to influence their health directly, a number of incentives could be institutionalized, such as health insurance tariffs that are linked to a person's manageable risks (as opposed to non manageable, chronic disease risks, such as allergies).

Instead, there are multi-layered conflicts that exist between patients and health insurance companies. On the one hand, health insurance companies need patients as customers to raise money for the insurance claims. In that regard, insurance companies need to appeal to the interest of the patients. On the other hand, those patients, i. e. customers, expect reimbursement for their insurance claims. They expect the payers to offer a wide variety of options for health coverage according to their individual needs. The payers, however, need to keep payments low, or they will face an increase in overall expenses, which leads to higher tariffs and, therefore, most likely fewer customers in the future. Ideally, payers want the patients to seek only needed care, follow providers' instructions, and recover quickly. If restrictions become too tight though, a patient may choose to change insurance providers.

The mentioned conflicts between patients and insurance companies are only an example of possible conflicts between patients and other stakeholders in a health care system. This demonstrates that health management has to deal constantly with opposing stakeholder goals and patient goals, although the overall goal remains the achievement of the best ► health outcome for the individual patient within the financial and organizational restrictions of the health care system.

Inpatient Health Care Providers: Hospitals

Hospitals are providers of inpatient health care on a public or private basis. They constitute an important part in every health care system with regard to the financial resources they need as well as to the medical impact they have. Hospitals are either providing necessary health care for all kinds of diseases or for specialized medical areas. As the hospital sector is vital to health management in any health care system, it is strongly regulated by government laws in most countries. The organization and structure of the hospital sector is therefore shaped by health policy guidelines. In order to constantly improve the health outcome of the delivered hospital services within restricted financial resources, health management measures constantly change.

A few examples of the main changes in hospital health management are:

Change of Payment Systems in Hospitals Towards Diagnosis Related Groups (DRGs) Traditionally hospitals have been financed by public or private financial resources on a basis of retrospective funding which means that the hospital owner allocates the financial resources according to the costs the hospital incurred the year before. Due to technical and medical improvements during the past decades, the hospital sector has particularly increased its need for financial resources leading hospital owners to shift from open-ended retrospective funding towards prospective budgets or per-case payments. Per-case payments are particularly popular in well developed health care systems. They are either based on contractual agreements between purchaser and provider or on ► diagnosis related groups (DRGs). Within the DRG system, patients are grouped together "according to principal diagnosis, presence of a surgical procedure, age, presence or absence of significant co-morbidities or complications, and other relevant criteria" (US Congress 1983). As all patients with-

in the same DRG are expected to have similar hospital resource use, DRGs are used to reimburse the cost of inpatient hospital care. Hospitals are paid a specific pre-determined amount for each patient treated according to its DRG regardless of the actual cost of care provided. This trend in the change of the financing method follows the overall need to reduce the continuously rising costs in the hospital sector (Mossialos 1999). The Organization for Economic Cooperation and Development (OECD) recently noted that 19 of its members had introduced DRG-based payments to control hospital reimbursement costs (Forgione et al. 2004). Most countries have adapted the original US model to fulfill their specific needs.

Besides using DRGs as a basis for reimbursement, some countries have designed DRG-based systems for planning, budget allocation and management of the hospital care provided. In France for example, DRGs are used to allocate budgets to hospitals: As DRGs demonstrate a similar use of hospital resources, hospitals can be compared with each other and an estimate for future hospital payments can be made. In Belgium and Ireland, DRGs are a means of reducing the length of stay and in the UK they are used as a system of management of hospital provision. DRGS may also be used to evaluate the quality of care: Since all cases in a DRG are clinically similar, treatment protocols and other factors, such as related conditions or demographic distribution, can be analyzed. In addition, quality reviews can be established, critical pathways can be designed and benchmarking between hospitals can take place.

Change of Disease Treatment With the change of disease patterns, such as the increasing advent of chronic diseases, the treatment methods are changing accordingly. There is a shift from distinctive operating hospital units towards multidisciplinary treatment, including the idea of a health care chain. These changes in disease management require not only a redesign of the processes of the health care delivery, such as the introduction of so-called disease management programs (► disease management programs), but also a redesign of organizational structures in hospitals.

Disease management programs became very popular in the United States during the 1990s as chronic diseases continued to be the major financial burden in the health care system. Enhancing health conditions of chronically ill people while reducing costs is the main concern of disease management programs. The key to success is to offer coordinated health intervention while avoiding complications and unnecessary health care services.

With regard to hospital management, many large hospitals of the early 20th century were divided into medical disciplines which delivered health services according to their own independent procedure. These rigid and very hierarchically organized hospital disciplines are slowly changing to integrate the idea of interdisciplinary cooperation and to participate in disease management programs.

Progress in Health Technology Health technology advancements in the hospital sector, such as diagnostic imaging, intravascular ultrasound and minimal invasive surgery, have led to a considerable reduction in the average length of stay of a patient. As a consequence hospitals have experienced an overall reduction in the number of their beds and a higher turnover in patients. Because administrative structures and procedures in hospitals needed to adapt, management techniques have become increasingly important. During the last decades there has been a boom in 'hospital management', attributing more importance to hospital administration than before.

Efforts to Improve Quality of Care Hospitals need to improve their quality of services in many areas (► health care quality). There is a lack of coordination between services, often an inappropriate use of resources with respect to the quality delivered and scarce maintenance of building and equipment as well as a lack of information among hospital staff on costs and outcome. Improvement in the quality programs necessitates changes in the organization and management of hospitals. The current trend is to consider hospitals as industrial companies which must be organized, managed and evaluated. In this sense, management functions and clinical activities have to be provided with a shared common goal of health care quality. Many initiatives aiming at the continuous improvement in health care quality have started: for example, the introduction of clinical guidelines, continuing medical education, disease management programs and standards for health technology assessment.

The continuous development of medical knowledge and improved treatment practices, together with the financial pressure of cost-containment and the rising expec-

tations in terms of quality of care, will inevitably lead to further changes in the organization and management of hospitals. The future challenges are two-fold:

1. to change the functional interaction between the levels of care incorporating the idea of a health care chain to provide effective and integrated health care to the patients, and
2. to change the reporting measures in order to make the effectiveness of health services transparent with regard to the patient's health quality.

Outpatient Health Care

Outpatient or ambulatory health care comprises health care services delivered outside the hospital in offices of physicians, dentists and other health care practitioners such as mental health specialists, physiotherapists, etc. Providers of outpatient health care operate in a national legal framework consisting of medical guidelines on the one hand and reimbursement methods on the other. The specific health infrastructure (► infrastructure and service delivery) of a country determines the health management measures applied in outpatient health care delivery. In the past decades health care delivered in the ambulatory or outpatient sector has become increasingly important as the inpatient sector faces more and more financial constraints. However, similar financial constraints, as already mentioned with regard to the hospital sector, are found within the outpatient health care sector and have led to numerous measures of cost-containment, initiated by the purchasers of health care services, i. e. health insurers or the government. Increasingly, controlling mechanisms and rationing measures have been developed.

With regard to doctors, many countries control entry to medical education and limit the number of independent doctors' offices that can be established. Their payment or reimbursement methods have also changed over the years. The payment per item of service method has, in some countries, been replaced by the so-called capitation payment whereby doctors receive a given amount per patient regardless of the individual medical situation of the patient. Other countries maintained the payment per item system but changed the relative value-scale in order to cut costs. Another important measure concerns prescribing behavior which is influenced, in many countries, by government guidelines promoting, for example, the use of generics.

With regard to the organization and processes of outpatient health care services, the development towards integrated health care (► integrated health care) leads to continuous changes in health management practices. In the field of prevention, long-term care and rehabilitation, which increasingly concern ambulatory services, integration is the key factor in the delivery of quality of care within financial constraints. To develop a more integrated approach to health care delivery some organizational changes are suggested as necessary:

- Ambulatory care has to be more flexible in order to link different levels of care, to improve access to adequate care and to improve the coordination between outpatient and inpatient health care.
- Telemedicine or ► e-Health applications have to be increasingly developed as a tool to improve access to services for patients in remote areas or with specific chronic diseases.
- The development of home health care on an ambulatory community level might be a cost-efficient and quality enhancing measure for the treatment of patients with diseases that are better suited to care at home than to long–term care in a facility.

Health Insurance

Health insurance companies are important stakeholders in the health management context as they are responsible for the payment of health services for individuals in case of sickness or injury. In countries with well developed health care systems there are three forms of health care financing:

1. Tax-based health care system, in which individuals contribute to the provision of health services through taxes that are typically pooled across the whole population. The government is in charge of the provision of health care services, usually from a mix of public and private providers and allocates the existing resources to the different areas of health care. Examples of health care systems mainly based on taxation are the United Kingdom, Ireland, Spain and Portugal, Denmark, Sweden and Finland.
2. Social health insurance system, in which contributions from workers, the self-employed, enterprises and the government are pooled into a single or multiple sickness fund on a compulsory basis. These so-called statutory sickness funds are either directed by the government or independent non-profit organiza-

tions. They typically contract with a mix of public and private providers for the provision of a well defined health care benefit package. Examples of countries with a social health insurance system are Germany, France, the Netherlands and Belgium.

3. Private health insurance system, in which premiums are paid directly by individuals, employers or associations to insurance companies pooling risks across their membership base. Private health insurance can be a complete substitute for social insurance; typicall of a market-based system such as the US. It can also supplement an existing social insurance system as is the case in France, Belgium and the Netherlands. Private health insurance systems are, in general, voluntary in contrast to social insurance systems that tend to be compulsory. However, in some countries, private insurance may also be compulsory for certain segments of the population.

Regardless of the specific form of health insurance, all face financial constraints due to medical progress and improvements in technology, expansion of coverage by public health systems and aging populations in the industrial world with higher levels of chronic diseases and disability. However, the funding for the upward spiral of medical expenses is in all health care systems limited: In tax-based health care systems governments are unable to continuously raise taxes. In social insurance based systems the compulsory contribution has to remain bearable for employees and employers. Private insurance models depend on individual willingness to spend money on health care, especially if the private insurance comes as a supplement to compulsory social insurance (e. g. France).

In this context health insurers are obliged to take measures affecting the balance of demand and supply aiming to reduce medical expenses if a growth in the contribution rate should become unbearable for the insured.

Demand side measures:

- The benefit package is restricted by the health insurance.
- Patients are asked for co-payments that may concern drugs, dentistry charges, spectacles and charges for visits to doctors.
- Health insurance improves the cost-awareness of their members by giving incentives not to consume health care (e. g. premium rewards).

Supply side measures:

- Health insurance sets budgets for hospitals and doctors under direct contract.
- Implementation of Disease Management Programs (► disease management programs) to improve care for chronically ill people while reducing costs through an automatic and streamlined care process.

Even if a growing insurance premium is not only in the interest of the health insurer but also in the interest of the patients, who are mostly contributors as well, there are still conflicts between patients and payers of health care that influence health management practices. On the one hand, patients expect payers to offer a wide variety of options for health coverage that can be customized to their specific needs. On the other hand, payers want to maintain or lower their cost contribution. They want the patient to seek only needed care, follow providers' instructions, and recover quickly. Patients should also seek to reduce their health risk behaviors through, for example, diet, exercise and smoking cessation.

Pharmaceutical Industry

As one of the completely private stakeholders in a health care system, the pharmaceutical industry comprises numerous private pharmaceutical companies who invest in research and development in order to meet the need for new pharmaceuticals or medical devices while working as for-profit organizations. Drugs are either delivered to the patient through pharmacies or directly through hospitals. Similar to the situation of ambulatory doctor's offices or hospitals, the pharmaceutical industry sector is highly regulated in all developed health care systems by government laws. These regulations mainly concern the process of research and development, the approval of drugs before commercialization is authorized, quality assurance in the production process and also the market price and reimbursements. In the context of medical cost containment, a number of measures have become very popular: the direct and indirect control of prices and profits by the government, the necessary price approval for reimbursement before a pharmaceutical product may be launched and the control of the use of expensive equipment in the inpatient sector. As a consequence the pharmaceutical industry tries to influence health policy decisions by lobbying through often nationwide associations. Representing an important part of the industry in the well developed countries, the power of these indus-

trial pharmaceutical associations is often considered as high.

Government

The government plays an important role in health management as it mainly acts as a decision maker to set the rules for the functioning of a health care system that fulfills the values and health policy ideals of the country. Within the regulatory framework the government may regulate volume and quality of the health care services, is responsible for legislation on health care financing, corporate negotiations, major professional regulations and public health measures such as prevention and health promotion. The government administration of health (e. g. Ministry of Health) formulates and administers the government policy in health, sets standards for the regulation and licensing of health care providers as well as for medical personnel in hospitals. Other governmental agencies that set public health standards are the Food and Drug Regulation Agencies and agencies regulating occupational health and safety in the workplace.

In most countries with well developed health care systems the government is in charge of a number of public health services (► public health services) which are focused on the health status of the whole population. Public health programs are typically provided by the ministry of health or other government agencies in order to promote, protect and improve public health. Programs encompass disease prevention measures, health education, immunization programs, control of communicable diseases, sanitary measures, and protection against environmental hazards.

In countries like the UK with a national health service (NHS), the government acts not only as a decision maker and provider of public health services but also as a payer and provider of individual health care services.

Health Management Worldwide

In 1998, many countries took a greater interest in improvement of health management, considering better management of their national health systems to be among their major needs and priorities. During this year, WHO Representatives' Offices in 16 countries managed WHO technical cooperation at country level and provided policy support to ministries of health on various aspects of health. Desk officers at the Regional Office continued to provide support for countries without WHO Representatives' Offices. In addition to serving as an interlocutor and focal point for contacts between WHO and its countries, the WHO Representatives play an important role in the implementation of the global health policy strategy 'Health for all', liaising with other UN agencies as well as bilateral donors and non-governmental organizations. The increasing reliance in recent years on extra-budgetary sources of income due to a combination of higher demands on WHO and lower regular budget resources in real terms underline the importance of the WHO Representatives' role in resource mobilization. Every effort is being made to make use of recent technological advances to establish communication links between WHO headquarters, its regional offices and country offices as well as countries to permit an efficient flow of information between all parties.

In most developing countries, health services are weak due to a lack of responsibility in the government, a lack of investment in health infrastructure to deliver health services as well as poor training and career structures for medical professionals. In order to respond adequately to national and regional expectations, needs and priorities, great efforts are being made by the Regional Office to provide necessary support to countries in the development and improvement of health management in the regions. This has been done through a variety of approaches including contractual services agreements, fellowships, national training activities, consultancy services and regional consultations, particularly on developing and expanding the use of the district team problem-solving (DTPS) technique.

Regional Office experts are regularly developing guidelines for restructuring the national health system, proposing possible reasons for restructuring, as well as mechanisms of restructuring, and the resources required to be made available for this process. The Regional Office collaborates with the Ministries of Health and develops a Quality Management Training Center for the countries they are in charge of. The center, which enjoys full support from policy-makers, is an innovative strategy to improve the quality of health care and health status through quality orientation, health system development and managerial capacity-building. The center focuses on the core health processes, problem solving and team work. The 12-month modular training program is action-oriented and product-oriented and fol-

lows a learning-by-doing approach designed to build on the knowledge and experience of the trainees.

The Regional Office continued its support to a number of countries in strengthening their planning capabilities at central and district levels. Efforts were made to promote strategic planning in ministries of health and to disseminate WHO literature on health futures. Support was provided through WHO collaborative programs to the national institutes of health management.

Summary

The overview of the different stakeholder activities within the well developed health care system has shown the wide spectrum of health management. In order to realize health policy goals, health management includes organizational strategies for the stakeholders, priority setting and cost-effectiveness analysis with regard to existing financial constraints and the implementation of a sound quality management.

Great effort has been made during the past decades in improving overall health management, new management techniques have been developed and promise to help bridge the gap between health care quality and existing financial constraints in the health sector. However, there are two main challenges for the success of health management in the future:

1. to manage the conflict of interest between the stakeholders in order to effectively apply health management practices, and
2. to deal with changing environment patterns of the health care systems, such as epidemiological and demographic changes.

As far as health management in developing countries is concerned, the organization, scope and quality of health standards and health services are still far behind the services provided in well developed industrial nations despite the WHO efforts over many years.

Cross-References

- ▶ Diagnosis Related Groups (DRGs)
- ▶ Disease Management Programs
- ▶ e-Health
- ▶ Health Care Quality
- ▶ Health Insurance
- ▶ Health Outcomes
- ▶ Hospitals
- ▶ Infrastructure and Service Delivery
- ▶ Integrated Health Care
- ▶ Public Health Services
- ▶ Stakeholders

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Health Monitoring

Definition

Health monitoring refers to regular checking of ongoing health activities or programs in order to determine if they are achieving the health goals of the population.

Cross-References

► Public Health Surveillance

Health of Muscles and Skeletal System

► Musculoskeletal Health

Health Outcomes

Synonyms

Health change

Definition

Health outcomes are defined as follows in the WHO Health promotion glossary:

A change in the health status of an individual, group or population which is attributable to a planned program or series of programs, regardless of whether such a program was intended to change health status. Such a definition emphasizes the outcome of planned interventions (as opposed, for example, to incidental exposure to risk), and that outcomes may be for individuals, groups or whole populations. Interventions may include government policies and consequent programs, laws and regulations, or health services and programs, including health promotion programs. It may also include the intended or unintended health outcomes of government policies in sectors other than health. Health outcomes will normally be assessed using health indicators. Health outcomes include morbidity and mortality; physical, social, and mental functioning; nutritional status; and quality of life.

(WHO 1998)

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Health Phobia

► Anxiety Disorders
► Hypochondria

Health Plans (U.S.)

► Managed Health Care Plans (U.S.)

Health Policy

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Introduction

Health Policy combines the elements of formulating health related goals, choosing the approach, instruments and financing via a political ► decision making process, and evaluating the outcome. In 2006, there is no consistent process or standardized approach in place as to how those steps are applied in different countries and different health care systems. Instead, national health policy is based on several factors, such as the political system, history of health policy throughout past decades, and the power of the different ► stakeholders in the health care system. Those systems and their respective health policy processes can therefore differ widely.

Global Health Policy

When defining ► global health policy, it is necessary to define targets and goals of such a policy. Health targets are such instruments, which can facilitate the achievement of health policy. Health targets therefore represent a commitment of a system or legislative body to achieve specific pre-defined outcomes over a pre-defined period of time. Furthermore, they enable the monitoring and evaluation of progress towards those goals.

Health targets are based on outcomes and processes. They can be quantitative, such as immunization rates, or qualitative, such as the introduction of national health care programs and initiatives. To faciliate monitoring and management towards the achievement of health targets, they should ideally be specific, measurable, accurate, realistic and time–bound (SMART).

Targets set priorities and can be used to create high levels of commitment. They are the basis for follow-up and evaluation. Health targets can be applied nationally, internationally, or within systems on sub-national levels, such as public health care systems.

Numerous governments in the member states of the WHO European Region and in OECD countries utilize health targets as an instrument and guidance for policy formulation and implementation. Countries across the world have shown a persistent interest in health targets, with some countries having a long track record in formulating such targets. Those targets have been optimized and fine-tuned over the past decades, thus representing a second- or third-generation iteration of country- or system-specific health targets.

WHO states that "undoubtedly, health targets have stimulated the debate and contributed in various ways to the development of national and sub-national health policies. However, when it comes to implementation the track record of health targets is less clear and less perfect."

Global Health Targets

A "Health for All by the Year 2000" strategy was launched by WHO in 1977 to set global targets and to form a global vision amongst the member states. In May 1998, WHO adopted a resolution to continue global efforts under the "New Global Health for All" policy. Coinciding with the 50th anniversary of WHO and the appointments of a new director general, this is commonly viewed as an opportunity for the organization to unify global goals once again, focus on the ten most relevant goals, and to re-establish its role in achieving those goals. The 10 global ► health targets can be divided into three subgroups: four health outcome targets, two targets on determinants of health, and four targets on health policies and sustainable health systems. This framework is supposed to be implemented throughout all member states, which will have the opportunity to finetune and adjust their own targets within that framework. The 10 Global Health Targets are (van Herten and van de Water 1999):

Health Outcome **1)** Health equity: childhood stunting. By 2005, health equity indices will be used within and between countries as a basis for promoting and monitoring equity in health. Initially, equity will be assessed on the basis of a measure of child growth.

2) Survival: maternal mortality rates, child mortality rates, life expectancy. By 2020, the targets agreed at world conferences for maternal mortality rates (<100/100 000 live births), under 5 years or child mortality rates (<45/1000 live births), and life expectancy (>70 years) will be met.

3) Reverse global trends of five major pandemics: By 2020, the worldwide burden of disease will be reduced substantially. This will be achieved by implementing sound disease control programs aimed at reversing the current trends of increasing incidence and disability caused by tuberculosis, HIV/AIDS, malaria, diseases related to tobacco, and violence or trauma.

4) Eradicate and eliminate certain diseases: Measles will be eradicated by 2020. Lymphatic filariasis will be eliminated by the year 2020. The transmission of Chagas' disease will be interrupted by 2010. Leprosy will be eliminated by 2010, and trachoma will be eliminated by 2020. In addition, vitamin A and iodine deficiencies will be eliminated before 2020.

Determinants of Health **5)** Improve access to water, sanitation, food, and shelter: By 2020, all countries, through intersectoral action, will have made major progress in making available safe drinking water, adequate sanitation, and food and shelter in sufficient quantity and quality, and in managing risks to health from major environmental determinants, including chemical, biological, and physical agents.

6) Measures to promote help: By 2020, all countries will have introduced, and be actively managing and

monitoring, strategies that strengthen health enhancing lifestyles and weaken health damaging ones through a combination of regulatory, economic, educational, organizational, and community based programs.

Health Policies and Sustainable Health Systems

7) Develop, implement, and monitor national Health for All policies: By 2005, all member states will have operational mechanisms for developing, implementing, and monitoring policies that are consistent with the Health for All policy.

8) Improve access to comprehensive essential health care: By 2010, all people will have access throughout their lives to comprehensive, essential, quality health care, supported by essential public health functions.

9) Implement global and national health information and surveillance systems: By 2010, appropriate global and national health information, surveillance, and alert systems will be established.

10) Support research for health: By 2010, research policies and institutional mechanisms will be operational at global, regional, and country levels.

When reviewing those goals, it becomes apparent that individual goals have a different relevance for different countries. The development status of a country – developing country or developed country – plays a major role in the relevance of the different goals as stated by WHO. Van Herten and van de Water have analyzed those targets in 1999 (see Table 1).

Health Policy Analysis

Health policy analysis is the process of determining how to spend money or invest resources based on different alternatives that affect the health care system, public health system, or the health of the general public. Health policy analysis involves multiple steps:

a) identifying and defining a problem
b) identifying the ► stakeholders, i. e. who is affected by the problem (private healthcare providers , industry groups, medical device manufacturers, professional associations, industry and trade associations, advocacy groups, the government, and consumers)
c) identifying and comparing the potential impact of different alternatives on how to solve the problem
d) deciding between the alternatives
e) implementing the alternative of choice and evaluating the impact

Decision Making Process

The ► decision making process is largely dependent on national and regional specifics, such as type of government, historical processes and different levels of power of parties involved. The process aims to find a consensus on how – using which resources or instruments – a certain goal can be reached best, given restrictions such as financing, development levels, technical expertise, etc. The stakeholders involved include patients, governments, agencies, ► health insurance companies, medical doctors, health service providers, pharmaceutical companies, hospitals, private and public companies and different organizations representing various interest groups.

Those groups have historically been easy to differentiate. In recent years, however, there has been a trend towards integration of various tasks, which leads to an ► integrated health care approach. Such integrated concepts can help to bundle resources and thus can make healthcare more efficient by eliminating unhelpful boundaries. Moreover, the growing efforts towards integrated health care leads to further developments in the area of ► health data management. Thanks to the development of information technology in the medical area, transparency of resource utilization as well as the automation of information flows has increased. However, these developments also require decision making bodies and health policy makers to adjust their decision making process respectively.

Financing Health Care

According to WHO, there are five broad ways of revenue collection for health care financing:

1. general revenue (taxation)
2. social health insurance
3. voluntary or private health insurance
4. out-of-pocket payments
5. internal donations.

Within WHO, countries have selected different ways of collecting revenue. Globally, in 1998, the estimated health expenditure (after adjusting purchasing power) amounted to US$ 3.1 trillion or 7.9% of the global income. The average expenditure per capita was determined as US$ 503, ranging from US$ 82 in Africa to over US$ 2.000 in OECD countries. Nearly 30% of this global expenditure came from taxation, around 20–25% from out-of-pocket payments (OOP), and anoth-

Health Policy, Table 1 Analysis of target characteristics, appropriateness of indicators, attainability, and relevance for the 10 global Health for All targets (Van Herten / van de Water 1999)

		Target characteristics			Indicator characteristics					Relevance	
	Target	Clear	Quantitative	Time limits (years)	Clear	Quantitative	Total set	Better ones needed?	Attainability	Global	Member state
1	Equity in health	Yes	No	–	Not given				Unclear	Yes	Yes
	Equity indices	Yes	No	5	Not given				Yes	Yes	Yes
	Childhood stunting	Yes	Yes	20	Yes	Yes	?	Yes	?	?	?
2	Maternal and child mortality, life expectancy	Yes	Yes	20	Yes	Yes	Yes	No	?	Yes	?
3	Five major pandemics	?	No	20	Not well described				Unclear	Yes	?
4	Elimination of diseases	Yes	Yes	10;20	Yes	Yes	?	Yes	?	Yes	Yes
5	Water, sanitation, food, and shelter	?	No	20	?	No	?	Yes	Unclear	Yes	?
6	Health promotion	?	No	20	Not well described				Unclear	Yes	?
7	Health for all policies	?	No	5	Not well described				Unclear	?	?
8	Essential health care	No	No	10	Not given				Unclear	Yes	?
9	Alert systems	Yes	No	10	Not given				Yes	Yes	Yes
	Surveillance systems	?	No	10	Not given				?	Yes	Yes
	Health information systems	?	No	10	Not given				Unclear	Yes	Yes
10	Research	No	No	10	Not given				Unclear	Yes	?

? = questionable

er 20–25% from social ► health insurance contributions. The remaining 15% was accounted for by private insurance. Variation in the distribution between different sources of financing is wide; Asian and African countries have spent more from out-of-pocket financing than from government general revenue or social health insurance.

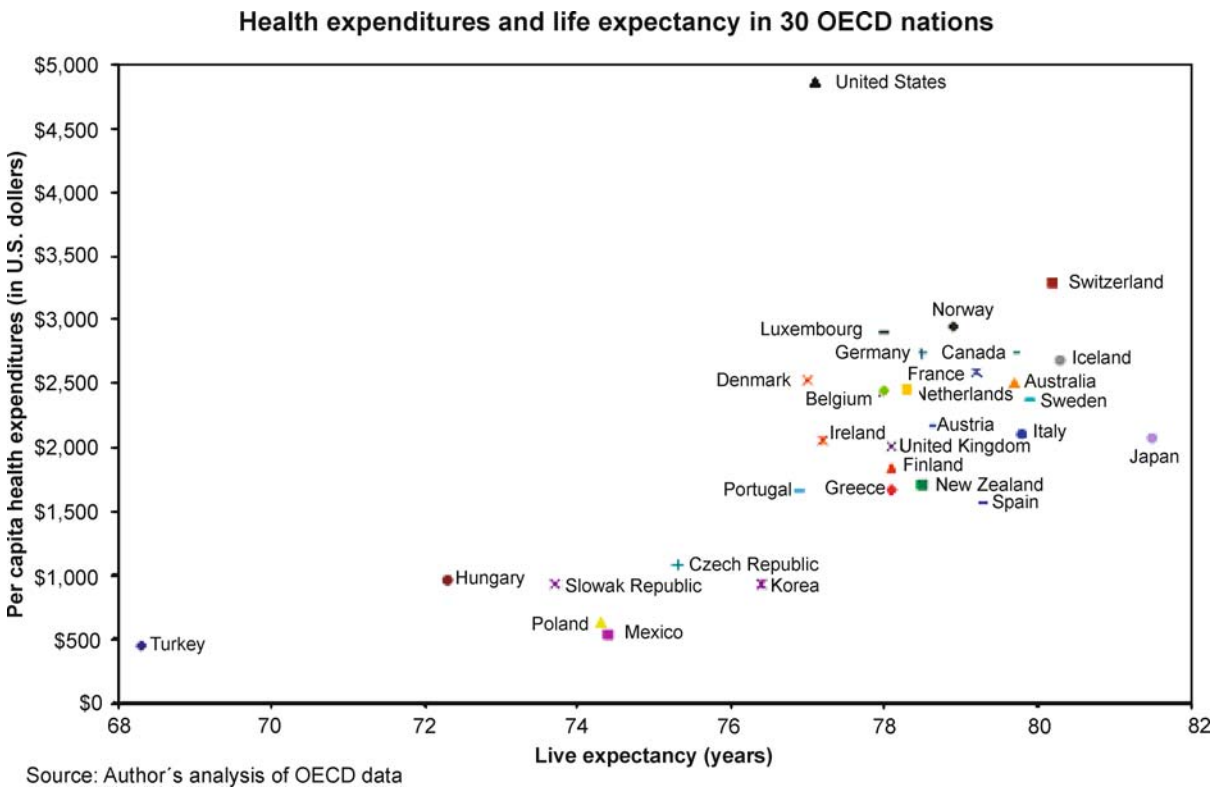
The Report of the WHO Commission on Macroeconomics and Health (WHO-CMH) recommended that countries should adopt an essential set of interventions with an average cost of US$ 30–40 per person. There is evidence to show that health systems which spend less than approximately US$ 60 per capita find it difficult to deliver a reasonable, minimum range of services.

The main source of financing across WHO – independent of the development state of a country – is from public general revenue, which is collected via taxes, health insurance contributions, and other methods. The levels vary, partly depend on the development state of a country. Moreover, the question remains what the optimum level of spending should be, how it should be collected, and what outcome should be achieved. An OECD study has demonstrated this challenge by comparing health expenditures and health expectancy in 30 OECD countries:

In 1981, a new indicator was proposed for the purpose of monitoring and evaluating of the global strategy for health for all by the year 2000: "the number of countries with at least 5% of GNP spent on health" (WHO 1999). While this indicator has never been formally adopted, the numerical level "5% of GNP spent on health" is commonly viewed as the WHO-recommended target.

According to WHO, "an appropriate percentage benchmark or target for health spending, like the fictitious target above, is extremely difficult to set. Research is under way to better define the minimum amounts of finance that countries should invest in order to optimally develop their health systems" (WHO 2005).

In a 2001 Report, WHO recommended that the low-income countries should increase their domestic spend-



Health Policy, Figure 1 Health expenditures and life expectancy in 30 OECD nations (Gould 2004)

ing on health by an additional 1% of GNP by 2007, and by an additional 2% by , linked to future trends of economic growth.

While many countries rely on general revenue for financing health care, others create or expand compulsory health insurance contributions, generally referred to as "social health insurance". These are usually based on pay-roll deductions, with additional contribution from the government in the form of general tax revenue. The World Bank in 1997 estimated that when a country's taxation is low (10% of GDP or lower), it would take 30% of government revenues to meet 3% of the GDP health expenditure target, through formal collective health financing channels. According to WHO "usually, poorer countries have widespread tax evasion among the rich and the middle class in informal sectors, thereby leading to low tax collections. They also rely heavily on taxation on international trade (exports and imports) and have the added limitation of broad-based taxes such as income tax or value-added tax."

A few countries have tried to add extra resources for health through earmarking a certain proportion of revenue collected from indirect taxation for health promotion and disease prevention. Some countries run state lottery services or other special revenue collection schemes, and earmark a certain proportion of collected funds for social services including health and education. Thailand recently enacted a legislation for a "Health Fund", which has specified a certain percentage of general revenue generated from taxes received from sale proceeds of tobacco and alcohol, being set aside for health promotion activities. With the adoption of the WHO Framework Convention on Tobacco Control (FCTC), an increasing number of countries are expected to use part of the revenue collected through a similar "sin-tax".

For inter-country comparisons, the level of health spending (like total health expenditure or per capita health expenditure as a percentage of GDP) may be useful. However, experience in some high- and middle-income countries has shown that more is not always better or always possible. Some developing countries with low investment in health could show outcomes comparable with those with high investment. What needs to be

seen is how efficiently and effectively countries spend their health resources according to their health needs. The output of effective spending according to health needs is reflected in the level of inequities in health outcome (WHO 2005).

Recent Trends and Developments

A WHO initiative was launched called "Health for All: the policy framework for the WHO European Region 2005 Update". According to WHO, "it answers the question of "Does tradition match the modern realities of policy-making?" In Europe, Health for All has proven to be visionary and inspirational. Is it also useful? Countries constantly face the need to make difficult choices and decisions that affect the functioning of their health systems. Can Health for All help them do so in a manner that ensures respect for human rights and for the values that lie at the heart of the European social consensus? The 2005 Health for All update proposes answers to some of these questions. Twenty-five years since the Health for All policy framework was first adopted in WHO's European Region, it is still seen by countries as valid, interesting and relevant. For some countries, Health for All served as a direct blueprint, in others it triggered the development of original, national Health for All policies, and many saw it as a basis for national target-setting, a source of ideas, a reference point or a general guideline in the area of values, health and human right and ethics. In the context of this broad usage of Health for All, the 2005 update should be seen exactly as what it is – an update, not a new policy. It reaffirms the European Region's 1998 HEALTH21 policy and is in the spirit of the global Health for All movement" (WHO 2005).

Since the update proposed an open-ended Health for All process, it provides a policy framework that can be developed further by the Health for All activities that countries decide to implement themselves. According to WHO, "It is hoped that the process will encourage the exchange of information, experiences and ideas inspired by the update and generated at the national and sub-national levels. Thus, the update will serve as a tool for promoting the ethical development of health policies and will be only one step in the continuing evolution and improvement of the regional Health for All policy" (WHO 2005).

Summary

Health policy does rarely exist on a global scale, but mostly depends on national specifics. Nevertheless, there are elements of health policy which can be applied globally. Therefore, WHO has formulated health goals, which naturally have different relevance for individual countries. Overall, within health policy, each decision making process is aimed at finding the most effective or efficient solution of specific health related goals, given different interests and levels of power of the stakeholders affected by the policy, and the ability to finance a potential outcome within a health care system.

Cross-References

- ▶ Decision Making
- ▶ Global Health Policy
- ▶ Health Data Management
- ▶ Health Insurance
- ▶ Health Targets
- ▶ Integrated Health Care
- ▶ Stakeholders

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Health Policy Indicators

Definition

Indicators of health policy are a subset of characteristics referring to the presence and implementation of national health policies and strategies, universal financial coverage, equitable distribution of resources, low cost sharing, comprehensive services, and family-oriented services. Some include indicators of social protection: social expenditure and community involvement.

Health Professional

► Health Care Provider

Health Promoting Hospitals

Definition

A health promoting hospital, as defined by WHO, does not only provide high quality comprehensive medical and nursing services, but also develops a corporate identity that embraces the aims of health promotion, develops a health promoting organizational structure and culture, including active, participatory roles for patients and all members of staff, develops itself into a health promoting physical environment and actively cooperates with its community.

Health Promoting Schools

Definition

A health promoting school can be characterized as a school constantly strengthening its capacity as a healthy setting for living, learning and working. It is defined by WHO as a place that takes all measures to foster health and learning, secures the health and education of officials, teachers, teachers' unions, students, parents, health providers and community leaders. Additionally, health promoting schools strive to provide a healthy environment and implement policies and practices that respect an individuals well being and dignity.

Health Promoting Workplace

Definition

A health promoting workplace (HPW) is a priority setting for health promotion. The concept of the HPW, as defined by WHO, is becoming increasingly relevant as more private and public organizations recognize that future success in a global marketplace can only be achieved with a healthy, qualified and motivated workforce. A HPW can ensure a flexible and dynamic balance between customer expectations and organizational targets on the one hand and employees' skills and health needs on the other, which can assist companies and work organizations to compete in the marketplace. For nations, the development of HPW will be a prerequisite for sustainable social and economic development.

Health Promotion

Synonyms

Healthy public policy; Health control; Disease prevention

Definition

Process of enabling individuals and communities to increase control over the determinants of health and thereby improve their health. Health promotion not only encompasses actions directed at strengthening the basic life skills and capacities of individuals, but also at influencing underlying social and economic conditions and physical environments which impact upon health.
The ► Ottawa Charter for Health Promotion (WHO 1986) identifies 3 basic strategies: ► advocacy, Enabling (► enablement) and Mediating (► mediation). Five areas of action support these strategies: building healthy/public policy, creating supportive environments for health, strengthening community action for health, developing personal skills for health and re-orienting health services ► prevention and health promotion

Cross-References

► Disease Prevention
► Health Campaigns
► Health Control
► Healthy Public Policy
► Public Health Law, Information and Communication

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Health Promotion Actors

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Synonyms

Actors in health promotion

Basic Characteristics

Background

The conception and implementation of the complex aim "health promotion" demands the collaborative work of many actors not only in the medical field but also many other fields and involves state or governmental and non governmental levels. Appropriate health promoting structures need to be in place to enable active intersectoral cooperation (► intersectoral cooperation) between different levels and all population groups.
Providing appropriate health promotion depends upon the cooperation of political decision makers at both national and international levels. Not only are regulations and laws required but also sustainable funding for continuous and long-term support is necessary along with flexible mediating and advising structures in health promotion. Those who devise and implement health promotion (the actors), at governmental as well as non governmental levels, come from the fields of education, welfare, health care and work.
For instance, at the European level, the European Union in 1986 passed a law assuring preventative health care and in 1993 the treaty of Maastricht contained health promotion as a central field of action of the European Community. The ► DG SANCO as part of the European Commission is responsible for the actions related to health promotion in the European Public Health Programme and it is the basis for the health policy in Europe.
The treaty of Maastricht anchored health promotion as a central field of action of the European Union. The DG SANCO of the European Commission runs the public health program which contains the following eight main topics amongst others:

- Health promotion.
- ► Health Information.
- ► AIDS and other ► transferable diseases.
- ► Cancer.
- ► Orphan Diseases
- Prevention of diseases.
- Environmental health.
- Prevention of addiction.

(Schwartz et al. 2002)

Principle Structure and Institutions Involved in Health Promotion and Disease Prevention

The national implementation of health promotion is strongly influenced by the structure and instruments of health policy devised by the politicians. Political activity can be subdivided in the following terms:

- ► Politics.

- ► Policy as well as ► policy networks.
- ► Polity.

Furthermore, political activity depends on the particular organization of the political authorities within any given state (e. g. central state or federal political system). In order to understand the structure and instruments of a country's health policy, one has to take into account the political organization of that country, remembering that health promotion actors are located on governmental as well as non-governmental levels. The principle structure depends also on the funding of health promotion and the legal framework. The financial funding for health promotion is significantly influenced by the implementation of one priority fields of action in health promotion: investment for health (Altgeld 2003).

Table 1 depicts an overview of several institutions that are possibly involved in health promotion and disease prevention activities.

Therefore, health promotion is strongly shaped by building up networks between the mentioned actors from different levels and representation bodies. These networks are often referred to an intersectoral cooperation, alliances, and partnerships or inter-organizational networks (► network) for health promotion. An ► alliance for health promotion is a partnership (► public private partnership) between two or more parties that pursue a set of agreed upon goals in health promotion. Building of alliances will often involve mediation between different partners and their aims such as the definition of common goals and ethical ground rules, joint action areas, and agreement on the form of cooperation. A partnership for health promotion is a voluntary agreement between two or more partners to work cooperatively towards a set of shared health outcomes. Such partnerships may form a part of intersectoral collaboration for health, or be based on alliances for health promotion. Such partnerships may be limited by the pursuit of a clearly defined goal – such as the successful development and introduction of legislation – or may be on-going, covering a broad range of issues and initiatives. Increasingly, health promotion involves a partnership between the public sector, civil society and the private sector.

Since the beginning of the 1990s, health promotion has been closely related to the development of networks. Important pioneering work on creating, developing and managing networks in the field of health promotion was published by the World Health Organization (► WHO). The WHO regional office in Europe encouraged the development of networks between local, regional, national, and international institutions as well as organizations. Many of these representative bodies in the field sought information from the key documents of the WHO on health promotion (WHO 1986).

The WHO provides these networks with a health policy framework for health promotion in the key documents "Health for All" and the "► Ottawa Charter on Health Promotion." The concept of interinstitutional and intersectoral collaboration and cooperation through network building was significantly promoted by the WHO. Currently, discussions concern not only a system of networks in health promotion but also the appropriate

Health Promotion Actors, Table 1 Actors and organization involved in health promotion activities at different levels

Level	Governmental institutions and other public bodies	Non governmental organizationsand private institutions/agencies
International	International policy institutions e. g. European Commission, DG Sanco	Representation bodies like ► INHPF, ► IUHPE, ► EUPHA
National	State or Federal Ministries of Health, Education, Welfare. Federal Centre for Health Education	National public health organizations, Federal association of consumer advice center, National contact center for self help groups, National societies of nutrition
Regional	Regional public health services	Regional federations on health promotion, Coordinating centers of self-help groups
Local	Local public health departments	Local activities of self-help groups Local health center Sport club Private trust and foundations

► setting of health promotion networks. It is considered that fostering networks enables the establishment of the necessary long term prerequisites of health promotion (Brößkamp-Stone 2002).

Successful health promotion and disease prevention requires a wide base of several institutions and state facilities, and ministries of health and state agencies for public health have to be involved. For instance, the American ► center of diseases control and prevention is one well known state public health institution in this field. Other issues of public health and prevention are also carried out by state ministries of consumer protection. The work of such state ministries is supported by subordinate departments in the following areas of work:

- Institutions for hygiene and transmissible diseases that aim at recognizing, preventing and fighting transmissible diseases.
- Public and state institutions for the protection of health and safety standards at work that aim at securing occupational safety and the prevention of work related health threats.
- Federal agencies for health education and health promotion.

Furthermore, various associations, foundations and scientific societies aim to strengthen and implement the goals of health promotion and disease prevention in order to improve knowledge about factors influencing the health of the population. These numerous organizations are derived, for example, from the following fields:

- Associations on nutrition.
- Associations on physical activity.
- Medical associations.
- Cancer associations, etc.

Cross-References

► AIDS
► Alliance
► Cancer
► Centers for Disease Control and Prevention (CDC)
► DG SANCO
► EUPHA
► Health Information
► Health Policy
► INHPF
► Intersectoral Cooperation
► IUHPE
► Network
► Orphan Diseases
► Orphan Drug
► Ottawa Charter
► Policy
► Policy Networks
► Politics
► Polity
► Setting
► Transmissible Diseases
► WHO

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Health Promotion Engagement

Synonyms

Commitment; Involvment; Engagement in health promotion

Definition

Involvement of affected or concerned persons in the process of identifying problems and needs as well as in the process of planning, implementing and evaluating actions. People have to be at the center of ► health promotion action and decision-making processes for them to be effective.

Participation can assume different degrees of involvement and commitment. There is a distinction between

active and equal collective participation and more passive collective acceptance of expert-oriented measures. Participative engagement in the sense of ► empowerment positively affects health through fostering the awareness of being able to exert control over one's living conditions and through revealing and furthering new skills and abilities.

Health Promotion, Ethical Aspects

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Synonyms

Health improvement; Health enhancement

Definition

Health promotion, as one of the main goals of public health practice, is the process of enabling people to increase control over, and to improve, their health. In order to reach this goal, public health initiatives at times come into conflict with other ethical principles (e. g. individual ► autonomy, ► social justice), therefore public health promoters have to deal with ethical dilemmas at various levels.

Basic Characteristics

Health promotion is significantly playing a more important role in health care in general, and public health practice in particular. Health promotion, as one of the main aims of modern public health practice, initially only focused on the lifestyle changes that might impact on the prevention of such things as cancer, chronic degenerative diseases and metabolic disorders; then it evolved and broadened its viewpoint to improving the physical and mental health and well being of people in local communities, including influencing living habits and living conditions that affect behavior, and also promoting individual self-esteem, dignity and respect.

To reach a state of complete physical, mental and social well being, an individual or group must be able to identify and realize aspirations, satisfy needs, and change or cope with the environment. Health is a positive concept emphasizing the possession of social and personal resources, as well as physical capacities. From this perspective, health promotion is a strategy to promote health by strengthening personal resources. To achieve this different methods are utilized at different levels. At a personal level, through positive socialization in families and peer groups, health consciousness is heighten and a sense of coherence is created; at a behavioral level, through health information, health education, health counseling, health training and social support, resources are strengthened; at a structural level, through a healthy public policy, resources are further strengthened. Health promotion is, therefore, not just the responsibility of the health sector, but involves the adoption of personal healthy life-styles that lead to personal well being.

Debating health promotion at times evokes different perspectives. On the one hand, the idea of individual responsibility has been submerged by the concept that individual rights or demands should be guaranteed by the government and delivered by public and private institutions, and that, in order to improve public health, government bodies should take responsibility. On the another hand, governmental institutions stress the responsibility of individuals to keep themselves healthy; this approach, however, may be seen as an ideological strategy for relieving a government of the obligation to provide healthy conditions and health care services.

Nevertheless, there is an increasing agreement, among both the general population and health professionals, that a good deal of disease is self-inflicted, and is a product of imprudent behavior, as proven by the evidence that various personal habits and lifestyle choices (such as poor nutrition, smoking, alcohol and drug abuse, failure to wear seat belts, unsafe sexual practices) are major causes of morbidity and mortality.

Traditionally, the "► harm principle" has been used by governments to impose restrictions on individual autonomy and freedom; ► paternalism, which imposed restrictions on those who represented a risk to others, was considered universally acceptable when the harm being caused was obvious. Divergences arose when the harm being posed to others was unclear, or when health promotion activities interfered with individual privacy and freedom in the name of the common good. What is still open, then, is the ethical question of how far a government should go in regulating, restricting or prohibiting behaviors that bring about morbidity and mortality;

or even in protecting citizens from commercial influences that may encourage or sustain patterns of behavior that are dangerous to health. How do we reconcile personal freedom and good health? Personal choice and common good?

According to Mr Mills, "He (the individual) cannot rightfully be compelled to do or forbear because it will be better for him to do so, because it will make him happier, because in the opinion of others to do so would be wise or even right." What role, then, should government play in urging citizens to give up their pleasurable but damaging habits? Many people believe that government should rarely exercise coercive powers either because they are ineffective or because they overrule individual autonomy, ► privacy, or liberty. The evidence of the negative consequences of some private habits and lifestyles, both on the public and on the individual's health, has added to the idea that there is an obligation to preserve one's health. How should society determine whether to intervene to protect the public's health and safety when doing so will diminish a personal or economic interest and will undermine individual freedom and personal responsibility? And how can the state be prevented from taking power to remove more and more choice in the name of better public health? Anyhow, some paternalistic health promotion interventions are based on the position that the costs of risky behavior are a national and not an individual responsibility; moreover, public health officials may feel justified and morally bound to prevent avoidable suffering and death regardless of social costs.

A very important role in this dilemma is played by health education. Health communication campaigns are the most common form of intervention designed to promote healthy behavior. Though they discourage certain activities linked to morbidity and mortality and encourage the adoption of others, they provide information to the individual, thus enhancing his personal autonomy. They have been credited with helping raise awareness regarding risks from chronic illness or new infectious diseases. They have been a tremendous factor in helping to promote the adoption of recommended treatment regimens and helping de-stigmatize populations that suffer from new and old medical conditions.

The debate, in these cases, is whether health education, which preserves individual autonomy and avoids coercion, is enough, and whether health promotion campaigns and advertising, using a wide range communication strategies in order to produce messages to promote public health, are appropriate.

Messages about how to improve health may not appear as ethically problematic and they can be viewed as rather benign, compared to more coercive methods in public health that involve regulations and sanctions. Yet, they may create subtle but real ethical dilemmas which permeate all facets of the public health communication process, including the initial focus on a particular health issue, choice of target populations, design of message appeals and assessment of effectiveness. Just to give but few tips:

- Tailoring messages corresponds to the communication ethical stipulation of comprehensibility, which requires the provision of complete and culturally-appropriate messages to diverse populations. A drawback associated with disseminating messages tailored to particular populations is that groups that are not provided with culturally-specific messages may feel excluded or short-changed.
- Tailoring messages may present competing demands to provide complete and accurate information whilst presenting this information in a format that is appropriate for low-literacy audiences. Yet, for some, low literacy may be a source of embarrassment and they may want to distance themselves from materials that have an appearance of being designed for low-literacy populations. This poses the challenge of developing materials that are respectful and not condescending but effective in their format.
- When the intended populations for communication interventions are the young, additional ethical issues may emerge: parents may object to the dissemination of information or the implementation of activities on certain topics. Yet, their children would like to obtain this information and public health practitioners strongly believe it is essential to promote their health. Should the children be provided with the information, despite the objections of their parents? Can this be justified on the basis of the rights of children and the young? Can this be justified on the basis of preventing vulnerable populations from harm?
- Appeals to personal responsibility are common in public health messages. Linking responsibility messages to health outcomes raises several ethical issues: the first concerns conceptions of culpability. Implied in messages that make a causal link between

a person's behavior and their health, is an assumption that people's behavior can significantly affect their health and therefore they can be held responsible for detrimental health outcomes. Whereas such messages resonate with the notion of human agency, they may be ethically problematic because they do not take into consideration that individuals may have limited impact on social factors that affect their behavior. Linking health with personal responsibility may, by implication, characterize those who do not adopt recommended health related practices as weak of character and at fault. This can lead to the conclusion that people should be held morally, and perhaps legally, accountable for their behavior, thus exempting society from paying certain health care costs, or requiring certain individuals to pay higher premiums.

- Messages that scare people regarding the hazards of a potential disease, on the one hand raise their motivation to avoid contracting it, but on the other hand may present a negative image of those who have the disease, thus stigmatizing them. Once stereotypes and stigmas are established, they can result in individuals being feared, avoided, regarded as deviant, and even blamed for engaging in the immoral behaviors that must have elicited the 'punishment' of their affliction. In general, this type of social climate can be devastating to members of vulnerable populations who suffer from stigmatized medical conditions since it can result in the internalization of self-blame and the destruction of self-esteem.
- With a continuous barrage of health messages aimed to promote the health of the public, the public is inundated with messages on the importance of health. As good health increasingly signifies virtue, those who are unhealthy may be made to feel that they are unworthy, forgetting that pain and suffering are part of human life and give a precious contribution to human growth and development at the psychological and spiritual level.

The task of developing ethically-derived public health communication also needs to include consideration of issues of diversity and pluralism amidst mounting social and economic disparities within and across nations. Scrutinizing public health communication strategies for ethical concerns should become a routine, not only because any benevolent attempt to contribute to people's well-being needs to be ethical, but also because communication interventions that are sensitive to ethical concerns are more likely to be better executed and to be trusted by intended populations.

One of the ethical aspects of health promotion concerns ► nutrition. We talk about nutrition when addressing lifestyle changes in relation to increasing foods with protective factors and reducing those with disease-promoting properties. If we look at a restricted population or at a specific Western country, it could be relatively easy to give guidelines which could also include the concepts of "► sustainable development" and "justice". The perspective changes if, instead, we look at the worldwide population. Just to give an example. The most recent general dietary guidelines for a healthy diet from the American Heart Association recommend: 'Eat at least two servings of fish per week.' This recommendation is based on scientific evidence. In the USA, there are 280 million potential fish consumers. Adherence to this recommendation would require the preparation of 29 billion fish portions per year for this market. Extended to the whole world, this would require 642 billion annual servings. Even if one were to restrict the recommendation to adults, this would only reduce the projected consumption by approximately half. Global compliance with the USA American Heart Association recommendation for regular fish consumption would risk the fish supplies of the world, and the ecological balance of aquatic and marine habitats. This recommendation is pro-people, but strongly anti-environment.

A very important step forward in the concept of health promotion has been "The ► Ottawa Charter for Health Promotion", released at the First International Conference on Health Promotion held in Ottawa in 1986.

The charter broadens the approach to health by proclaiming that good health is a major resource for social, economic and personal development and an important dimension of quality of life, and that its fundamental conditions and resources are: peace, shelter, education, food, income, a stable eco-system, sustainable resources, social justice, and equity (known as "► social determinants of health").

In this approach, health promotion includes various areas of action:

- Build healthy public policy .
- Create supportive environments.
- Strengthen community action.
- Develop personal skills.
- Reorient health services.

As a consequence, improvement in health requires a secure foundation in these basic prerequisites and demands coordinated action by all concerned: by governments, by health and other social and economic sectors, by nongovernmental and voluntary organization, by local authorities, by industry and by the media. Health promotion strategies and programs should be adapted to the local needs and possibilities of individual countries and regions to take into account differing social, cultural and economic systems.

The Ottawa Charter has definitely opened up new paths for the future development of health promotion and public health in general.

Looking at social justice has been indeed a major step in the recent evolution of public health practice, which has focused, more than in the past, on reducing differences in current health status and ensuring equal opportunities and resources to enable all people to achieve their fullest health potential. One of the ethical issues is that the increased costs of health care have brought along disparities in distribution and accessibility within a specific population; moreover, if we look at the global level, it cannot be ignored that the developing world is still devastated by preventable infectious diseases, malnutrition and poverty.

There is still a long way to go, but health promotion aims and activities have already, as we have seen, taken up the challenge.

Cross-References

- ► Autonomy
- ► Harm Principle
- ► Health Determinants, Social
- ► Nutrition
- ► Ottawa Charter
- ► Paternalism
- ► Privacy
- ► Social Justice
- ► Sustainable Development

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Health Promotion, Fields of Action

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Synonyms

Action area

Definition

Action areas in health promotion were outlined in the ► Ottawa-Charta and support the implementation of the three basic strategies (► advocacy, ► enablement, and ► mediation) of health promotion mentioned in the Charta. The action areas are:

- Build healthy public policy
- Create supportive environments for health
- Strengthen community action for health
- Develop personal skills (life skills) and
- Re-orient health services.

The term "health promotion" was defined as an overall goal in the declaration "Health for all" that was made at the beginning of the 1980s in the last century. Aims, principles, and necessary terms of health promotion were summarized in the Ottawa-Charta on health promotion. According to the understanding of

the ► World Health Organization (WHO), health promotion describes the concepts of analyzing and increasing the resources and potential of health on all policy and social levels. This description led to the above-mentioned five important fields of action in health promotion that concretize the aims of it.

Health Promotion Action means to be active in the five fields described above, and is defined as follows by the WHO (WHO 1986):

Basic Characteristics

Healthy Public Policy (► Health Policy)

The development of healthy public policy was described by the WHO as a formal statement or procedure that is not limited to medical and social care. Moreover, health care has to be considered on all levels of political and social activities. A policy of health promotion is distinguished by mutually adding approaches in legislative rule-making that define regulations and incentives to enable the provision of health services and programs, and access to those services and programs. Further developments in healthy public policy initiatives will depend on them arising from a systematic process of building support for public health action that draws upon available evidence integrated with community preferences, political realities, and resource availability.

Supportive Environments for Health

The second field of action in health promotion is defined as creating supportive environments. The basis of action in this field is the close relation between human kind and the environment since a healthy environment has to be recognized as having a significant role producing health promoting living conditions. Protection of nature and the environment as well as sustainable development (► sustainability) dealing with resources is a prerequisite for implementing the strategies of health promotion. Creating supportive environments requires development of a stimulating and satisfying working and living condition (► living conditions). Direct political action is needed to develop and implement policies and regulations that help to create supportive environments. Economic action is also required, particularly in relation to fostering sustainable economic development and social action.

Community Action for Health

Strengthening community action is also a central matter in health promotion. It aims at establishing the development of community action of the population and supporting the capabilities of ► self-help groups and their activities in the sense of self-determination. Community action is also addressed through the ► participation of society in health issues and the health promotion-related work of each individual.

Develop Personal Skills

Developing personal skills is the process of supporting personality development and social competence through information and health-related education as well as the improvement of social competence. It aims at empowering (► empowerment) persons to increase their influence in health related behaviors and their everyday living conditions. In this context, it is aimed that individuals should get the possibility of a lifelong process of learning in order to attain the ► life skills that could be needed to deal with chronic disease or handicaps.

Re-orient Health Services

The term "re-orient ► health services" is understood as the development of a health care service by public health bodies that does not only concentrate on the process of recovery and rehabilitative issues but also on the improvement of health. It should also be considered that health is the result of a large number of health influencing determinants. This perspective leads to the identification of resources and their potential and specific strengths, which have to be supported by re-orientated health services.

The above-mentioned fields of action were confirmed as important and added to at the successor conferences of health promotion. In particular, all action areas were expressly established as effective measures for health promotion at the fourth conference of health promotion in Jakarta in 1997.

Further development of the concept of health promotion as defined by the WHO was significantly influenced by the conferences on health promotion held in Ottawa in 1986 and in Jakarta in 1997. The declaration of the conference of Jakarta focused on the following newer priorities (WHO 1997):

Promote Social Responsibility for Health

Social responsibility for health is reflected by the actions of decision makers in both the public and private sector to pursue policies and practices that promote and protect health (WHO 1997).

Increase Investments for Health Development

Investment for health refers to resources that are dedicated explicitly to the production of health and health gain. They may be invested by public and private agencies as well as by people as individuals and groups. Investment-for-health strategies are based on knowledge about the determinants of health and seek to gain political commitment to healthy public policies (WHO 1998).

Secure an Infrastructure for Health Promotion

Infrastructures for health promotion are understood as human and material resources, and organizational and administrative structures, policies, regulations, and incentives that facilitate an organized health promotion response to public health issues and challenges. Such infrastructures may be found in a diverse range of organizational structures, including primary health care; government, private sector, and nongovernmental organizations; and self-help organizations, as well as dedicated health promotion agencies and foundations (WHO 1998).

- Expand partnerships for health promotion
- Increase community capacity and empower the individual.

In summary, all of the above-mentioned fields of actions in health promotion are accepted as important for successful implementation of the strategies of health promotion. Mutual consent exists in the scientific community that health promotion activities are effective if the basic strategies are carried out in combination in order to achieve a high rate of participation of the target groups (► target group), to empower all actors, and to stimulate the building of networks and community action for health (Noack 2002).

Cross-References

- ► Advocacy
- ► Empowerment
- ► Enablement/Enabling
- ► Health Policy
- ► Health Service
- ► Life Skills
- ► Living Conditions
- ► Mediation
- ► Ottawa Charter
- ► Participation
- ► Self Help
- ► Sustainability
- ► Target Group
- ► WHO

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Health Promotion Models

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Synonyms

Health promotion theories

Definition

Models or theories in health promotion are systematically built and validated constructs with clearly defined and interconnected concepts covering a wide range of

phenomena related to health behaviors or health conditions. For this essay, the terms "model" and "theory" are used interchangeably, since their application does not follow a stringent logic.

Basic Characteristics

Empirical Basis for Practical Theories

Models or theories in health promotion are – in contrast to those of disciplines like physics – not approximations to an accepted hypothesized "truth" but guiding schemes for the explanation or planned change of health-related human behaviors or conditions. What makes them models according to generally accepted concepts is the fact that they have been empirically tested and proven to be of generalizable, practical usefulness: their "truth" is the compilation of effectiveness by experiences from many studies (sometimes far more than 1000) in vastly different types of populations.

Historical Developments and Types of Models

The best-known and most often applied health promoting models have four different orientations: the first, from the 1930–1950s examine ► health behaviors and behavior changes by focusing solely on the individual and her/his characteristics. While these theories substantially contributed to the understanding of human health practices, the attention to and inclusion of the broader environmental and socio-economic context led to a second generation of theories that additionally focus on the influence and competence of a community or "setting" in which individuals live, work, play, or learn. These theories might include the individual as one focus of intervention, but they also address issues beyond the control of the individual, such as the increased availability of supporting devices (e. g. condoms free of charge or the implementation of a health center in the neighborhood).

A third group of theories clusters around *awareness raising* and *knowledge transmission through communication and action-motivation*. Here, the targets might be individuals, (risk) groups, communities, or even whole nations, addressed by mass communication campaigns (► mass media) or social marketing strategies (e. g. BZgA's HIV-prevention campaign "Mach's mit").

A fourth group of theories focuses on the *analysis of organizational structures* and structural change mechanisms and their health impact by means of general policy or "► healthy public policy" development (Nutbeam and Harris 2004).

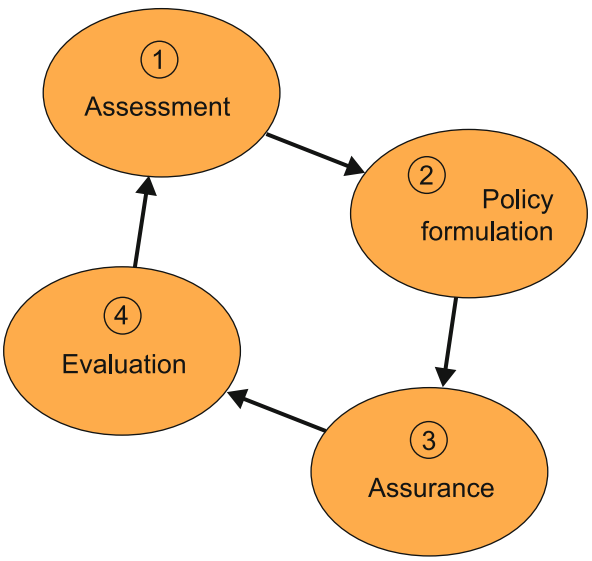
Many projects have successfully been conducted without theory – solely based on experience or intuition. However, the likelihood of success and ► effectiveness has been proven to be higher when the conceptualization is theory-led.

Usefulness of Models for Health Promotion

The use of models in health promotion can serve the purpose of helping to systematically plan, conduct, and evaluate health promotion interventions or programs. In modern public health practice, a mix of concepts from different models is usually employed and all major theories are checked for their applicability to a given project. One intervention model – the Pantheoretical Model – is a synergistic composition of concepts from theories of different disciplines like *education and training*, *persuasion*, *motivation,* and *facilitation* (McAlister et al. 1991; Seibt 2003a).

Models such as the Public Health Action Cycle (Fig. 1) remind practitioners to follow a systematic approach – from *assessment* to *policy and strategy formulation*, and from *implementation* to *evaluation* (Institute of Medicine 2003).

The ► precede–proceed health promotion planning model (Seibt 2003b; Green and Kreuter 2004) propos-



Health Promotion Models, Figure 1 The Public Health Action Cycle

es a clear understanding of the *social*, *epidemiological, behavioral, environmental, educational, organizational, administrative,* and *policy aspects* of a problem area during the needs assessment or planning stage; for evaluation, there is a distinction between ► process evaluation, ► impact evaluation, and ► outcome evaluation.

Selected Psycho-Social-Ecological Models

► Health education and prevention have developed towards health promotion along the following path: they started in the 1950s of the last century with context-free models, such as the ► health belief model where the individual is the sole target, and progressed to more recent theories such as the Social-Learning Theory or the Stages-of Change-Theory, which focus on the individual but also consider the individual's life style and their ecological and socioeconomic environment.

A short introduction to the three models mentioned is outlined here:

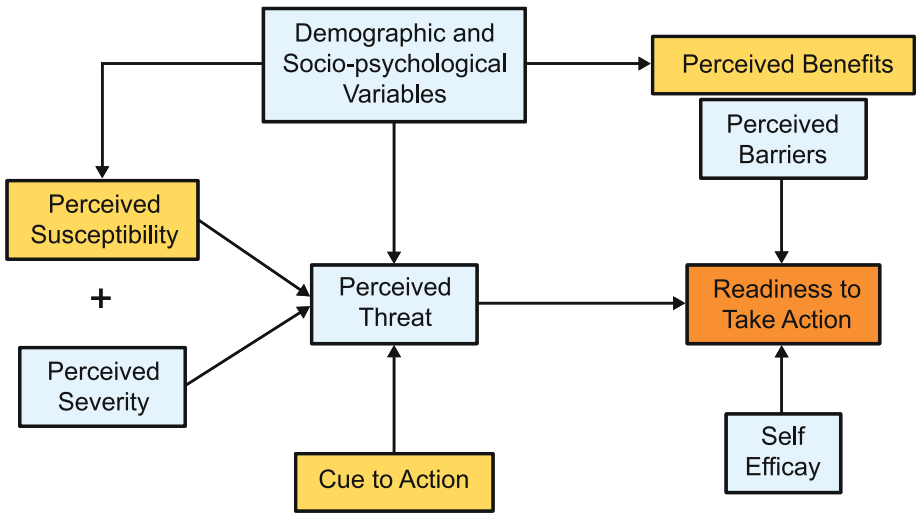
The Health Belief Model was developed in the 1950s by the U.S. Public Health Service. It is still used as an assessment tool to understand why persons participate in programs for the prevention or detection of diseases (e. g. being immunized against the flu). The original model encompassed five concepts; self-efficacy was added for modern applications (Fig. 2). Perceived *susceptibility* is defined as the subjective opinion about the chances of contracting a condition; perceived *severity* is the subjective opinion of how serious a condition and its consequences might be if untreated. Perceived *benefits* means the opinion of the effectiveness of various available actions in reducing the problem, and perceived *barriers* are the potentially negative aspects of a health action, e. g. side effects or costs. *Cues to action* might be an environmental event or a bodily trigger. *Self-efficacy* is defined as the person's confidence in performing a particular behavior successfully (Bandura 1986).

The model's empirically highest validated concepts are susceptibility and barriers, mostly used in combination with concepts of other models (Seibt 2003c).

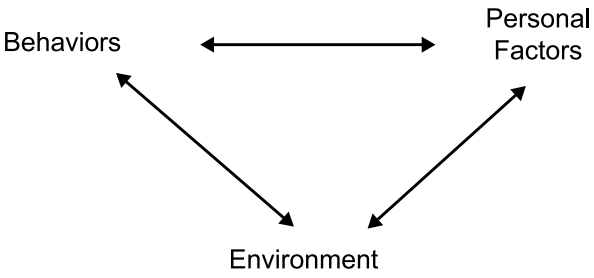
The ► social learning theory, also called Social Cognitive Theory, not only explains how people "learn" and maintain certain behavioral patterns, but also explicates factors influencing health behaviors and thereby provides the basis for intervention strategies for the promotion of behavioral change. Human behavior is explained in terms of a triadic, dynamic, and reciprocal model, in which behavior, personal factors (including cognitions), and environmental influences all interact (Fig. 3).

According to the theory, humans are not only able to learn from direct experience, but also by observing others and anticipatorily drawing conclusions for their own behavioral outcome; this type of vicarious learning enables them to build outcome expectations through cognitive processes, to acquire tactile and social skills through (imitative) training, and, amongst others, to develop self-efficacy expectations.

Social Learning Theory is widely used since its concepts are easy to operationalize for health promoting interventions: role models can be used to model pos-



Health Promotion Models, Figure 2 The Concepts of the Health Belief Model



Health Promotion Models, Figure 3 Scheme of the triadic, reciprocal interaction between the three determinants for human behavior according to the Social Learning Theory: Environment, Person, and Behavior (according to Bandura 1986)

itive outcomes, to correct misconceptions, to demonstrate self-reward, to reflect mastery, to point out opportunities, to signal social support, etc. (Seibt 2003d).

The Stages-of-Change-Theory, also called the ► transtheoretical model (TTM), differentiates phases through which people, groups, or organizations go when changing – both for eliminating an old and for adopting a new behavior or condition. This theory provides a time dimension for the change process.

The original Stages-of-Change-Theory distinguishes five phases:

In the first stage – *Precontemplation* – people have no awareness of the problem and no intention to take action; this stage is the most stable one. The second stage – *contemplation* – is defined as an intention to take action some time in the future, conceptualized as within the next 6 months for most individual problem behaviors. In this phase, there is recognition of a problem, and causes, effects, and solutions are reflected. However, there is no readiness yet to engage in any changes. In the third stage – *preparation* – the focus lies on the solution rather than the problem. There is an intention and a plan to test the new condition. It is an ambivalent stage with high awareness, anxiety, impatience, etc. Often, small changes have already taken place (e. g. a reduction in cigarette consumption per day). *Action* is the (fourth) stage in which individuals overtly modify their behavior or environment in order to overcome their problems. This phase requires considerable commitment of time and energy. *Maintenance* is the (fifth) stage in which people work to prevent relapse and consolidate the gains. For addictive behaviors, this stage often extends to an indeterminate period (e. g. former alcoholism).

A second dimension of the Stage-Theory is the specification of processes, by which people (or groups or organizations) move onto the next stages. In short, the progression through stages one to three involves cognitive, affective, and self-evaluative processes, while for stages three to five, social support, contracts, rewards, and environmental control mechanisms are important. In each stage, people can rush through, stay for long periods of time, or remain forever.

This theory allows differentiation between target populations and intervention methods in a stage-sensible way (Seibt 2003e). There is almost no public health problem behavior for which the theory has not yet been tested and used.

H

Other Models

There are other models or theories used in health promotion: the ► theory of reasoned action, also called ► theory of planned behavior (Seibt 2003f); the Diffusion of Innovation theory (Seibt 2003g); the Communication-Behavior Change Theory (Seibt 2003h); the Attribution Theory (Seibt 2003i); ► social marketing (Seibt and Lehmann 2003k), etc. Another group of theories includes those of changes in organizations for the creation of health-supportive organizational practice and those for the development of healthy public policy and community development (for a short description of those, see Nutbeam and Harris 2004 or Glanz et al. 2002).

Cross-References

- ► Effectiveness
- ► Formative Evaluation
- ► Health Behavior
- ► Health Belief Model
- ► Health Education
- ► Healthy Public Policy
- ► Impact Evaluation
- ► Mass Media
- ► Precede–Proceed Model
- ► Reasoned Action Theory
- ► Social Learning Theory
- ► Social Marketing
- ► Summative Evaluation
- ► Transtheoretical Model

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Seibt AC (2003) a) Pantheoretisches Modell, p 167; b) Precede/Proceed-Modell, p 180; c) Modell der Gesundheitsüberzeugungen/Health Belief Model, p 150; d) Soziale Lerntheorie/Sozial-kognitive Theorie, p 206; e) Transtheoretisches Modell der Phasen der Verhaltensänderung, p 233; f) Theorie des rationalen Handelns und Theorie des geplanten Verhaltens, p 229; g) Verbreitung von Innovationen – Diffusionstheorie, p 235; h) Modell der überzeugenden Kommunikation, p 152; i) Attributionstheorie, p 16; k) Soziales Marketing, p 210 (with author Lehmann M). In: BZgA (ed) Leitbegriffe der Gesundheitsförderung – Glossar zu Konzepten, Strategien und Methoden der Gesundheitsförderung, 4. erweiterte und überarbeitete Auflage. Fachverlag Peter Sabo, Schwabenheim

Health Promotion Outcomes

Definition

Health promotion outcomes, as personal characteristics and skills, as well as social norms and actions, organizational practices and public policies which are attributable to a health promotion activity, are defined by WHO. They represent the most immediate results of health promotion activities and are generally directed towards changing modifiable determinants of health. Health literacy, public health policy, and community action for health are included as health promotion outcomes. Health promotion outcomes often produce a broader range of changes and effects than initially intended by the program.

Health Promotion – Setting

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Definition

Setting is the place or social context in which people engage in daily activities in which environmental, organizational and personal factors interact to affect health and well being (WHO 1998).

Basic Characteristics

Settings are places or social conditions in which humans spend a huge part of their daily lives and which have a great influence on their health. Typical settings are work situations, areas of leisure time and schools. When carrying out interventions it is recognized that it is necessary to consider the living conditions of individuals and their settings. With regard to health promoting activities, need to be described and analyzed before implementing health promotion interventions. As individuals belong to and are influenced by a variety of settings, the formulation of the setting approach was an important step in the development of health promotion activities. Settings can be categorized in various ways: personal and individual (e. g. health risk related lifestyles), regional aspects (cities, regions, islands and countries), social as well as institutional (family, kindergartens, schools, associations or communities of interest).

The setting approach was first put forward as a health promotion concept in the ► Ottawa Charter in 1986 and it is the basis of the ► WHO ► healthy cities project; a long-term development project to place health on the agenda of cities around the world, and to build a constituency of support for public health at the local level (WHO 1998).

Numerous and widespread programs and interventions, mainly initiated by WHO, give credence to the fundamental importance of the concept of settings. Examples of settings include ► social networks, ► healthy islands, ► health promoting schools, ► health promoting workplaces (HPW), healthy cities and healthy vil-

lages, health promoting prisons, neighborhoods and ► health promoting hospitals.

The WHO initiative "Health 21" confirmed the setting approach as an important strategy in health promotion and was continued at the 4th Conference on Health Promotion in Jakarta, held in 1997. Settings were classified as central concept for strategies and interventions in social systems and organizations. Their focus was on organizational networks, not on the health risk behavior of individuals and their circumstances.

Therefore, the intention of WHO was to support the idea of settings in ► networks. The WHO/EURO initiative "Networking the networks" and other global networking activities are examples of these initiatives. They aim at creating a global alliance for health promotion. The whole concept of inter institutional and ► inter sectoral-collaboration and cooperation through network building was seriously promoted by WHO (WHO 1998).

Currently, discussions center not only on the concept of systems of networks in health promotion but also on the setting of health promotion networks; the fostering of networks is regarded as a necessity and long term prerequisites for health promotion will be established through network building (Broesskamp–Stone 2002).

Nevertheless, settings, as one part of health promotion interventions, need to be more specifically identified if implementations are to be successful. For example, community, city or workplace are not specific enough definitions; more particular information is required, such as which actors (e. g. ► target group, decision maker, professions, etc.) define the setting and careful consideration has to be given to the advantages and disadvantages their involvement incur. The success or failure of an intervention in health promotion activities in settings depends on the careful definition of these settings. This definition must not only describe the level of involved actors but also consider the addressed problems which are the target of the health promotion interventions (Grossmann, Scala 2003).

The advantage of defining settings is that the same intervention can be utilized to reach both actors and target groups at various levels; health promotion activities are combined, in a given setting, not only as individual measures but also as population related measures. Thus, all the participants of the setting define the potentials for health in a participative process and develop their own priorities and produce suggestions for improvement.

Cross-References

- ► Health Promoting Hospitals
- ► Health Promoting Schools
- ► Health Promoting Workplace
- ► Healthy Cities
- ► Healthy Island
- ► Intersectoral Cooperation
- ► Networks
- ► Ottawa Charter
- ► Social Networks
- ► Target Group
- ► WHO

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Health Promotion Theories

► Health Promotion Models

Health Protection

► Health Care

Health Record

Synonyms

Medical record; Patient record; Medical documentation

Definition

Health record refers to all patient records generated over an individual's lifetime by all health care providers

the patient was in contact with, and records every time that health services were used. It comprises the histories of all disabilities and illnesses, laboratory findings and results from other diagnostic procedures, and information on the therapies applied.

Health-Related Quality of Life (HRQOL)

Definition

In public health and in medicine, the concept of health-related quality of life refers to a person or group's perceived physical and mental health over time. Health-related quality of life is used to measure the effects of numerous disorders, short- and long-term disabilities, and diseases in different populations on their patients to better understand how an illness interferes with a person's day-to-day life. Health-related quality of life represents the functional effects of an illness and its consequent therapy upon a patient, as perceived by the patient.

Cross-References

► Indicator
► Quality of Life

Health Reporting

Definition

Health reporting is performed to follow the trends in health status of the population over time. Health reporting can be done using ► health indicators – changes of the indicator level in a specific period of time; by using indicator sets – a set of parameters used as a model to track progress of health goals over time; or by using health targets – formulated strategies adopted by several countries.

Health Research

Synonyms

Medical research; Clinical research

Definition

Health research is defined as investigative work undertaken on a systematic and rigorous basis using quantitative and qualitative methods to generate new knowledge aimed to impact on human physical, social and psychological well being.

Health Research and Indigenous Health

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Synonyms

Medical research; Clinical research; Medical anthropology

Definition

Medical research encompasses a broad range of activities within basic and clinical research, all aimed at improving or maintaining human health. Clinical research involves research on human participants, while basic research refers to underpinning research from areas such as animal studies, psychology, statistics, economics, physics, chemistry, etc. (http://www.mrc.ac.uk/index/current-research/current-clinical_research/current-clinical_research_definition.htm) (UK Medical Research Council).
Research and indigenous health focuses on two main areas:

- Research on traditional medical practices
- Research on indigenous populations

Basic Characteristics

Research Methods

Research on Traditional Medical Practices Ethnobotanical surveys and phytochemical analysis of possible active compounds should be done ideally simultaneously with a study of the socio-cultural beliefs and rituals underpining the use of plants in traditional medicine.
Research on traditional medicine has focused on clinical and experimental medicine. In order to maximize the contribution of traditional medicine to health

care globally, cultural, social, political and economical aspects of traditional medicine should be researched (Bodeker 2000).

Protocols for clinical trials should be designed according to the specificities of the tested substance and the cultural sensitivities of the peoples who have used the therapies for generations. Guidelines developed by the World Health Organization state that if a traditional medicine is in customary use with no reported side effects, a fast-track toxicology regime (testing on two species of animal for a six-week period) with documentation is an adequate basis for starting Phase III clinical trials.

Research on Indigenous Populations *Epidemiological research* has shown that native populations have a significantly lower health status than that of the dominant population and that barriers exist to receiving formal health care.

Safety

Roy Chaudhury has offered a model for the clinical evaluation of herbal medicines which includes toxicity testing of the plant in two species of animal for acute and sub-acute toxicity, a modified, shorter toxicity testing if the plant has already been used in man or is in such use now and the administration of the total extract or combination of plants, if used, in exactly the same way as it is prepared and used by the population (Roy Chaudhury 1992).

Claims of curing, especially, life-threatening diseases, and traditional practices related to pregnancy and birth have to be evaluated in order to avoid dangers. For instance,further research is needed to determine the side-effects of Isihlambezo (herbs taken in some regions of South Africa during pregnancy for cleansing) on the pregnant woman, the fetus, the labor process and the outcome of pregnancy.

Several research projects are focused on studying the safe side of herbal medicine as well as adverse drug reactions and adverse reaction of herbal medicine when used simultaneously with Western medicine.

Government Involvement

Traditional healers in some countries want their governments to fund testing of their remedies because they believe it is the only way these effective medicines would be recognized as such and become more widely used.

Some governments have urged traditional healers to collaborate with scientific researchers to prove the safety of traditional medical practices, in addition to the age-old practice in the respective communities.

Funding

Despite the importance, very limited amounts, mostly from private funds, are allocated for research on traditional medicines, as compared to research of the most advanced techniques and pharmaceuticals for diagnosis and treatment.

Resources should be channeled towards research into the efficacy and safety of traditional medicines.

Ethics

Most healthcare-related research that has been externally sponsored in developing countries has not taken account of traditional medicine. In some circumstances, the belief systems of traditional healers and biomedical researchers may be so incompatible that the two groups will be unwilling or unable to collaborate in research. Such collaboration is desirable, or even essential, for research to be successful (The ethics of research related to health care in developing countries, Nuffield council on Bioethics).

Many developed countries sponsor healthcare-related research involving populations and patients in developing countries. The Human Genome Diversity Project uses indigenous peoples as subjects for genetic research raising concerns that they are largely unaware of the potential impacts of this research on their communities. Informed consent is taken lightly and short-term health benefits are being promised to attract participation. Indigenous peoples have frequently expressed criticism of Western science for failing to consider their cultural world views and ethical principles when seeking to find breakthrough information for the advancement of biotechnology, which is least likely to benefit the populations from whom the knowledge derived (http://www.ipcb.org/publications/primers/htmls/ipgg.html).

Conclusion

Research on traditional medical practices from a culturally appropriate perspective and taking into con-

sideration social, political and economical aspects of indigenous health care as well is needed to validate diagnostic and therapeutic procedures on which the majority of peoples in the developing world rely. Indigenous health addresses mainly symptoms of illnesses as well as aspects of palliative care entailing rituals involving the entire community and thus the principles of testing used for Western medicine do not apply. The holistic nature of traditional medicine requires a new paradigm of research, different from the methods prevalent in biomedicine.

The results of unprejudiced research on indigenous medicine would promote the integration of the two approaches into a modern health care system.

The advances in biotechnology and genetics in recent years has alarmed indigenous peoples as to the effects on their culture and future and raised concerns about the ethical treatment of populations which are uneducated in respect to the methods and purpose of this research.

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Health Risk

Definition

Health risk from the environment comes about by the daily intake of toxic and carcinogenic chemical substances through the air, water and food which exceed recommended guideline values; these values should guarantee freedom from adverse effects to health over a life time of consumption.

Health Risk Assessment at Workplace

► Workplace Health Risk Assessment

Health and Safety Measures

Synonyms

Health and safety risk management

Definition

The law requires an employer to assess and manage health and safety risks. Risk management (► risk management and communication) involves the employer looking at the risks that arise in the ► workplace, and then putting sensible health and safety measures in place to control them.

There are three basic steps in managing the risk from workplace ► hazards:

1. eliminate hazards posed by equipment and work processes at their source (e. g. redesign the work process, substitute a safer chemical for a hazardous chemical, use new equipment);
2. if it is not practical to eliminate hazards, control the hazard to reduce the risk to workers (e. g. machine guards, noise enclosures, ventilation to dilute the concentration of a hazardous substance);
3. if it is not practical to control the hazard, protect workers from the hazard by using tools such as administrative controls, safe work procedures, effective safety training, proper supervision, or personal protective equipment.

Health Service

Definition

A health service is a permanent system of institutions aiming to meet the health needs of the population and to provide health protection for both individuals and the community.

Health Service Area

Definition

A health service area is a geographic area designated based on geography, political boundaries, population, and health resources, for the effective planning and development of ► health services.

Health Services Management

► Health Economics in Dentistry

Health Services Research

Synonyms

Routine health care research

Definition

Health services research is a multidisciplinary field of research that focuses on the study of the provision of individuals and populations with products and services related to health care. Goals are the evaluation of the effectiveness of health care measures under realistic conditions and the impact of influencing factors (e. g. insurance plans, costs, organization, structures, health technology, and quality of care). Health services research complements traditional clinical research. Its research domains are individuals, families, organizations, institutions, communities, and populations and ultimatly their health and well-beeing.

Health Services System

► Health Systems

Health Services System Reforms

► Health Systems Reforms

Health Setting

Synonyms

Living condition; Social system and organization

Definition

The place or social context in which people engage in daily activities in which environmental, organizational and personal factors interact to affect health and well-being. A setting is also where people actively use and shape the environment and thus create or solve problems relating to health. Settings can normally be identified as having physical boundaries, a range of people with defined roles, and an organizational structure. Examples of settings include kindergartens, schools, work sites, hospitals, villages or cities.

Action to promote health through different settings can take many different forms, often through some form of organizational development, including change to the physical environment, to the organizational structure, administration and management. Settings can also be used to promote health by reaching the people who work in them, or who use them to gain access to services, and through the interaction of different settings with the wider community.

Health Statistics

Definition

Health Statistics contain all relevant statistical information of the health status of populations or subgroups. In all developed health care systems, there are national health statistic centers identifying health problems, monitoring trends in health status and health service delivery of their population and identifying disparities in health status and the use of health care services by different subgroups. Health statistics are an important source of information for public health policies and programs and support medical research.

Health Status

Definition

The term health status describes the state of health of an individual, a group or a whole population that is measured at a particular time according to defined standards or indicators. The definition of these standards or indicators necessitates an evaluation of the degree of the individual's illness or wellness, basic physical and mental functionality and quality of life. The individual health status may be measured by a medical examination defining the presence or absence of life-threatening diseases, other diseases and their impact on the quality of life and risk factors of overall health. It may also be determined by asking the individual about his or her

health perceptions. As there is no single standard measurement for the health status of individuals or population groups, researches must define their own way of measuring.

Health Status Indicators

Definition

Indicators of health status are the essence of ► health indicators. They include mortality, morbidity (general rate and disease specific rates), generic health status, and composite health status measures. They are most widely used for comparisons between populations, for communication within the healthcare system, and for the coordination of future priorities in health of the community.

Health Strategy

Synonyms

Health action plan

Definition

Health strategy is defined as an elaborate and systematic plan of action in the organization of health care.

Health Subsidies

Synonyms

Subsidy; Voucher

Definition

A grant provided to individuals, organizations or institutions to purchase a restricted set of health-related goods and services. Consumer-side subsidies place purchasing choice in the hands of individual health care users, while producer-side subsidies support organizational or institutional provision of particular goods or services. These subsidies are primary granted by government or philanthropic foundations for the primary purpose of promoting a goal considered beneficial to the public welfare.

Health Surveillance

Synonyms

Medical surveillance

Definition

Health surveillance is the ongoing observation of the health status of the population and the factors that may affect it.
Health surveillance refers to the systematic collection, analysis, and interpretation of health data that has a significant impact on health, which is then used to drive decisions about health policy and health education. Health surveillance in occupational health refers to the application of medical tests and procedures to individual workers who may be at risk for occupational or work-related morbidity, to determine whether an occupational or work-related disorder may be present. A medical surveillance, also, applies tests and procedures on a group of workers with common exposures for the purpose of identifying individuals who may have occupational or work-related illnesses and for the purpose of detecting patterns of illness which may be produced by occupational exposures among the program participants. Medical surveillance represents the first step in ascertaining the presence of a work-related problem.
Occupational health surveillance entails the systematic monitoring of health events and exposures in working populations in order to prevent and control occupational hazards and their associated diseases and injuries. The purposes of occupational health surveillance is to identify the incidence and prevalence of known occupational and work-related diseases and injuries, and to find and evaluate other individuals from the same workplaces who may be at risk of similar disease and injury. Occupational health surveillance is an important means of discovering new associations between occupational agents and accompanying diseases.

Health System in Dentistry

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Synonyms

Oral health care system; Oral health care services; Dental care delivery system

Definition

The health system can be described on a fairly general level as the "totality of organized social action in response to the occurrence of disease and disability and for averting risks to health" (Schwartz and Busse 2003). Although this definition is broad and likely to meet with a wide measure of acceptance, it is not very useful for operational purposes. A narrower and therefore more practical definition subsumes within the concept of the health system "all institutions and activities directed towards the provision and funding of health benefits to the population" (Hajen et al. 2000). In this less wide-ranging sense, the term "health *care* system" is also used. The "oral health system" can be defined in functional terms as "the combination of organizations, flows of finance, workforce training and structure, laws, regulations and accepted practice which are aimed at improving the oral health of individuals and communities" (Anderson et al. 1998).

History

Health systems have existed ever since people first attempted to protect their health and to treat diseases. Organized health systems in the modern sense, however, are an institution of the last hundred or so years and universal cover is predominantly confined to industrialized countries. In Germany the process of development towards an organized health system began in the second half of the nineteenth century (Tiemann et al. 2003). Nowadays, owing to its quantitative significance the health system is already commonly described as an "industry". Total health spending in Germany in 2005 amounted to 239 billion euro, or 10.7% of gross domestic product. Oral health care is estimated to account for about 1% of GDP.

Basic Characteristics

A "system" is generally understood to mean the totality of interconnected elements that influence each other and are organized for a specific purpose. The system of oral health care thus involves the interaction between dentists and patients, health insurance funds, associations of statutory health insurance dentists, associations of health insurance funds, professional dental organizations, associations and societies, the dental technology industry, health ministries and other government institutions, as well as other bodies. The objectives of the system are enshrined, for example, in the German Dental Association's "Oral Health Goals", which are in turn based on the World Health Organization's "Global Goals for Oral Health 2020":

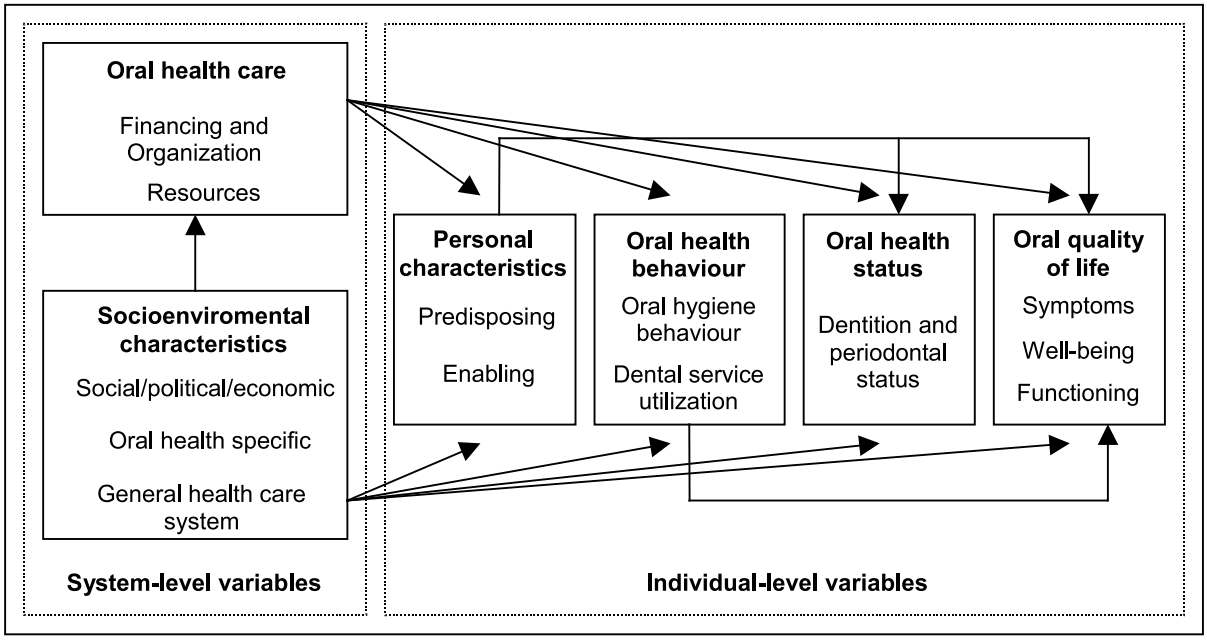
1. Promotion of oral health and reduction of the effects of dental, oral and maxillofacial pathology on general health and on psychosocial development, with particular reference to at-risk groups.
2. Reduction of the effects of dental, oral and maxillofacial pathology on general health at both individual and population level by early diagnosis, prevention and efficient treatment of oral disease.

Given appropriate operationalization of the specified aims, for instance on the basis of the ▶ DMFT value for caries or the Community Periodontal Index (▶ CPI) for periodontal status, attainment of the system objectives can be assessed empirically by ancillary evaluative research.

Analysis reveals that the oral health system can be broken down into three components, of which the third is assignable to the individual sector (see Fig. 1). They are:

1. The oral health care system proper (the medical system).
2. The social, political and economic background to the oral health care system (health policy).
3. Patients' individual capabilities and attitude patterns (which are subject to influence by the oral health care system and the socioeconomic background) (health behavior of the general population).

Compared with the health system as a whole, the oral health system exhibits certain particularities: "Most oral care is provided as an outpatient service, and hospital oral health care is very limited. Among the reasons suggested for this are: (a) the elective nature of most dental treatment; (b) the highly individualistic nature of solo dental practice; (c) the relatively restricted use of dental auxiliaries; (d) the chronic rather than life-threatening nature of most dental diseases; (e) the minimal interest in and development of hospital-centered treatment in general dentistry; and (f) the relatively slow advances in oral health sciences compared to medicine" (Holst et al. 2002).



Health System in Dentistry, Figure 1 Oral health system. Source: Chen et al. 1997

Comparative Oral Health Systems Research

The comparative analysis of health systems is concerned with the extent to which indications for the design of a health system can be derived from a comparison of differently structured health systems and from evaluation of experience gained in other countries. For the specific field of oral health care, the Manual of Dental Practice published by the Liaison Committee of the Dental Associations of the European Union (Kravitz and Treasure 2004) constitutes a good general survey of the various national oral health systems.

National differences in the design of oral health systems are largely attributable to the historical and cultural particularities of the countries concerned. Both the structure and organization of the system of oral health care and the level of benefits provided depend on a state's specific "► sociopolitical culture". The transferability of system elements between countries is consequently very limited. The outline of European health systems given in Table 1 reveals a number of common features that allow the systems to be assigned to just a few classes or "models" (Anderson et al. 1998; Holst et al. 2002; Klingenberger 2006).

As a rule, these models are not applied in pure form; that is to say, a given national health system may perfectly well include individual features of a different model and thereby assume a hybrid configuration. The Semashko model of the central and eastern European countries has developed in the direction of the Bismarck model since the "fall of the iron curtain" in 1989. Since all national health systems are faced with similar economic and demographic challenges and a concerted European health policy is proposed for the medium term (under the "Open Method of Coordination"), it is generally assumed that there will be a "► convergence of systems" – i. e. that the various models will develop in the direction of a "mixed system". The mixing of systems is already far advanced in some European states (the countries shown in parentheses in Table 1).

Measuring Health System Performance

An important aspect of comparative health systems research is international comparison of the performance of health systems – that is, the extent to which health goals (including oral health goals) are achieved and the resources required for this purpose. Anyone wishing to compare the performance of health systems faces two problems. First, generally accepted criteria for assessment must be identified (the assessment problem), and, second, the effect of the health system on the performance of other factors must be isolated (the problem

Health System in Dentistry, Table 1 Delivery models

Bismarck model (government-regulated social insurance system)	
• Oral health care is mainly financed through compulsory social insurance, with the option of voluntary private insurance • Contributions from employees and employers, usually as a fixed percentage of earned income; these contributions are pooled and disbursed by independent sickness funds • Provision relies mainly on private dental practitioners • Benefits cover most restorative dental care • There are also private insurance schemes in which patients pay their dentist directly and are reimbursed from the insurance company • Cost-sharing generally consists of the consumer's payment of a fixed percentage of expensive porcelain or gold restorations and fixed prostheses	*Countries*: Austria, Belgium, France, Germany, Luxembourg, Netherlands, (Switzerland)
Beveridge model (government-organized and tax-financed national health system)	
• Financing of oral health care used to be predominantly provided out of general and/or specific taxation, collected by central or regional government • Oral health care services are traditionally provided by publicly owned and managed institutions • Price and treatment profile regulation • Universal access to oral health care, but usually with defined levels of patient co-payments for treatment • Small but rising market share of voluntary insurance schemes	*Countries*: Denmark, Finland, Sweden, United Kingdom, (Norway), (Portugal), (Spain), (Italy), (Greece), (Ireland), (Iceland)
Semashko model (mixed system of Bismarck [financing] and Beveridge [provision])	
• Oral health care is mainly financed by compulsory social insurance • Comprehensive oral health care is provided free of charge to the whole population • Dentists are salaried public employees who operated from local or company-based polyclinics or hospital dental departments • Oral health facilities are publicly owned and the distribution of personnel, clinics, treatment and materials is planned • A small proportion of expensive services – mainly prosthetic services – is covered by patient-co-payment • Some private practice exists in several CEE countries, entirely paid for by patients on a fee-for-service basis	*Countries*: Central and eastern European countries (CEE)

of attribution) (Hajen et al. 2000). To permit the comparison of different health systems, the World Health Organization has developed an "overall health system performance" index, which takes account of the following five criteria of the performance of a health system (World Health Organization 2000):

- level of health (life expectancy)
- openness of the health system (accessibility)
- fairness of funding (distribution of burdens) and access to services (equity)
- status of medical care
- satisfaction of the population with the health system and individual satisfaction with one's state of health.

However, the World Health Organization's methodology has been criticized as unscientific. All multidimensional analyses are at risk of not comparing like with like – i. e. of failing to solve the assessment problem mentioned above. Statements about the performance of health systems should thus concentrate preferentially on detailed analysis of individual fields of care. A good example from the oral health care sector is the Euro-Z project, an empirical comparison of the prices of dental treatments in seven European countries (Kaufhold et al. 2001) ▶ (oral) health system performance.

Conclusion

The analysis of health systems is subject to a number of methodological problems, in consequence of which caution must be exercised in interpretation of the results. Yet health systems analysis can offer important early indications of feasible approaches to reform and of emerging trends. In the specific field of dentistry, a trend is becoming apparent, regardless of the particular system applied, for the proportion of expenditure accounted for by public funding to be reduced and for relatively more reliance to be placed on private ▶ models of finance. In the future, too, a greater role will be played by private service provision in the field of oral

health care. An early steering of health policy along lines based on the results of health systems analysis is desirable.

Cross-References

- ► Convergence of Systems
- ► CPI (Community Periodontal Index)
- ► DMFT-Index
- ► Models of Finance
- ► Oral Health Behavior
- ► (Oral) Health System Performance
- ► Sociopolitical Culture

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Health System Forms

Synonyms

Similar trends of health care systems reform

Definition

The basis of convergence theory is the hypothesis that industrial states with different forms of organization face comparable challenges and must accordingly develop similar solutions. The pressure of comparable problems, it is held, gives rise to similar requirements of adaptation and thereby results in an approximation of institutional, political and economic structures and strategies. A comparative study of health policies in the OECD member states concluded that "the most remarkable feature of the health care systems reform is the degree of emerging convergence". Transnational problems and trends in health care can be attributed to, for example, economic causes (mass unemployment or globalization), technical factors (innovative medical technology and consequent new treatment methods) and issues of population structure (demography and epidemiology).

Health System Indicators

Definition

Indicators of the performance of ► health systems are defined by effectiveness, appropriateness, efficiency, responsiveness, accessibility, safety, continuity, capability, and sustainability. Health system characteristics include the extent to which the system delivers good quality health actions to improve the health of the population. This is the most general term for health indicators, including indicators of health care provision, utilization, health care financing, and health policy.

Health Systems

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Synonyms

Health care systems; Health services system

Definition

Health systems are usually characterized according to the predominant source of health care finance. With the notable exception of the health care system United States (US) – which is a mixed system – one predominant source of financing can be identified in most Organisation for Economic Co-operation and Development (OECD) countries, which is either taxes or social health insurance premiums.

Basic Characteristics

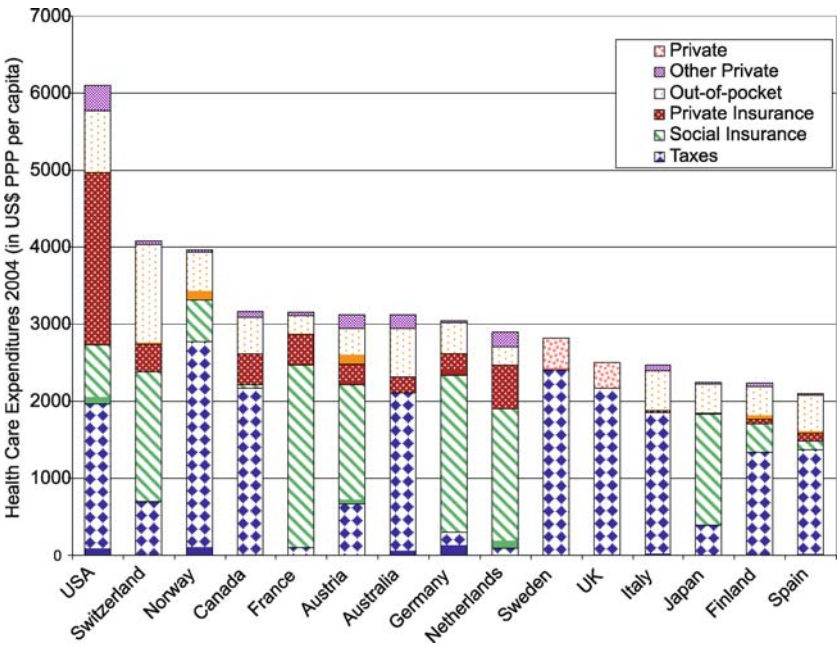
Typology of Health Care Systems

A typology of health care systems is necessarily rather crude, since divergent approaches towards the design of health care systems lead to diverging institutional arrangements. However, probably the most widespread approach for grouping health systems is by predominant mode of health care financing. Figure 1 illustrates the fact that no health care system is financed from one source only. However, with the notable exception of the US and maybe Switzerland, one predominant mode of financing can be identified. Countries such as Canada, Norway, Sweden, Finland, Australia, Italy, Spain, and the United Kingdom (UK) are predominantly financed out of taxes. Other health care systems such as those in France, Austria, Germany, the Netherlands, and Japan are financed primarily by social health insurance premiums.

Social Health Insurance Systems

The common feature of ► social health insurance systems is the fact that health care financing is administered by social health insurers at arm's length from government. In contrast to taxes, the premium income of social health insurers is earmarked for health care financing. As a consequence, social health insurance systems are less prone to under-funding than tax-funded health care systems – the Netherlands being an important exception (Brouwer et al. 2003). On the other hand, social health insurance financing may act as a drain on employment if premiums are linked directly or indirectly to labor costs (► labor market).

One important difference between social health insurance systems is whether health insurers are competing or not. In Austria and France, consumers are not able to choose between social health insurers; in contrast, there is considerable consumer choice in Germany, the Netherlands, and Switzerland (► health systems reforms, ► competition, health care). Moreover, social health insurance premiums are not the only source of



Health Systems, Figure 1 Health care expenditure and source of financing in selected OECD countries 2004, Source: OECD Health Data October 2006

health care financing in these countries. As a consequence, countries with social health insurance systems differ in the importance of secondary sources of financing. Except for Japan, private health insurance premiums are an important source of secondary health care financing in these countries. Only in Germany is private health insurance an alternative (► alternative private health insurance) to social health insurance – at least for part of the population (Wasem et al. 2004). This was also true for the Netherlands until 2005; however, social health insurance and alternative private health insurance were merged into one unified health insurance system in 2006 (Schut and van de Ven 2005).

Supplementary private health insurance is most important quantitatively in France (Turquet 2004; Wasem et al. 2004). Out-of-pocket payments are the biggest secondary source of health care financing in Switzerland. In fact, Switzerland is on the verge of becoming a mixed system, since tax-financing is also an important source of secondary health care financing.

Tax-Financed National Health Systems

In contrast to countries with social health insurance systems, health care financing in tax-financed countries is administered by governmental institutions. Health care is financed not by earmarked social health insurance premiums. Instead, it is usually financed out of general tax revenue. This means that health care has to compete with other items such as education and defense, which also have to be financed out of general tax revenue. As a consequence, rising health care expenditures may crowd out other public expenditures. Conversely, under-funding of health systems may occur if other spending items crowd out rising health care expenditures. Under-finding is therefore an important reason for long waiting times, which are a major problem in Canada and the UK (Hurst, Siciliani 2003; Oliver 2005). Table 1 shows that waiting times for specialist appointments and elective surgery are considerably higher in Canada and the UK than in the US and Germany. On the other hand, access problems due to cost are less prevalent in Canada and the UK than in the US and Germany.

Health Systems, Table 1 Waiting times among sicker adults in four countries in 2005

	CAN	UK	US	GER
Wait for specialist appointment (more than 4 weeks)	57%	60%	23%	22%
Wait for elective surgery (more than 4 months)	33%	41%	8%	6%

Source: Schoen et al. 2005

Mixed Systems

The US health system is often characterized as a system that is financed predominantly by private sources of finance. ► Private health insurance, co-payments, and charities indeed cover approximately 55 percent of health care expenditures in the US, which was equivalent to 3,375 US$ per capita in 2004. This amount exceeds *total* health care expenditures per capita in all other countries except Switzerland and Norway. However, another 2,727 US$ per capita are covered by public sources (taxes, social health insurance premiums) to finance public schemes for the poor and the elderly. This amount exceeds *public* spending on health care per capita in any other country except Norway (Woolhandler, Himmelstein 2002). As a consequence, the US health system is also characterized as a mixed system.

Although total health care expenditure per capita in the US is much higher than in any other country, only part of the population is covered by either private health insurance or public schemes. About 18 percent of the non-elderly population (over 46 million individuals) is uninsured (The Kaiser Commission on Medicaid and

Health Systems, Table 2 Access problems due to cost among sicker adults in four countries in 2005

	CAN	UK	US	GER
More than 1000 US$ out-of-pocket expenses for medical bills in the past year	14%	4%	34%	8%
More than 100 US$ out-of-pocket expenses for prescription drugs	16%	3%	30%	5%
Did not fill a prescription	20%	8%	40%	14%
Did not visit a doctor when sick	7%	4%	34%	15%
Did not get recommended test or follow-up	12%	5%	33%	14%
Reported any access problem due to cost	26%	13%	51%	28%

Source: Schoen et al. 2005

the Uninsured 2006). As a consequence, ► risk solidarity in the US is low and financial barriers to the access of health care services are high (see Table 2).

Cross-References

► Competition, Health Care
► Health Systems Reforms
► Labor Market
► Private Health Insurance
► Publicly-Financed Health Systems
► Risk Solidarity
► Social Health Insurance

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Health Systems Reforms

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Synonyms

Health care system reforms; Health services system reforms

Definition

A number of health system reforms have been exceptionally important during recent years. First, a comprehensive health insurance reform has led to the abolishment of alternative private health insurance in the Netherlands. As a consequence, Germany is the only remaining Organization for Economic Co-operation and Development (OECD) country where social health insurance and alternative private health insurance continue to co-exist. Second, the establishment of the National Institute for Clinical Excellence in the United Kingdom set a trend for assessing the cost-effectiveness of health care services, which has also been taken up by other countries. Finally, the health insurance reform in Massachusetts may lead to the introduction of universal health insurance in other states of the United States (US) as well.

Basic Characteristics

This essay follows the typology that has been applied in the essay on ► health systems. For each type of health system, one country where major health system reforms have taken place has been selected.

Reforms in Social Health Insurance Systems: The Netherlands

At the beginning of the year 2006, the Dutch government introduced a fundamental reform of the Dutch health system. The aim of this reform was to improve the quality and efficiency of the health system by introducing a uniform health insurance system and intensifying ► regulated competition between health insurers (Schut and van de Ven 2005; Greß et al. 2007). The rather arbitrary separation between social health insurance and private health insurance of the past has been abolished. This is a major achievement, since policy makers in the Netherlands have been trying to introduce an universal health insurance system since the early 1990s (Schut and van de Ven 2005).

Although the new health insurance scheme is executed by private carriers, regulation of the system is essentially social (Paolucci et al. 2006). All health insurers are

obliged to accept all applicants, premium rate restrictions do not allow ► risk-rated premiums, and insurers are compensated by a health-based ► risk adjustment system. The new health insurance scheme is compulsory for all inhabitants of the Netherlands.

As a result of the reform, the health insurance market in the Netherlands has changed dramatically. Price competition between health insurers has become very fierce and consumer mobility has increased dramatically. While consumer mobility was dormant before the reform, consumers started actively comparing prices and options after introduction of the reform. While the short-term effects of the reform seem to be in line with the intentions of policy makers, it remains to be seen whether the same is true for the long-term consequences of the reform. One key aim of reform was that the new system would lead to a more efficient provision of health care services. However, so far, competition between health insurers is based primarily on price. As a consequence, the quality of health care services is not yet an important means for health insurers to attract consumers (► competition, health care).

From a comparative perspective, the Dutch reform is a rather fascinating example of cross-country policy learning. Some key features of the Dutch reform, such as the introduction of a universal health insurance system, mandatory coverage for the entire population, tax-financed premium subsidies for low-income consumers, and voluntary ► deductibles, can also be found in the Swiss health insurance system. What is more, shortly after the introduction of the reform in the Netherlands, policy makers in Germany became very interested in the design of the new Dutch system. As a result, some key features of the health care reform of 2007 in Germany look strikingly similar to the Dutch system. However, one very important difference between the system in Germany and those in the Netherlands and Switzerland remains: the rather arbitrary separation between social health insurance and private health insurance in Germany.

Reforms in Tax-Financed National Health Systems: United Kingdom

Towards the end of the 1990s, "► postcode prescribing" had become a key issue for the tax-financed National Health Service. Examples where access to certain treatments and services differed between health authorities were frequent, and controversies had emerged over access to a wide range of treatments. As a consequence, the ► National Institute for Health and Clinical Excellence (NICE) was established in April 1999.

NICE is supposed to provide guidance on the use of health services to the National Health Service. The guidance is based on appraisals of pharmaceuticals, medical devices, diagnostic techniques, and surgical procedures, as well as preventive services (Department of Health 1998). Appraisals result in recommendations for the use of health care services within the NHS that are binding for regional health authorities. If providers intend to use a service recommended by NICE, regional health authorities have to finance this use. NICE is supposed to consider not only the clinical effectiveness of services, but – given scarce resources – also the relationship between effectiveness and associated costs (Devlin and Parkin 2004; Greß et al. 2005). In this respect, NICE has been the pioneer of a development which has become imperative in many other countries as well – no matter if these countries are predominantly financed by taxes or by social health insurance premiums (Greß et al. 2007).

Reforms in Mixed Systems: United States

Health insurance coverage in the mixed US health financing system is not mandatory. As a consequence, almost 20 percent of the non-elderly population in the US is uninsured (► health systems). So far, any effort to introduce universal coverage in the US on a national level or even on a state level has been unsuccessful. However, in April 2006, Massachusetts enacted legislation that is supposed to provide universal coverage to state residents (Haislmaier and Owcharenko 2006). The Massachusetts Health Care Reform Plan requires all adults in the state to purchase health insurance. Moreover, employers are required to provide health insurance coverage to their employees or a pay a fine. Individuals receive government-funded subsidies in order to be able to buy health insurance. By May 2007, more than 100,000 previously uninsured individuals had gained coverage because of the reform. As a consequence, the Massachusetts plan has generated a great deal of interest on the national and state level and has ignited a broader debate about the feasibility of the introduction of universal coverage (Kaiser Commission on Medicaid and the Uninsured 2007).

Cross-References

- ► Competition, Health Care
- ► Deductible
- ► Health Systems
- ► National Institute for Health and Clinical Excellence
- ► Postcode Prescribing
- ► Regulated Competition
- ► Risk Adjustment
- ► Risk-Related Premiums

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Health Targets

Synonyms

Health goals

Definition

Health targets are based on outcomes and processes. They can be quantitative, such as immunization rates, or qualitative, such as the introduction of national health care programs and initiatives. While not a requirement, health targets should ideally be specific, measurable, accurate, realistic and time-bound ("SMART"), to enable better monitoring and management towards achieving those targets. Health targets facilitate the achievement of health policy and therefore represent a commitment of a system or legislative body to achieve specific pre-defined outcomes over a pre-defined period of time (► health outcomes). As they set priorities, they can be used to create high levels of commitment and they are the basis for follow-up activities and evaluation. Health targets can be applied nationally, internationally, or within systems on sub-national levels, such as public health care systems.

Numerous governments in the Member States of the WHO European Region and in OECD countries utilize health targets as an instrument and guidance for policy formulation and implementation.

Health targets are defined as follows in the WHO Health promotion glossary:

> They define the concrete steps which may be taken towards the achievement of health goals and it means a change in the health status of a population that can be reasonably expected within a defined time period. Setting targets also provides one approach to the assessment of progress in relation to a defined health policy or program by defining a benchmark against which progress can be measured. The implementation of health targets requires the existence of a relevant health indicator and information on the distribution of that indicator within a population of interest. It also requires an estimate of current and likely future trends in relation to change in the distribution of the indicator, and an understanding of the potential to change the distribution of the indicator in the population of interest.
>
> (WHO 1998)

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Health Technology

Definition

Health technology includes a wide range of procedures, devices and equipment applied to the maintenance, restoration, and promotion of health. The technology comprises interventions at any stage of health

care, including primary prevention, early detection of disease and risk factors, diagnosis, treatment, rehabilitation, and palliative care.

Health Technology Assessment (HTA)

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Introduction

Health Systems have developed differently and with varying degrees of complexity throughout the twentieth century. They share a common reason for their existence; that is the improvement of health for the entire population. Unfortunately, they share another characteristic: available resources are limited, and delivering health services therefore involves making necessary decisions. As a result, decision-makers need information about the available options and their potential consequences. It is now apparent that many interventions once thought to be advantageous have, in the light of closer evaluation, turned out to be at best of no benefit, or at worst, harmful to the individual and counterproductive to the system. This recognition has led to the concept of "evidence based medicine" (EBM), which argues that the information used by policy-makers to make decisions should be based on rigorous research to the fullest extent possible (Ham et al. 1995). Sackett defined ► evidence based medicine as "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients". However, Sackett recognized that "there is some fear that evidence-based medicine will be hijacked by purchasers and managers to cut the costs of health care" (Sackett et al. 1996). As a consequence, he changed his definition four years later to define evidence based medicine as the integration of the best research evidence with clinical expertise and patient values.

EBM primarily affects medical (and health care) practice and focuses mainly on the individual level, whereas Health Technology Assessment (HTA) aims to influence health policy and focuses on the population. In other words, HTA offers a way of evaluating actual or potential health interventions, and helps to ensure that the limited resources available are well spent. Health care systems worldwide are under increasing pressure, and such pressure does not seem likely to diminish in the near future. Critical health ► policy analysis and HTA are needed more than ever in order to assist policy-makers in making difficult decisions and choices.

Definition

HTA has been defined as "a form of policy research that systematically examines the short- and long-term consequences, in terms of health and resource use, of the application of a health technology, a set of related technologies or a technology related issue" (Henshall et al. 1997). Given the broad context of HTA, it is not defined by a set of methods, but by its intention.

The aim of a HTA report is to support decision-making in the health sector by systematically assessing medical, economic, social, and ethical aspects of health. HTA is also a form of policy analysis. By nature, HTA is a multidisciplinary activity, which systematically evaluates the effects of a technology on health, on the availability and distribution of resources, and on other aspects of health system performance such as equity and responsiveness (European Observatory on Health Systems and Policies). In order to achieve the goal of supporting decision making, two preconditions have to be fulfilled: the reports have to meet explicit qualitative standards and they need to have an actual impact on the decision-making process in its context.

History

The term "technology assessment" was first used by the Subcommittee on Science, Research and Development of the House Science and Astronautics Committee of the US Congress in 1965. After a long process, the Subcommittee defined technology assessment as "a comprehensive form of policy research that examines the short- and long-term social consequences (e. g. societal, economic, ethical, legal) of the application or use of technology". Later, beginning with reports from the Office of Technology Assessment (1976), this general definition was applied to the health field as well. HTA began to develop in Europe in the early 1970s, with studies of expensive medical devices in several European countries, notably Sweden. The Swedish Planning and Rationalization Institute (SPRI) began stud-

ies of the then-new computed tomography (CT) scanner in 1972, and then developed a series of studies of the implications of health technology. By the mid-1980s, other European countries had begun to carry out such studies and to use the term "health technology assessment" to describe their work.

Policy Analysis, Policy Orientation and Context of HTA

HTA has been compared to a bridge between the world of research and the world of decision-making (Battista 1996). This bridge is intended to allow the transfer of knowledge produced in scientific research to the decision-making process. In order to achieve this, HTA is dedicated to the work of collecting and analyzing evidence from research in a systematic and reproducible way, as well as making it accessible and usable for decision-making purposes, normally by assessment reports (► policy analysis). HTA shares these principles with EBM and clinical practice guidelines (CPG) and, together with them, enables a body of best practice initiatives to be built (Perleth et al. 2001).

Assessments can be conducted on, for example, investment decisions (purchasing new equipment), or shaping of the benefit catalog (reimbursement of new services), as well as decisions concerning the organization of service provision (inpatient vs. outpatient services). For the purposes of HTA, the decision-maker's need for information is termed the policy question. Intensive cooperation between policy-makers and researchers is needed in order to clarify the underlying policy question and tailor the assessment to the decision-maker's information needs. The quality of this interaction is one of the main determinants of the value of evidence for policy-making (Innvaer et al. 2002). Unfortunately, this cooperation is inadequately established in many countries. Therefore, HTA exists alongside policy decisions and is insufficiently recognized by politicians and health care managers. It is crucial to explain the context of a HTA clearly, so that readers can better assess whether the report is relevant to their own problems. The context-embedded approach of HTA is a key advantage of these assessments because EBM is mainly focused on randomized controlled clinical trials, and the transferability of such results into policy decisions is questionable. In order to give an evidence-based solution to the problems addressed in the policy question, the researchers have to define the policy question in terms of safety, efficacy, and effectiveness, and psychological, social, ethical, organizational, professional, and economic aspects. These questions determine how the rest of the assessment will be conducted, the aspects that will be evaluated, and those that will not, as well as the profundity of the research regarding each of the aspects mentioned.

In each country, the adoption and use of health technology is influenced by many factors, including the perception and experience of health and disease, the cultural responses to technology, the nature of the medical profession in the particular country, industrial information and promotion, and the financial and regulatory system (► HTA, context of).

Aspects of HTA

Technology assessment is carried out by a multidisciplinary group because it requires wider expertise than any individual or single disciplinary group could be expected to have. It identifies the groups that will be affected by the proposed technology (the "parties at interest") and evaluates the impact of the technology on each party.

A thorough assessment requires attention to different aspects of health technology and health technology assessment. Such aspects include dimensions (i. e. safety, efficacy, or effectiveness), functions (i. e. using, doing, and supporting HTA), focus (i. e. treatment or prevention), and type of technology (i. e. drug, medical procedure, or preventive program), as well as types of healthcare provider (i. e. inpatient and outpatient), and decision level (► HTA, aspects of). A scheme of all of these aspects can provide a method for evaluation and further development of the HTA; identifying gaps in coverage and suggesting improvements for the future.

A relatively new field where HTA is being used is to assess patient safety technologies (► patient safety HTA). Regardless of widespread investment in patient safety technologies, especially in the UK but also in the US and elsewhere, little HTA has been done to establish the effectiveness of these technologies. The HTA and patient safety literature suggests there are four categories of assessment of patient safety technologies: HTA for existing safety technologies, for underutilized safety technologies, for emerging safety technologies, and for safety aspects of technologies with a non-safety primary purpose.

HTA Methodology

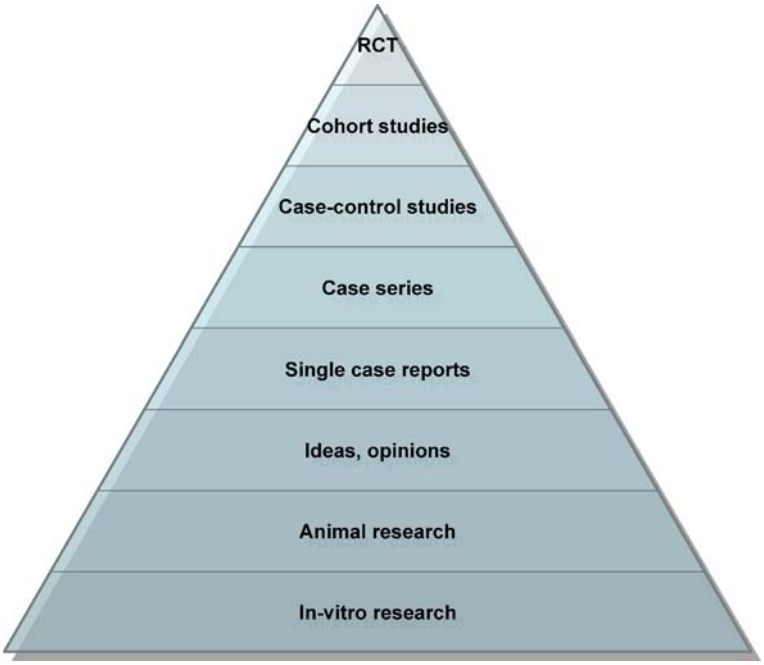
After consensus on the research questions has been reached, the task of the HTA is to retrieve, analyze, and synthesize the available evidence, and to prepare it in a way that is useful for decision-makers or politicians (► HTA, methodology). The researchers try to identify and collect the best available evidence that is suitable to give valid answers to the different aspects of the policy question. They then summarize this evidence. In some cases, it could be appropriate to provide recommendations for policy-making, or at least to outline resulting policy options.

A technical assessment of a pharmaceutical or medical device carried out by a program as a part of a regulatory decision can be called a HTA. Similarly, an ethical analysis concerning gene therapy, that is performed to clarify the implications of the therapy before deciding whether to provide it, can be considered a HTA. The most frequent activity in HTA is a synthesis or systematic review of available information, in particular on efficacy and cost-effectiveness, in order to assist different types of policy decisions. A prospective randomized clinical trial or prospective cost-effectiveness study done for policy reasons, as in the Netherlands or the UK, is also a technology assessment. On the other hand, clinical research or even clinical trials done solely for increasing scientific knowledge are not technology assessments.

Given the wide scope of HTA, it is not considered a discipline or a field; it is a systematic inter-disciplinary process based on scientific evidence and other types of information. It involves physicians, other clinicians, economists, social scientists, public health, and health service researchers, as well as ethicists. Additionally, the public and its representatives are more and more involved in HTA.

Role of Evidence

In the last decade, pressure to base decisions on evidence has been extended to other areas of health care, such as public health interventions and health care policy-making. In this context, evidence is understood as the product of systematic observation or experiment. The evidence-based approach relies mainly on research, that is, following a pre-established plan to systematically collect and rigorously analyze data. Evidence is the result of a search for practical, useful knowledge (Banta 2003). Additionally, the definition of ► evidence based medicine introduces the concept of best available evidence, which implies a "hierarchy of evidence". Since the evidence normally comes from research, it is important to consider the hierarchy of research designs as well as the quality of research execution. Some research studies are considered to be better than others; therefore, evidence from good research is generally considered better than evidence resulting from research of a lesser standard. HTA often assesses the potential effects of an intervention on health outcomes. In the evaluation of these effects, evidence from experiments is, in principle, superior to evidence from non-experimental observations. Furthermore, among experiments, some study designs are considered better than others, in consequence ranking higher in the hierarchy of research designs (Fig. 1: Hierarchy of research designs for evidence-based medicine). The rationale for a hierarchy of research designs is associated with the concept of EBM and involves considerations of validity, particularly internal validity. Internal validity is a form of experimental validity. An experiment is said to possess internal validity if it properly demonstrates a causal relation between two variables. Internal validity tells us how likely it is that an observed effect of an intervention is in fact attributable to that intervention. On the other hand, a study that readily allows its findings to be generalized to the population at large has high external validity, but not necessarily high internal validity. The extent to which the information provided by a study has clinical or policy relevance (the external validity) has also been defined as the "non-methodological quality" of the evidence (Lohr and Carey 1999). The more internal validity a research design has (the higher it is in the hierarchy of evidence), the more likely it is that the observed effect is truly attributable to the intervention. Further down in the hierarchy, the possibility increases that the findings from the study will be misleading. The design highest in the hierarchy is the randomized controlled (clinical) trial (RCT). However, a major problem of the gold standard study design for EBM, the RCT, is the poor external validity of the findings. Unfortunately, the external validity of RCTs is normally reduced as the participants and intervention delivery may not be truly representative of the population to whom the results should be applied later on. This can happen for a number of reasons; often only a very small proportion of the patients with a condition are considered eligi-



Health Technology Assessment (HTA), Figure 1
Levels of Evidence

ble for a trial. Additionally, important subgroups of the population are often systematically excluded, such as ethnic minorities, the elderly, and/or women. Furthermore, participants in research studies differ systematically from those eligible subjects who refuse to participate. Finally, yet importantly, research is often conducted in health care settings not representative of the usual health care setting.

The way in which an intervention has effects on health is referred to as its "directness". Evidence that a link is direct is thought to be better than evidence that a link is indirect. When there is only evidence on indirect links available, it is normally necessary to have evidence for each of the single indirect steps in the causal chain. A direct link can be established in a single study but several studies are needed for the establishment of a complete chain of indirect links. Directness is thus also related to the kind of parameters used to measure the effect of an intervention.

In contrast to the strict research hierarchy of the EBM concept, HTA reports try to judge and generalize their findings from different studies with different degrees of internal and external validity to make them suitable for decision makers who make decisions based not on the individual patient, but on the population.

The United States Task Force on Community Preventive Services has consistently developed a more elaborate hierarchy of research designs for the assessment of interventions. The authors introduced the concept of suitability for assessing the effectiveness of interventions (Briss et al. 2000), which goes beyond the internal validity of the research designs used. This approach is particularly interesting because it argues that the RCT is not always the most appropriate (or feasible) research design. It recognizes that other study designs—in particular, well-designed cohort studies—can produce data that are not obtainable from RCTs.

Assessing Research

The results from research are usually published in scientific journals. Consequently, searching for the best evidence is usually seen as synonymous with searching the literature for results of studies. Although it is desirable and sometimes necessary to search for evidence from sources other than the published literature, this is not always possible. Additionally, many systematic reviews and assessments focus mainly on published results and, as mentioned in the beginning, transparency and comprehensibility are necessary preconditions for a HTA report. Use of unpublished results always leads to problems in the verifiability of the report and should therefore be avoided. Sources for assessing studies to consider within a HTA report are mainly literature

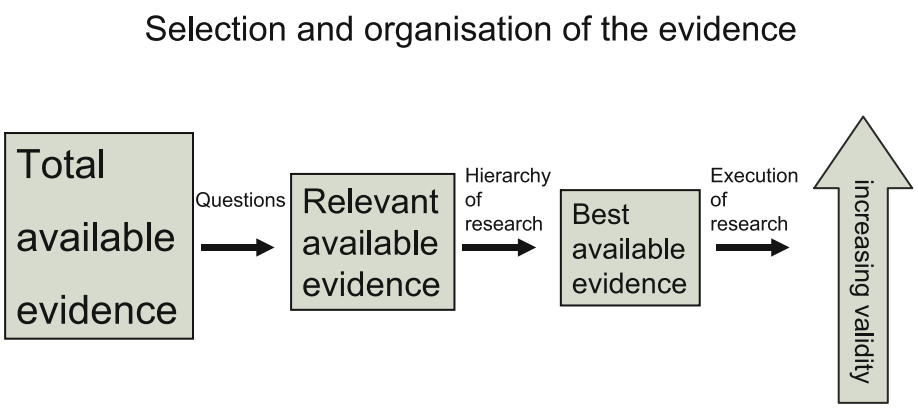
databases like Medline, EMBASE, Current Contents, etc. In addition, specialized ▶ HTA databases with complete HTA reports exist. The internationally recognized Cochrane Library is the best example of this type of database.

The concepts shown above allow for a broad classification of the available evidence on the effects of an intervention into different levels of quality. When evaluating an intervention, this approach can be used to limit the types of studies taken into consideration. Therefore, with the help of the hierarchy of research designs, it is possible to set a threshold concerning the types of research to be considered in the evaluation.

Several tools have been developed to assess and grade the quality of execution of single studies, following the same rationale as the hierarchy of research designs in Fig. 1. This rationale is higher quality = higher internal validity = higher level of evidence. A review identified 67 ways to assess and grade the quality of different study designs, most of which have been developed for assessment of the quality of RCTs (West et al. 2002). These grading algorithms allow ordering of a group of studies with the same design according to the quality of their execution, again generating a hierarchy. This approach makes it possible to organize the available evidence in a way that facilitates drawing conclusions and making recommendations. Figure 2 visualizes the process of organization and selection of evidence as it takes place when conducting systematic reviews as well as HTAs.

Summarizing the Identified Research

The group of studies selected as the best available to answer specified research questions is called the "body of evidence". A body of evidence is characterized by a combination of the hierarchy of research design, the directness of the evidence, and the quality of execution. Furthermore, factors such as the number of studies, the size of the effect, and the consistency of results across the group of studies are also relevant when judging the strength of the evidence. The challenge in HTA is to judge the evidence from different studies in order to give answers to the research questions and, based upon this, to the policy questions. In recent decades, several approaches have been developed to standardize the way researchers make judgments about the strength of the evidence that underlies their recommendations. To rate the strength of evidence, 40 different systems were developed (West et al. 2002). The concepts differ in the combination of factors required for the standard of evidence and the weight given to each when rating the strength of evidence derived from a group of studies. These systems also establish a link between the strength of the evidence and the strength of the recommendation. Strong evidence on the effects of an intervention allows for strong recommendations for or against the use of the intervention. Consequently, weak evidence only supports weak recommendations. There are several systems to standardize the process of grading the strength of recommendations, typically using letters (for instance A, B, C, etc.) to describe the grade of strength of a recommendation (West et al. 2002). If such a system is used in HTA reports, it is necessary that the authors provide information that allows the reader to interpret the grading of recommendations used. For each of the aspects of assessment in a HTA, the standard and relevance of available evidence needs to be assessed. The underlying rationale always consists of the same three key ques-



Health Technology Assessment (HTA), Figure 2
Selection and organization of the evidence

tions: are the research findings valid, are they relevant to the assessment questions, and how strong is the evidence?

Evidence Based Recommendations

The identification of strong evidence for the effectiveness of an intervention does not necessarily lead to the formulation of strong recommendations for or against its implementation in the health care system. Evidence of the effectiveness of health technology is only one part of the picture. Clinical recommendations consider (for the most part) only the benefits and disadvantages of one or more specific interventions.

The other parts of the picture, such as the impact on organization of the system, on resources available, on responsiveness, and on equity, also play a determinant role in the decision for or against the introduction or implementation of an intervention respective technology. Even with strong evidence of benefit for health from an intervention, the recommendations from a HTA may be against its implementation. When considering other factors, such as cost and cost-effectiveness issues, the burden of disease, needs and priorities, barriers to implementation, features of the health care system, cultural issues, etc., implementation can appear to be improper in a given context.

Normally, HTA explicitly considers such factors. However, for the assessment of these factors, RCTs do not occupy the highest place in the hierarchy of evidence since this study design is not appropriate to answer relevant questions besides clinical efficacy. In addition, the epidemiological approach is not always the appropriate method in these cases. Evidence obtained with empirical, social, or political science methods must therefore be considered in a HTA (► evidence based recommendations).

A consensus by the World Health Organization (WHO) Regional Office for Europe agreed a new definition of evidence in the context of HTA: "findings from research and other knowledge that may serve as a useful basis for decision-making in public health and health care" (WHO Regional Office for Europe 2004). This emphasizes the prospective relevance and validity of different study designs and research forms. It also goes further, acknowledging the value of evidence obtained with methods that—within the scope of some scientific discourses—are not considered scientific.

Impact of HTA

In addition to the dissemination and implementation of HTA recommendations, the evaluation of their effects is an important factor of HTA. Like other health technologies, HTA should be judged on the quality and size of its effects. In recent years, this aspect has received increased attention as HTA has begun to become an important part of health care policy-making in many countries (► HTA, impact of). However, the response of policy-makers shows that many of them do not see the importance of assessment. There is more interest in controlling costs then in steering health care. Consequently, even when good assessments are done, their impact on policy-making has been modest. The effects of HTA are linked with the assessing institution and the motivation of its commissioner (Gerhardus 2006). For best use of HTA, exact formulations of the impact aims are needed. As the first step in assessing a technology, the people concerned should be defined. These people have to formulate the aims and disseminate the recommendations of the HTA. Effects of HTA should then be evaluated, and if defined impact aims are not reached, a discussion should follow.

HTA Institutions

Many organizations throughout the world assess healthcare technology (► HTA, institutions). There is an evident need to cooperate and share information from different cultures. Since the beginning of HTA activities, efforts have been made to share experiences at an international level. The first meeting of the International Society for Technology Assessment in Health Care (ISTAHC, today called HTAi) in 1985 made evident the beginning of international networking in the field of HTA. HTAi represents mainly single researchers.

In contrast, the International Network of Health Agencies for Health Technology Assessment (INAHTA) represents agencies in different countries. It has now grown to 43 member agencies from 21 countries, and stretches from North and Latin America to Europe, Australia, and New Zealand.

All of the important HTA agencies in Europe recognize the need for improved coordination of HTA in Europe. There are several **European HTA Networks**. One of them is the HTA-Europe project, which aims to contribute to the effectiveness and cost-effectiveness of health care in Europe through improved HTA, and to

strengthen the coordination of HTA in Europe. A form of HTA exists in all of the old EU-15 member states, though with a high degree of diversity in institutionalization, impact and, financial equipment.

The Future of HTA

HTA is already an important force in Europe. Investments in HTA are growing, formal programs are being established at the national and regional level, and evidence is accumulating that HTA is making a difference in the cost-effectiveness and quality of health care. HTA is becoming a field of exceptional interest to policy-makers, because many health care interventions are not evaluated or inadequately evaluated. On the other hand, many beneficial and cost-effective technologies are not fully deployed for the benefit of the public. One key challenge is to base adoption and use of health technology on evidence such as that developed by HTA. Policies offer many possibilities for HTA; for example, coverage decisions, i. e. for pharmaceuticals, can be based on HTA. Determination of the number of services needed in an area can also be based on HTA. There are therefore many challenges for HTA at the national and regional levels of all countries.

Summary

HTA can provide a unique input into the decision-making processes of the health care system. In accordance with its broad concept, the principles and scope of HTA can be applied in order to assess the potential consequences not only of medical interventions, but also of organizational interventions, and even of health care reforms, since reforms can also be considered as interventions in the health system. HTA can offer several key features to decision-makers: a thorough assessment of the potential effects on health and the consequences of implementation of interventions for the health system, as well as for the economy and the society in which a technology is to be introduced or excluded.

To fulfill this task properly, evidence from different research traditions will have to be considered in one assessment, using a broad scope of evidence. The field of HTA has illustrated that it can identify technologies and produce meaningful assessments in a timely fashion. Technology assessment agencies have successfully involved leading physicians, administrators, and other professions in their work.

Nevertheless, some problems remain: despite the 20-year history of this field, many policy-makers do not see the importance of assessment. In fact, policy-makers sometimes have little interest in health care other than controlling costs. Even with coverage policy, which is being used increasingly to control costs, HTA is often not a part of policy-making. Much of the potential of technology assessment has not been realized. Even when good assessments are done, their impact on policy-making has been modest. However, there are great differences in adoption, implementation, and support of HTA between countries all over the world. Health technology itself is international and efforts to understand its benefits, risks, and costs must also become increasingly international. For this purpose, HTA is a promising way forward.

Cross-References

- ▶ Evidence Based Medicine, in HTA
- ▶ Evidence Based Recommendations
- ▶ HTA, Aspects of
- ▶ HTA, Context of
- ▶ HTA, Databases
- ▶ HTA, Impact of
- ▶ HTA, Institutions
- ▶ HTA, Methodology
- ▶ Patient Safety HTA
- ▶ Policy Analysis

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Health Telematics

Definition

Health telematics refers to health-related activities, services, and systems carried out over a distance by means of information and communication technologies, for the purpose of global health promotion, disease control, and health care; as well as education, management and research for health.

Health Transition

Definition

The health transition is the gradual change from a morbidity and mortality pattern driven by infectious, childhood and maternal diseases to a pattern of chronic, noncommunicable diseases occurring mainly in older age. The health transition is advanced not only in the industrialized countries, but also in high-income population segments of middle- (and even some lower-) income countries.

Health Warning Systems

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Synonyms

Monition about health hazard

Definition

System of forecasting and targeted dissemination of a warning message regarding a hazard to human health and recommended actions to be taken by the people concerned.

Basic Characteristics

Health warning systems, e. g. based on forecasting extreme weather and floods, help to protect life, health, and property and enhance national economies. Some such systems have been put in place in several countries, and others are being envisaged.

In the United States (US), excessive heat is considered to be the main weather-related killer, causing more fatalities in an average year than floods, strong winds (such as tornadoes and hurricanes), lightning, and winter events (storms and extreme cold spells). During an average summer, there are over a thousand excess deaths in the US that could be attributed to heat. If deaths due to heart attacks, strokes, or respiratory illness are above normal during a heat wave, they could be considered heat-related deaths, even if they may not be registered as such by a medical examiner.

People living in cities with strong summer weather variability have the strongest weather-mortality relationship. They are not adapted (► adaptation) to extremely hot weather, which is infrequent and occurs irregularly. The number of deaths reported during an intense heat spell is higher in such cities than in many tropical

cities, where hot weather is a normal state. Early season heat waves can cause higher mortality, because human organisms have not adapted. People acclimatize better to the heat as the hot season continues.

There has been considerable progress in the design and implementation of health warning systems in the US, established to reduce effects of weather extremes as well as for seasonal prediction of infectious diseases. Warning systems are being developed to permit urban health agencies and local meteorological offices to issue prior advice to the public if a dangerous heat wave is imminent. The National Weather Service (NWS) of the National Oceanic and Atmospheric Administration (NOAA) in the US provides advance notice (with a forecast capability of five days) of extreme heat events for the protection of life and health, based on a single heat index value derived from temperature and humidity. The excessive heat warning program started in Philadelphia and is currently functioning in more than a dozen cities. A custom-made system is developed for each city, based on the specific conditions of meteorology of each urban area, as well as urban structure and demography. The NWS is developing a plan to expand a heat/health warning system to each of over 70 large US municipalities with populations exceeding 500,000. The system initiated in Philadelphia is now becoming a worldwide model for heat forecasting and collaborative attempts to construct heat/health warning systems for vulnerable large cities around the world have been undertaken in three continents: North America, Europe, and Asia.

The French lesson of August 2003 showed that the death toll of the heat wave was not foreseen and detected only belatedly. Health authorities were overwhelmed by the influx of patients. Retirees' houses had no air conditioning. The number of deaths exceeded the working capacity of undertakers and crematoria. This lesson demonstrates the need for establishing health and environment surveillance, and heat wave forecasting and warning. Air conditioning in retirees' homes proved efficient (yet they are very energy consuming, hence contributing to enhancement of the ► greenhouse effect and ► global warming).

The World Meteorological Organization (WMO) develops a number of global products and services relevant to the natural disaster management. For example, the WMO Tropical Cyclone Programme monitors all tropical cyclones around the Globe from their early stages of formation and throughout their lifetime, providing information on their behavior, movement, and changes in intensity, and on associated onset and development of storm surges and floods. The WMO's Severe Weather Information Center project, carried out in collaboration with the Hong Kong Observatory, has the goal of developing a centralized source of official tropical cyclone warnings and information from around the Globe.

Since deadly extreme heat events occur in many regions of the world, the WMO is working with the World Health Organization (WHO) to develop guidelines that any country can use to set up and run heat/health warning systems. These systems will include monitoring and prediction of conditions leading to intense heat waves, to be carried out by the national meteorological and hydrological services, the WMO's constituency, and with communication between the meteorological and health sectors. They will increasingly include special measures for intervention (by the health and social service sectors) to inform and better protect the most vulnerable members of society.

Long-term forecasts and seasonal forecasts, e. g. based on El Niño-Southern Oscillations (ENSO), are being used in many regions, e. g. for drought warning, to improve preparedness and reduce disaster-caused human and material losses.

Cross-References

► Global Warming
► Greenhouse Effect

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Health of Women

► Women's Health

Healthy Ageing

Definition

A hypothesis that assumes an increase in longevity will increase the number of years lived in good health.

Healthy Cities

Definition

A healthy city is one that is continually creating and improving those physical and social environments and expanding those community resources which enable people to mutually support each other in performing all the functions of life and in developing to their maximum potential.

Healthy Island

Definition

A healthy island is one that is committed to and involved in a process of achieving better health and quality of life for its people, and healthier physical and social environments in the context of sustainable development.

Healthy Public Policy

Synonyms

Health control; Disease prevention; Health promotion

Definition

Health promotion is the process of enabling people to increase control over and improve their health. It involves the population as a whole in the context of their everyday lives rather than focusing on people at risk for specific diseases, and is directed toward action on the determinants or causes of health. The goal of a healthy public policy is health promotion. It is essential to create supportive environments, strengthen community action, develop personal skills and reorient health services.

Cross-References

► Disease Prevention
► Health Control
► Health Promotion

Healthy Subjects

Definition

Healthy subjects are people without any medical condition (including normal physiological and laboratory parameters) requiring treatment. The phrase is usually used for people participating in the early stages of clinical trials, where the kinetics and way of action of new pharmaceuticals is being established, or in studies to evaluate physiological or otherwise defined conditions. Because these individuals do not profit medically from such investigations, they are often financially compensated for their participation and any experimental risks are kept minimal and foreseeable.

Healthy Years Equivalent (HYE)

Definition

The concept of healthy years equivalent attempts to put the remaining lifetime spent in a limited health state relative to the time spent in perfect health. Individuals are asked to weigh the complete remaining lifetime directly. The concept of healthy years equivalent shows some relationship to the QALY concept but has not been fully implemented so far.

Hearing

Definition

A hearing is a procedural element of administrative proceedings and criminal proceedings as well as any type of lawsuits heard before courts. All individuals affected by administrative acts or court decisions have the right to receive a hearing where they are entitled to present their own facts and evidence and to challenge the administration's facts and opinions. Hearings are a crucial component of administrative and court procedure rules. Violation of the hearing right can result in unlawfulness of an administrative act or court order.

Hearing Impairment Caused by Noise

Synonyms

Occupational hearing loss

Definition

Hearing impairment is loss of normal hearing due to ► noise exposure. Occupational exposure to noise is quite frequent in metallurgy, construction, textile and many other industries. At the start of occupational noise exposure workers are faced with temporary hearing loss. This hearing loss is not only present during the exposure but also for a certain period after the exposure to noise. After several years of exposure, depending on ► individual susceptibility, this temporary hearing loss becomes permanent. A characteristic audiogram will show impairment in both bone and air conduction, with a maximum loss around 4.000 Hz which is symmetric and bilateral.

Heart Disease

Synonyms

Cardiac disease

Definition

A structural or functional abnormality of the heart, or of the blood vessels supplying the heart, that impairs its normal functioning. Heart disease is a general term that refers to any disease or condition of the heart, including coronary heart disease, hypertension, heart failure, congenital heart disease, disorders of the heart valves, heart infections, cardiomyopathy, conduction disorders, and heart arrythmias.

Heart Rate

Definition

Heart beats per minute.

Heat Cramps

Definition

Heat cramps is a medical condition occurring when the body is dehydrated and loses minerals due to excessive sweating. It is the least severe form of heat emergencies, which occur when human body is exposed to physical activity, in a hot environment, and without adequate water supply. The condition can occur in an occupational setting, in warm ► weather, in sportsmen, children, etc. The typical symptom is forceful and painful contractions of muscles exposed to intense activity: e. g. the muscles at the back of the calves (the gastrocnemius muscles) or the muscles of arms in sportsmen or workers. Heat cramps improve with rest, drinking water, and a cool environment.

Heat Exhaustion

Synonyms

Dehydration

Definition

Heat exhaustion refers to dehydration caused by prolonged physical activity without consuming adequate water, especially in a hot environment. This medical condition is characterized by impaired water homeostasis in the body. Symptoms of mild dehydration (loss of about 2% of body water) include headaches, visual impairment, decreased blood pressure, dizziness, thirst, discomfort, tiredness, and dry skin and mouth. In moderate dehydration (more than 5%) symptoms are lethargy, seizures, fainting, and sunken eyes. In severe cases

(with 10% to 15% fluid loss), muscles become spastic, paresthesia occur, skin is wrinkled, urination is greatly reduced, and the state may progress to delirium, unconsciousness, and death. Treatment includes re-hydration – replenishment of water and electrolytes orally or intravenously.

Heat Stroke

► Hyperthermia

Hebrew Bible

Definition

The Hebrew Bible begins with the sacred story about creation and salvation and contains the Jewish scripture. Christians accept the scriptures and their continued faith in a transcendent god.

Hedonic Pricing

► Willingness-to-Pay Analyses

Hegemonic Masculinity

Synonyms

Dominating masculinity

Definition

To speak of hegemony is to seek to come to terms with a particular idea of political leadership or influence. Much of what might have been positive aspects of the term have dropped out of use after Gramsci. Instead, the word typically implies a "demanding" and "commanding" form of dominance. Now, when used adjectivally, it typically imputes negative connotations to the word it modifies. The ability to use the word to refer to predominant influences towards "the good" through example and through reason are now almost wholly lost. When used of masculinity, it invariably indicates a "hard" version of what is considered to be acceptable male functioning. Therefore, no capacity is left for a Macduff both to publicly mourn the loss of loved ones to the treachery of a trusted peer and to publicly vow to right an injustice in the political domain. For Shakespeare, Macduff represents a masculine influence that stands with peers to face openly the tyrant Macbeth rather than retreat into an inner world as does Hamlet.

Heine-Medin Disease

► Polio
► Poliomyelitis

Hemagglutinin

Definition

Hemagglutinin is a spike-shaped glucoprotein of the virus surface. At the present time, 15 serotypes are known. Hemagglutinin not only causes agglutination (clumping) of erythrocytes but also controls viral attachment and uptake. The virus can only bind to specific receptors. Not all hosts have the same types of receptors. Thus, contagiousness of an influenza virus depends on the serotype of viral hemagglutinin as well as on the host's receptor pattern.

Hematopoietic Stem Cells

Synonyms

Haematopoietic stem cells; Hemopoietic stem cells; Haemopoietic stem cells

Definition

A hematopoietic stem cell (HSC) is the common precursor of any myeloid or lymphoid cell type, for example white and red blood cells, platelets and lymphocytes. Like the precursor of vessel cells, the HSC derive from the hemangioblast in embryogenesis.
HSC are clonogenic (► clonogenicity) as verified in animal models using lethally irradiated mice. Theoretically, mice can be rescued if one single HSC is successfully transferred to the animal bone marrow. In vitro, HSC can be induced to differentiate into various cell types, for instance cardiomyocytes. Due to their low proliferation rate it is rather complicated to expand them in vitro. Therefore, they may not provide an ideal cell type

for cell replacement therapy, where besides safety, feasibility is the most important property.

Hemolytic Uremic Syndrome (HUS)

Definition

Hemolytic uremic syndrome (HUS) is a severe complication of an EHEC-infection. It is caused by bacterial toxins. HUS is assumed to occur in 6–8% of all EHEC-cases. Primarily, young children, older people and immunocompromised people are concerned. HUS causes a destruction of small blood vessels, a breakdown of red blood cells (hemolysis) and a reduced platelet count (thrombocytopenia). The impairment of the kidneys leads to progressive renal failure. Without treatment HUS can be lethal, in 10–30% terminal renal insufficiency develops.

Hemophthisis

► Anemia

Hemopoietic Stem Cells

► Hematopoietic Stem Cells

Hemorrhagic Fever

► Tropical Diseases
► Tropical Diseases and Travel Medicine

Hemorrhagic Fever with Renal Syndrome (HFRS)

► Hanta Fever

Hepatitis

Synonyms

Inflammation of the liver

Definition

Hepatitis is inflammation of the liver that may be caused by several different viruses (A, B, C, D, E, F). Hepatitis A infection is acquired by ingesting contaminated food or water and is also called an illness of dirty hands implying poor hygiene habits as the cause of infection. Most common are hepatitis B and C infections that are acquired from contaminated blood or body fluids directly (e. g. needle) or during sexual contact. They may cause acute illness, as with hepatitis A infection, but also create many different long term consequences, including liver cancer.

Hepatitis A

► Food- and Fecal-Orally Transmitted Infectious Liver Diseases

Hepatitis A Immunization, Active

Synonyms

Hepatitis A vaccination, active

Cross-References

► Hepatitis A Vaccination, Active
► Immunization, Active

Hepatitis A Vaccination

Synonyms

Hepatitis A immunization

Definition

In hepatitis A vaccination, which was first permitted in 1996, whole inactivated viruses are administered. Two inoculations are given at an interval of 6–12 months, whereby the first vaccination already leads to a protective effect of almost 100% after 2 weeks. The second dose achieves long-term protection lasting at least 20 years. Although hepatitis A vaccination is one of the officially recommended vaccinations in some countries,

in other regions it is only administered for certain specified indications. There might be a higher risk of infection due to one's profession, due to residence in a community institution, in case of certain chronic diseases or when the subject is planning a journey to a region where endemic disease is present. Contraindications for the hepatitis A ► vaccine are acute illness with fever, and a known severe allergic reaction to components of the vaccine.

Hepatitis A Vaccination, Active

Synonyms

Hepatitis A immunization, active

Cross-References

► Immunization, Active

Hepatitis B

Synonyms

HBV-Infection

Definition

Hepatitis B is a viral infection, which is transmitted by contact with blood or other body fluids of an infected person. Following an incubation period of 2–6 months, inflammation of the liver develops. The symptoms are elevated liver enzymes, icterus, fever, malaise and stomach ache. In 0.5–1% the infection takes a dramatic course, which leads to liver failure and – without transplantation – has a lethal outcome. In adults a chronic hepatitis is found in 5–10%, in children the incidence is much higher, in newborn babies even up to 90%. In a number of countries, up to 30% of the population suffers from chronic hepatitis B. During the course of years, 50% of people with chronic hepatitis B develop liver failure or liver cancer. In general, no medicinal therapy is given in acute hepatitis B, chronic courses can be treated with interferon alfa and various virustatics. To prevent hepatitis B infection, active and passive vaccination is possible (► immunization, active; ► immunization, passive).

Cross-References

► Food-Safety and Fecal-Orally Transmitted Infectious Diseases

Hepatitis B Immune Globulin

► Hepatitis B Vaccination, Passive

Hepatitis B Immune Prophylaxis

► Hepatitis B Vaccination, Passive

Hepatitis B Infection

► Sexually Transmitted Diseases

Hepatitis B Vaccination

Synonyms

Hepatitis B immunization

Definition

A ► vaccine against hepatitis B has been available since 1981. There is no age limit for its use. For newborn babies whose mothers are infected with active hepatitis B, the inoculation process should be started directly after birth. In such cases, the first dose of active vaccine is given simultaneously with a passive hepatitis B immunization. Otherwise, hepatitis B vaccination is generally implemented 3 times from the third month of age as part of the 6-fold vaccination, or twice when no pertussis component is involved, at intervals of at least 4 weeks, followed by a further vaccination after 4–12 months. The protection rate achieved is 95–99%. Booster vaccinations are recommended for persons at risk, in particular for those individuals who come into contact with blood frequently, such as medical staff, police officers or prison staff. Contraindications for the hepatitis B vaccine are acute illness with fever, and a known severe allergic reaction to components of the vaccine.

Hepatitis B Vaccination, Passive

Synonyms

Application of hepatitis B immune globulin; Hepatitis B immune prophylaxis

Definition

If a pregnant woman suffers from a chronic active hepatitis B, that means Hbs (surface)- antigen can be detected, the risk of the newborn baby developing hepatitis B is 10–20%. For this reason, infants of HBs-Ag-positive mothers should receive a passive hepatitis B-vaccination directly after birth. Simultaneously, the active hepatitis B-vaccination is started. Another indication for the administration of hepatitis B immune globulin is contact of a non immune person with the blood of someone infected with hepatits B. Due to their profession, some individuals come into contact with blood frequently and thus face an enhanced risk of infection, in particular medical staff, police officers and prison staff.

Herbalism

Synonyms

Herbal medicine; Phytotherapy

Definition

Herbalism refers to the use of herbs to prevent and cure illness. Whole plants or their parts are used for treatment instead of separating and purifying the active constituents of plants. Plant derivatives may be highly active and concentrated in various parts of the plant. The season of the year and the time of day may affect the best time for gathering. These preparations are difficult to standardize, since they are complicated mixtures which may have hundreds of constituents.

Herbalists

► Indigenous Health Care Services

Herbal Medicine

► Herbalism

Herd Immunity

Definition

Immunization involves both a direct benefit to the individual child as well as to those in the community who remain un-immunized and benefit from the immunization of the vast majority. The latter is called “herd immunity”.

Herpes Genitalis Infection

Synonyms

Infection with herpes simplex type 2

Definition

Following an incubation period of 2–12 days an infection with herpes-simplex virus can lead to lesions of the skin and the mucous membranes, cause general symptoms like fever, headache, painful swellings of the lymph nodes, or induce a severe systemic infection, which involves the whole organism. In local infections, firstly vesicles appear, which are arranged in groups, then the rupture of the vesicles leads to painful erosions, which develop into superficial ulcers. An effective therapeutic is aciclovir. Depending on the localization and the severity of the infection, aciclovir can be administered as an ointment, tablets or infusion. The viruses are not killed by the therapy, they can be reactivated at a later point of time.

Heterogeneity

Synonyms

Heterogeneousness

Definition

In the field of monogenic disorders, heterogeneity describes the phenomenon that the same phenotype can

be caused by different ► mutations. The different mutations can be located within a single gene (allelic heterogeneity) or may occur in different genes (locus heterogeneity). However, in contrast to polygenic disorders, a given individual harbors only one (autosomal-dominant) or two different mutations (autosomal-recessive) in one gene.

Heterogeneousness

► Heterogeneity

Heterotopic Pregnancy

► Ectopic Pregnancy

Heterozygosity/Homozygosity

Definition

Diploid organisms like humans carry two copies of each autosomal chromosome (paired homologous chromosomes) and thus, also two copies of each autosomal gene. One of the paired chromosomes (one of the two copies of a gene) is transmitted by the father, the other by the mother. If the sequence of the two copies (► alleles) of a gene is identical, the individual is homozygous, if the two copies of a gene contain different alleles, the individual is heterozygous. Autosomal-dominant disorders manifest when only one of the two copies of the underlying gene is mutated (heterozygosity). In contrast, autosomal-recessive disorders manifest when both copies of a gene carry either the same mutation (homozygosity) or two different mutations on each allele (compound-heterozygosity).

HETUS

Definition

Harmonized European time use surveys. Project initiated by the statistical office of the European Union to harmonize time use surveys in Europe and to provide for comparable time use data. Important source to analyze health related behavior(al) patterns.

HIB-Vaccination, Active

Synonyms

Active immunization against *Haemophilus influenzae* B (Hib)

Cross-References

► Immunization, Active

Hierarchical Linear Modeling

► Multilevel Statistical Analysis

High Blood Pressure

► Arterial Hypertension

Highly Dangerous Infectious Diseases

► Acute Life-Threatening Infections

High Risk (Prevention) Strategy

Definition

High risk prevention strategies represent preventive measures that focus on individuals who are judged most likely to develop a certain disease. They are valuable in addition to measures of prevention within the general population. One example for a high risk approach for stroke prevention is the treatment of hypertension in individuals that have previously suffered a transient ischemic attack (TIA). The high risk strategy falls mainly in the medical domain of secondary prevention (screening).

High Risk Workplaces

Definition

High-risk working places include all workplaces where in spite of completely or incompletely applied preventive measures and actions, health risks for workers still

exist that can endanger their safety and health. At high-risk places a higher risk of injuries, ► occupational diseases and damages exists, due to specific technological processes whereupon there is no possibility to apply the adequate occupational safety measures or due to specific demands related to specific health, physical, psycho-physical working ability of a person. Such high-risk workplaces include for example those in agriculture, logging, commercial fishing, etc.

With insight into risk and causal factors at workplaces, possible prevention strategies aimed at reducing risk, or interventions to interrupt the causal sequence of accidents should be considered. There is a wide range of protective technologies and strategies that has already been applied to workers' protection. The goal is the identification, development and implementation of effective preventive strategies to reduce the risk of injuries and occupational diseases to workers at the highest possible extent.

Hill People

► Indigenous Health Care Services

Hinduism

Definition

With some 900 million followers, Hinduism is the third most popular religion after Christianity and Islam. Its origins can be found in India. All believers take on the religion as a way of life, following the earlier Vedas scriptures.

Hippocratic Oath

Definition

The Hippocratic Oath concerns the doctor–patient relationship, focusing on the physician's code of conduct. It goes back to the forth century before Christ. The Oath stated: "I will use treatment to help the sick according to my ability and judgment, but I will never use it to injure or wrong them … And whatsoever I shall see or hear in the course of my profession … I will never divulge, holding such things to be holy secrets." Medical ethics consisted, therefore, initially, of these three, clear principles: ► beneficence, ► non-maleficence, ► confidentiality.

HIV/AIDS

Synonyms

HIV-infection; Acquired immunodeficiency syndrome

Cross-References

► AIDS
► HIV-Infection and AIDS

HIV (Human Immunodeficiency-Virus)-Infection

Synonyms

AIDS

Definition

Acquired immuno-deficiency syndrome (AIDS) results from the infection with the human immuno-deficiency virus (HIV). The virus is transmitted sexually or by inoculation with contaminated blood, but may be passed from mother to baby at birth. The highest risk is among homosexual or bisexual men, intravenous drug abusers, and people with multiple blood transfusions. AIDS infection is ► endemic in sub-Saharan Africa and India. Its origin is unknown. The virus damages the immune system and therefore the body's defense towards infections weakens. Carriers of HIV may be symptom-free for years, but after shorter or longer periods of time illness develops with various manifestations. AIDS is a fatal disease with new drugs helping relieve the symptoms, or prolong the survival period.

HIV-Infection

► HIV/AIDS
► HIV-Infection and AIDS

HIV-Infection and AIDS

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Synonyms

Infection with human immunodeficiency virus; Acquired immunodeficiency syndrome

Definition

AIDS is a chronical infectious diseases, which is caused by the HI (human immunodeficiency)-virus, and which is primarily transmitted by sexual intercourse or by reused contaminated needles of drug dependents. AIDS is characterized by a weakening of the immune system, which can neither be healed, nor prevented by a vaccination. Different drugs are available, which can impair the viral reproduction and delay the inevitably lethal course of the disease.

Basic Characteristics

History of AIDS and its Problems Nowadays

AIDS is a transmissible disease of recent times, which is caused by an infection with the HI (human immunodeficiency)-virus. Most probably, the HI-virus stems from the SI-virus (simian immunodeficiency virus), which can be present in chimpanzees. The SI-virus, however, developed from a combination of two different viral strains, which are found in guenons. As guenons are hunted and eaten by chimps, the chimpanzees were infected with the precursors of SI-virus. The first transmission to a human presumably took place in the middle of the 1950s by ingestion of chimp meat. In 1959, HIV-antibodies were detected in a man in Congo for the first time. The further spreading of the HI-virus among humans was caused by sexual intercourse or by contact with contaminated blood. As many years lie between the infection with the HI-virus and the onset of AIDS, the problems of this new infectious disease did not become relevant until the 1980s. Initially, AIDS seemed to concern only particular groups at risks. These groups were homosexual men, who faced a higher risk of infection due to frequent partner-swapping and the practice of anal intercourse, and drug dependents, who were infected by the virus through the reuse of contaminated needles. After an antibody test, which was developed by Robert Gallo in 1985, had become available, it quickly became clear that AIDS was much more dangerous than assumed initially. Within a short period of time, AIDS proved to be a global infection and a worldwide threat. In 1986, the virus was named "HIV", in the following year, AZT (Retrovir®), a ► nucleoside reverse transcriptase inhibitor (NRTI) was licensed as the first therapeutic substance. In 1988, the WHO declared December 1st as World AIDS Day. Two years later, a red ribbon became the sign of protest against the discrimination of HIV-infected people. In 1991, a loop of red silk ribbon established to be the international symbol of the fight against AIDS (Fig. 1). As a valuable parameter for therapy control, HIV-PCR (polymerase chain reaction) was introduced in 1994. During the following years, therapeutic possibilities were extended by the introduction of ► protease inhibitors (PI) (saquinavir in 1995), ► non-nucleoside reverse transcriptase inhibitors (NNRTI) (nevirapin in 1996), and a ► fusion inhibitor (enfuvirtide, 2003). With the awareness of the consequences of AIDS, the population of the industrial nations initially developed a kind of mass hysteria; during the course of 1990s the public interest slowly faded away, although the risk of AIDS remained unchanged. Unfortunately, knowledge about AIDS has decreased, especially among teenagers

HIV-Infection and AIDS, Figure 1 The Red Ribbon – the worldwide symbol for solidarity with HIV-positive people and those living with AIDS

and young adults. A lack of knowledge, promiscuity and careless sexual behavior with a high readiness to take risks make the fight against HIV more difficult. Furthermore, AIDS is frequently treated as a taboo subject. Many people do not know that they are infected, or they do not perform a test as they fear social discrimination. HIV-tests may not be available, especially in developing countries. Because individuals may be unknowingly infected and because the latency period is extended, transmission of the virus can easily be spread. Today, more than 40 million people are infected with HI-virus, 2.2 million are children under the age of 15 years. The most recent HIV-infections appear in Africa south of the Sahara; in these regions, the effects of AIDS are highly damaging. Meanwhile, 15 million children have become orphans due to AIDS, and by the year 2025 this number is expected to reach 25 million. Most of these orphans live in extreme poverty. Even if they are adopted by relatives, in most cases, the care they receive is not as good as that given to the biological children in the adoptive family. AIDS orphans are not only susceptible to exploitation and abuse but also their life expectancy is considerably shortened.
Further, a sufficient amount of therapeutics to treat AIDS is not available in developing countries.

The HI-Virus

The HI-virus is a RNA-virus belonging to the retrovirus group. One has to differentiate between the strains HIV-1 and HIV-2, both of which are divided into further subtypes. By the action of the enzyme reverse transcriptase, retroviruses integrate their genetic code into the genotype of the host's cells, that means, viral RNA is assimilated into the double-stranded structure of DNA. Other important viral enzymes involved in the process are integrase and a protease. HI-viruses bind to the so-called ► CD_4-receptors of T-lymphocytes (T4-cells, helper T-cells, CD_4-lymphocytes), which are responsible for cellular immunity. A complex of glycoproteins (Gp 120), which is found on the surface of HI-viruses, is responsible for the viral adhesion. The virus is highly adaptable and is able to develop different subtypes quickly. For this reason, it has an excellent survival capability because resistance to therapeutic measures can rapidly evolve. Due to the high mutation rate, the development of a vaccine has so far not been successful. HIV-infection is detected by the ► HIV-test. Virus load and CD_4 evaluation play an important role in determining the course of the disease.

Ways of Transmission

The HI-virus can be found in various body fluids. Blood, sperm, vaginal secretions, mother's milk and cerebrospinal liquor are contagious. On the other hand, no risks are associated with spittle, tears or sweat. Transmission of HIV by droplets or insect bites does not occur. The virus can be transmitted through microinjuries or larger lesions of the skin or the mucous membranes. Primarily, the virus is transmitted by sexual intercourse with an infected partner without the use of ► condoms. In the case of unprotected vaginal sex with an infected partner the woman's risk of infection is 0.05–0.15%, for the male partner 0.03–5.6%. These are average risks, but the individual risks have to be considered. Individual risks are markedly increased when there is a high virus load in the presence of other ► sexually transmitted diseases (STD), or if sexual intercourse is performed during menstruation. Another way of transmitting HI-virus is the re-use of contaminated needles in cases of intravenous drug consumption. Moreover, a pregnant HIV-positive woman can transmit the virus to her unborn child; the risk is about 25%. Babies can also be infected during the birth process or through breastfeeding. Blood transfusions are a further possible source of infection; thanks to the testing of blood donors, which was established in the middle of the 1980s, the actual risk of transmission by blood transfusion is minimal, at least in industrial countries. However, it has to be remembered that the HIV-test may remain negative for up to 3 months after an individual has become infected.

Course of HIV-Infection and AIDS

HIV-infection passes through three stages. Following an incubation period of 6 days to 6 weeks, the acute phase appears with flu-like symptoms (fever, headache, sore throat, exanthemas and swellings of the lymph nodes). It lasts 4–6 weeks. The following latency phase, in which there are no symptoms, can last for several years. After this phase, the so-called AIDS related complex (ARC) occurs. In this stage of the infection there are similar symptoms as in the first stage, but the symptoms do not disappear. The last stage of the disease, which in general takes a lethal course within two years,

demonstrates the complete AIDS clinical picture with ► AIDS-defining symptoms. There can be a considerable variability in the individual course of the disease. Fast progressors develop the clinical picture of AIDS within 5 years after the infection (5% of adults). Long-term non-progressors do not show any AIDS-defining symptoms even after a time interval of 15 years. In adults, the percentage of the latter group is 5%.

AIDS-Therapy

AIDS cannot be cured; it is only possible to delay the course of the disease and improve the quality of life. At the onset of therapy, the risk of developing AIDS and the long-term-toxicity have to be weighed up. Following the Centers of Disease Control and Prevention classification, there are 3 categories (A-C) according to clinical appearance.

- Category A is asymptomatic HIV-infection;
- Category B is defined by the presence of diseases, which do not belong to the AIDS-defining symptoms, but which can, most probably, be related to an immune deficiency.
- Category C consists of AIDS-defining symptoms.

Furthermore, the CD_4-status and the virus load are taken into consideration. Indications for an onset of therapy are a CD_4-value of 200–350 cells/pl, a CD_4-value of 350–500 cells/pl in combination with a high virus load, AIDS-defining symptoms and diseases, which indicate the presence of immunodeficiency. The primary aim of HIV-therapy is to reduce the virus load below the detection limit (< 50 copies/ml). Antiviral therapy (ART) is carried out as a combined treatment (HAART = highly active antiretroviral treatment). After an induction therapy with four of the available therapeutics, in most cases, maintenance therapy is carried out using three of the therapeutics; in general, 2 NRTI + 1 PI or 2 NRTI + 1 NNRTI. During the course of the disease, therapeutic drug monitoring is performed. Plasma levels of the drugs are determined in order to detect over- and/or underdosage. Moreover, CD_4-value and virus load are controlled regularly to evaluate therapeutic success. In the case of the development of resistances, changes in the medication will be necessary. Different databases supply information about current HIV resistance profiles (like http://hivdb.stanford.edu or http://www.hiv.lanl.gov/content/index). In HIV-treatment, so-called adherence plays an important role, meaning compliance with the therapeutic options. If > 5 % of drug applications are omitted, then an increase of virus load above the detection limit has to be expected. To achieve a good adherence, it is essential to inform the patient about the aims, necessity, complications and side effects of treatment.

HIV-Infection During Pregnancy and in Childhood

It has been found that in 90% of infected children, the HI-virus was transmitted vertically during pregnancy or breastfeeding. As infection with multiresistant viral strains is possible, a genotypic resistance test has to be performed. The administration of the antiviral drug nevirapin in pregnancy and birth by Cesarean section plays an important role in the "prevention of mother to child transmission" (PMTCT). In general, the course of HIV-infection is more severe in children and leads to death more quickly than in adults. In developing countries, 50% of the infected children die within the first two years of life, only a few survive beyond five years of age. In babyhood, there is an extremely high risk of developing AIDS-defining syndromes, like HIV-encephalopathy, pneumocystis-pneumonia or HIV-hepatopathy. For this reason, antiviral therapy should be given to all children below the age of one. In older children, the risk of AIDS and AIDS mortality correlate well with CD_4-values. Children should be given adequate therapy. Furthermore, consideration should be given to their whole social surroundings (caring persons, kindergarten, school, etc.).

Prevention of HIV-Infection and AIDS

The most important factors preventing HIV-infection are an informed population and the acceptance of safer sex (condom use).

Unfortunately, some years ago, in Africa, the Catholic Church claimed that condoms were not effective in the prevention of AIDS. The growth of such mistrust in the population makes information campaigns less effective. As promiscuous behavior amongst teenagers increases, sexual education, including information about sexually transmitted diseases, becomes a must for this age group.

In an effort to educate people in developing countries, companies of actors travel from one village to another performing show pieces about the AIDS problem.

In the case of a proved HIV-infection (positive HIV-test), a strengthening of the immune system should be striven for in order to delay the course of the disease. A healthy way of life with balanced diet, sufficient sleep and renunciation of smoking and drug consumption can help to achieve this aim.

To avoid the spread of HIV-infection, an easily available HIV-test which gives a quick result is necessary.

Postexposition prophylaxis (► postexposition prophylaxis (PEP) in HIV-infection) may be indicated in some situations. For example, inadvertent contact with contagious material (following a needle stick injury or some other kind of professional exposure) or the positive HIV-status of a partner does not becomes clear until after sexual intercourse has taken place.

Conclusion

HIV-infection, which is primarily transmitted by unprotected sexual intercourse, after a latency phase of several years leads to a deficiency of the immune system, which is called AIDS (acquired-immune-deficiency-syndrome). AIDS has become a disease with worldwide significance and far-reaching consequences for society. In developing countries, a great number of children suffer from the disease, either directly or indirectly by the loss of one or both parents. AIDS cannot be cured, a vaccination is not available, but the inevitable deadly course of the disease can be delayed by antiviral therapy. Information campaigns, the avoidance of unprotected sexual intercourse (without use of condoms) and the HIV-status of partners are of decisive significance in the fight against AIDS.

Cross-References

- ► AIDS-Defining Symptoms
- ► CD_4
- ► Condom
- ► Fusion Inhibitors
- ► HIV-Test
- ► Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTI)
- ► Nucleoside and Nucleotide Reverse Transcriptase Inhibitors (NRTIs)
- ► Postexposition Prophylaxis (PEP) in HIV-Infection
- ► Protease-Inhibitors (PI)
- ► Sexually Transmitted Diseases
- ► Virus Load

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http://www.unicef.org/aids/

HIV-Test

Synonyms

Detection of HIV-Antibodies

Definition

HIV-test detects antibodies against the HI-virus. At first, a HIV search-test (HIV-ELISA-test) is carried out. In the case of a positive result, a second test follows for confirmation (Western blot method or immunoblot). According to the WHO, a person is assumed to be HIV-positive when antibodies against two different viral proteins can be detected. In further tests more detailed information of the virus' stems is revealed, and – after the onset of a therapy – testing of resistances is performed. Directly after the infection with the HI-virus, during the building antibodies phase, the test still shows a negative result. About 12 weeks after infection the detection of antibodies can assumed up be reliable. In newborns maternal IgG-antibodies are present, which leads to falsely positive test results. Due to this, in newborn children, a direct detection of the virus itself (e. g. PCR-test) is performed.

HMO

Definition

A Health Maintenance Organization (HMO) is a type of health care plan that provides a full range of healthcare services to its members. It offers prepaid, comprehensive health coverage for both hospital and physician

services. An HMO contracts with healthcare providers, e. g. physicians, hospitals, and other health professionals. Members are required to use participating providers for all health services. Members are enrolled for a specified period of time.

Hole

► Landfill

Holistic Medicine

Synonyms

Complementary medicine; Traditional medicine; Alternative medicine

Definition

Holistic medicine represents an approach to medical treatment based on the theory that living creatures and the non-living environment function together as a single integrated whole. The holistic approach to medicine insists on the study not only of individual disease but also of the response of people to their disease – physically, psychologically, and socially. A treatment plan must meet the unique needs of each individual, and all aspects of an illness are taken into account, such as the effects of the illness on personal relations, the family, work, and the patient's emotional well being. Holistic treatment prefers to encourage the patient's own capacity for self-healing, rather than having recourse to surgical or drug remedies, and emphasizes education and self-care, including proper diet and exercise.

Cross-References

► Alternative Medicine
► Complementary Medicine
► Traditional Medicine

Home Care

► Community Care

Home- and Community-Based Services

Definition

Home and community-based services are ► health services provided in a patient's place of residence or in a non-institutional setting located in the immediate community. They may include home health care, adult day care, consultative-specialist health care, medical equipment services, or other interventions.

Homogeneity Analyses: "Fixed Effect" Model

Definition

Homogeneity analyses: "Fixed effect" model is a method of meta-analysis (and general statistical modeling) which estimates an overall single effect for an intervention. Variation of study estimates is assumed to be due to random (sampling) error within studies. This model assume that the exposure effect is constant across studies and that variation from one study to the next is due solely to within-study random variation. Fixed-effects models may allow the outcome to depend on several fixed effects, corresponding to several variables that characterize the studies. This method of meta-analysis ignores between study variability, and may overestimate the precision of the treatment effect if there is significant unexplained heterogeneity between the studies.

Homogeneity Analyses: "Random Effect Models"

Definition

Homogeneity analyses: "Random effect models" is a method of meta-analysis (and general statistical modeling) which estimates the effect of an intervention, assuming that variation in the meta-analysis is a combination of random sampling error within studies and variation between studies. Random effect models are more conservative than fixed effect models, giving estimates with wider ► confidence intervals. This method takes into account the possibility that other factors may modify treatment effects, and assumes that the studies

included in the review are a random sample taken from the distribution of the possible treatment effects. If random-effect models are used, then the rationale for model selection should be given, and estimates of among-study variation should be reported.

Hookworm Infection

► Infection with Ancylostoma Duodenale

Hormone Replacement Therapy (HRT)

Definition

Hormone replacement therapy refers to the substitution with the female hormone estrogen alone (in a woman with no uterus) or estrogen and progesterone (in a woman with an intact uterus to prevent overgrowth of endometrial lining and consequently endometrial cancer) in the peri- and postmenopause to prevent signs and symptoms of the declining female hormone production in the ovaries. HRT is effective for menopausal symptoms as well as for the prevention of ► osteoporosis and hip fractures due to bone mass declines in the ► menopause. Because of the major adverse effects (increased risk of invasive breast cancer, cardiovascular diseases, stroke, phlebothrombosis) benefits and risk of HRT have to be weighed carefully and individually.

Hospice

► Palliative Medicine and Hospice Care
► "A Safe Place to Suffer"

Hospice Care

Synonyms

Palliation at home; Long term-care facility

Definition

Hospice and palliative care have a similar philosophy, namely the alleviation of symptoms (e. g. severe pain) for patients with end stage disease. But they represent differing aspects of the aim of 'a safe place to suffer.' Furthermore, their locations of treatment often vary. Hospice care is defined as 'a program that provides palliative care and attends to the emotional and spiritual needs of terminally ill patients at an inpatient facility or in the patient's home' (http://cancerweb.ncl.ac.uk/cgi-bin/omd?query=hospice&action=Search+OMD). Hospice care is most frequently provided in the patient's home, in long term care facilities or residential institutions.

Cross-References

► Palliative Care

Hospice Care in Children

► Paediatric Palliative Care

Hospice Chaplains

Synonyms

Geriatric chaplain

Definition

Hospice chaplains work in hospitals, seminaries or with volunteer organizations, which provide spiritual care for geriatric and terminally ill patients. They visit homes and retirement centers, often with the cooperation and assistance of voluntary helpers. The hospice chaplains, along with their team, provide a welcome relief from isolation and routine for most patients. Their visits mostly occur at weekly intervals on a one-on-one conversational basis which guarantees personal and intimate contacts that often lead to durable friendships.

Hospital-Acquired Infections

► Nosocomial Infections

Hospital Care

► Inpatient Care

Hospital Epidemiology

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Synonyms

Infection control

Definition

Hospital epidemiology and infection control have been synonyms for many years, and both refer to the discipline concerned with preventing the spread of infections within the healthcare setting. However, both of these terms have grown in terms of definition and function. *Infection control* refers to policies and procedures used to reduce or minimize the occurrence of hospital infections (► hand hygiene, cleaning/► disinfection/► sterilization, vaccination, ► surveillance, ► outbreak investigation, etc.). *Hospital epidemiology* is the use of scientific methodology to measure the necessity and effect of preventive strategies for hospital infection control.

Basic Characteristics

The fundamental roles of hospital epidemiology are to identify risks, understand risks, and eliminate or minimize the risks of hospital infections.

Hospital infection (HI), also called *hospital-acquired* or *nosocomial infection,* is an infection that originates or occurs in a hospital or other healthcare facility. The term "nosocomial" comes from two Greek words: "nosus" meaning "disease", and "komeion" meaning "to take care of".

The ► Centers for Disease Control and Prevention (CDC) has developed a set of definitions for surveillance of HI (Garner et al. 1988). The definitions combine specific clinical findings with results of laboratory and other tests. According to these definitions, a HI is an infection not present on admission, but acquired during a stay in hospital, that manifests itself either during hospitalization or in the period following a hospital stay. The majority of HIs become evident 48 hours or more following admission. HIs include occupational infections that healthcare workers acquire while performing their duties within a healthcare setting. All HIs can be classified as occurring in one of 13 sites. The most common types of HIs are ► surgical site infections, ► urinary infections, ► pneumonia, and ► bloodstream infections.

Epidemiology

Hospital infections occur worldwide and affect both developing and developed countries. Approximately 5%–10% of all hospitalized patients in developed countries acquire a clinically significant HI per year; the ► mortality rate attributable is about 10% (WHO 2002). The ► incidence rate for developing countries can be higher than 25%. HIs increase patients' morbidity and mortality, length of hospital stay, and treatment costs. HIs have occurred for as long as hospitals have existed. Reasons why nosocomial infections will be common in the future include the advancing age of patients admitted to healthcare settings; greater prevalence of chronic underlying diseases among admitted patients; increased use of aggressive medical and therapeutic interventions, including implanted foreign bodies and organ transplantations; growing numbers of immunocompromised patients; and transmission of ► antibiotic-resistant bacteria.

Etiology

Many different pathogens may cause HI. The infecting organisms vary among different patient populations, different healthcare settings and facilities, and different countries (Ducel et al. 2002). The most common nosocomial pathogens are bacteria, viruses, fungi, and parasites. These microorganisms may already be present in the patient's body or may come from the environment, contaminated hospital equipment, healthcare workers, or other patients.

Reservoirs

Reservoirs of HI may be animate (healthcare workers, patients' own endogenous flora, visitors) or inanimate in the environment, including equipment and medications.

Host

Exposure of a susceptible host to infecting agents is influenced by intrinsic factors (age at infection, birth

weight, sex, nutritional status, comorbid conditions and diseases, immunosuppression, immunization status, and psychological state of the host) and extrinsic factors (invasive medical or surgical procedures, medical devices, duration of antimicrobial therapy and hospitalization, and exposure to hospital personnel) (Mayhall 2004).

Environment

Environmental factors include a) physical factors such as building features, ventilation, water; b) biologic factors such as vectors; and c) social factors (socioeconomic status, sexual behavior, potable water, food preparation, and adequate waste disposal).

Mode of Transmission

Pathogens that cause HIs can be acquired in several ways.

a) *Endogenous infections*: bacteria present in the normal flora may cause infections due to transmission to sites outside their natural habitat.
b) *Exogenous infections*: bacteria can be transmitted through ► contact (direct or indirect); ► droplets or air; contaminated food, water or medications; or by arthropods or other insects. Contact transmission is the most important and the most common mode of transmission. Vector-borne transmission of infectious agents is of less significance in developed countries.

Risk Factors

All patients admitted to hospital are at some risk of acquiring a HI. The most vulnerable are neonates (especially premature babies), very old people, people with compromised nutritional or immune status, and those with comorbid conditions (such as diabetes). Other risk factors include a prolonged hospital stay, use of indwelling ► catheters, inadequate hand hygiene, and prevalence of antibiotic-resistant bacteria from the overuse of antibiotics.

Prevention

In the early 1970s, The CDC initiated the Study on the Efficacy of Nosocomial Infection Control Project (SENIC) to examine the ► effectiveness of HI surveillance and control programs. This project showed that approximately 32% of HIs are preventable if infection surveillance and control programs include four components: 1) appropriate emphases on surveillance activities and vigorous control efforts; 2) at least one full-time infection-control practitioner per 250 beds; 3) a trained hospital epidemiologist; and 4) feedback of wound infection rates to practicing surgeons (for surgical site infections) (Haley et al. 1980).

Although the components needed for prevention vary for the different types of HI, a variety of steps can be taken to prevent nosocomial infections, and include the following key components (Ducel et al. 2002):

- Adopting an infection control program which includes strict quality control of procedures known to lead to infection, and a surveillance program to track infection rates,
- Limiting transmission of pathogens through correct and frequent handwashing and glove use, aseptic practices, sterilization, disinfection, ► isolation strategies, and laundry,
- Limiting the risk of endogenous infections by minimizing invasive procedures and promoting cautious use of antibiotic medication,
- Protecting patients with appropriate antibioprophylaxis and vaccination,
- Prevention of infections in staff members,
- Continuing staff education.

Epidemiologic Methods Applied to Hospital Infections

Classic methods in epidemiology (► epidemiology, aims and scopes) are used to study HI. *Descriptive epidemiology* provides helpful tools to describe the distribution and frequency of HI, particularly in relation to persons (age, sex, race, marital status, personal habits, occupation, socioeconomic status, medical or surgical procedure or therapy, device use, underlying disease, or other exposure), time (duration of stay in hospital, pre- and post epidemic periods, seasonal variation, secular trends), and place (geographic occurrence of the HI or outbreak, medical or surgical ward of acquisition of infections). Information on each of these characteristics allows the formulation of a hypothesis about the source, reservoir, or the mode of transmission of a HI. In particular, descriptive data analysis may be performed in the early phase of the investigation of clusters of HI. ► Analytical studies are designed to test

hypotheses. Two types of analytical studies can be used: ► cohort studies and ► case-control studies. Examples of cohort studies include identification of risk factors for HI and risk factors for postoperative complications, and handwashing methods. A ► retrospective (historical) cohort study is widely used in the investigation of an outbreak of HI. Experimental epidemiology mainly consists of ► randomized clinical trials in hospital epidemiology. Examples are the following: prevention of catheter-related bloodstream infections, prevention of surgical site infections, prevention of ventilator-associated pneumonia, control of transmission of multiresistant microorganisms, etc.

Cross-References

► Antibiotic-Resistant Bacteria
► Bloodstream Infections
► Case Control Studies
► Catheter
► Centers for Disease Control and Prevention (CDC)
► Cohort Studies
► Contact
► Disinfection
► Droplet
► Effectiveness
► Epidemiology
► Hand Hygiene
► Incidence Rate
► Isolation in Public Health
► Mortality Rate
► Observational Studies
► Outbreak Investigation
► Pneumonia
► Public Health Surveillance
► Randomized Clinical Trials
► Sterilization
► Surgical Site Infections
► Urinary Infections

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Hospital Information System

Definition

A hospital information system is an ► information system for processing ► data, information and knowledge in hospital activities, i. e. on the secondary and tertiary health care levels. These electronic systems include electronic patient databases; applications for data access, retrieval, presentation, and distribution from several units (physicians' notes, nurses' notes, laboratory and other diagnostic tests, medications, etc); and communication technologies enabling simultaneous use by several users and transfer of information for several purposes: research, education, teleconsulting, etc.

Hospitals

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Definition

Hospitals are licensed establishments providing mainly inpatient healthcare, i. e. diagnosing, treating and housing the sick and injured, and managing childbirth. Outpatients, i. e. patients who do not stay in the hospital after treatment, can receive examination, ► emergency care or other services not provided by doctors outside the hospital. Hospital health care delivery may be on a public (government-owned) or private (non-profit or profit making) basis. Hospitals are either providing necessary health care for all types of diseases or specialized in some medical areas (e. g. children's hospitals, mental hospitals). The hospital sector is in most countries strongly regulated by government law. Scope and

quality of inpatient health care services depend on the resources spent in the hospital as well as on the qualifications of the hospital staff and therefore may vary significantly from one country to another.

Basic Characteristics

History

The term 'hospital' comes originally from 'hospitium' meaning a place for guests. During Roman times, its meaning has extended to 'needing shelter'. Throughout the middle ages, hospitals were charitable institutions for the needy, aged, infirm, or young and hospitals were mostly dependent on the church. In the 16th century hospitals took on their modern meaning as institutions where sick or injured people are given medical or surgical care. In Europe, in the late 17th century, large facilities for the sick and poor were created, and, especially in France, hospitals have since been well established. During the 18th century there was a rising need for hospitals due to the increase in the urban population in larger industrializing towns, and hospitals became more and more independent from the church. But there was little that could be done in a hospital that could not be as well done in a home. Only with the progress of medicine and surgery has the hospital flourished. Toward the end of the 19th century, hospital care was revolutionized by the discovery of anesthesia, improvements in sanitation, establishment of hospital nursing schools, and other advances. After the World Wars, hospitals broadened the scope of their activities, becoming important centers not only for health care services but also for medical education, nurse training, medical research, and the provision of patient convalescence and social support. The development of ambulance services, transporting sick and injured people, made the modern hospital also the focus of emergency care. In conclusion, hospitals have changed from places providing care solely for the sick and poor to being the center of the medical world, occupying an important place in society from birth until death.

Types and Organization of Modern Hospitals

Today, inpatient hospital health care is delivered either by general hospitals or by specialized hospitals, for example, mental health and substance abuse hospitals or other specialty hospitals such as specialized heart disease hospitals.

General hospitals are licensed establishments which provide surgical and non-surgical diagnostic and medical treatment for inpatients, using specialized facilities and equipment for all types of diseases. Hospitals also may provide outpatient care such as examination, laboratory services, diagnostic X-ray services or emergency services which are not provided by outpatient doctors' offices. In some countries, a minimum number of beds is a required condition for registration as a hospital. Hospitals can be run by the government on a national, regional or community level (e. g. general acute hospitals, army and police hospitals, prison hospitals), by private non-profit organizations (e. g. the Red Cross) and by universities (teaching hospitals). Teaching hospitals, in addition to providing care, train health care providers, perform research and provide high level services such as organ transplantation.

Specialized hospitals, such as mental health and substance abuse hospitals, provide the whole spectrum of inpatient services needed for mentally ill people or people suffering from substance abuse disorders requiring typically longer lengths of stay. Services comprise general psychological, psychiatric and nutritional care along with other social services.

Specialty hospitals are licensed establishments for the care of patients with specific types of diseases or medical conditions. For example, specialized emergency centers, hospitals for tropical diseases, orthopedic hospitals, sanatoriums for rehabilitation or disease prevention. These hospitals may also provide outpatient services, laboratory and operating room services.

Hospital staff in modern hospitals are required in significant numbers to provide the whole spectrum of hospital services. Large hospitals may employ between 2000 and 3000 people which makes the management of a hospital a very complex task. The main groups of employees in a hospital are as follows:

- Clinical staff: Physicians or doctors responsible for the diagnosis, treatment and prevention of diseases and surgeons, specializing in performing surgery.
- Nurses performing diagnostic skills (e. g. history taking), therapeutic management (e. g. coordinating

consultations and referrals), and promoting health activities in collaboration with the patient.
- Laboratory staff and pharmacists.
- Administrative staff dealing with finance and accounting, salaries, supply, storage, staff recruitment and training, building maintenance, catering, laundry, etc.

Funding and Payment Systems

According to the health care system and regulatory framework in place, hospitals may be run by the government or independent non-profit organizations with public funding through taxes or social insurances (e. g. in most European countries). Or, hospitals may be privately run with a clear for–profit motive (e. g. in the United States).

Regardless of who owns the hospitals, the methods of financing have changed significantly during the two past two decades all over the industrialized world. There has been a clear shift from open-ended retrospective funding of inpatient health care towards funding based on ► prospective budgets or ► per-case payments. The change in financing methods of hospitals is due to the persisting need for ► cost containment as endlessly rising hospital expenditures are confronted with limited public and private financial resources. Budgets in general are based on historical spending and do not typically incorporate incentives to spend less than the fixed budget. Even annually revised activity-related budgets make it difficult to realize cost containment. Therefore, more and more hospital owners changed the financing method of hospitals towards per-case payments based on purchasing packages, i. e. contractual agreements between purchaser and provider, or on ► diagnosis related groups (DRGs).

Organizational and Structural Changes, Future Challenges

There are four main factors that influence the organizational and structural changes in hospital health care provision:

1. Evolution of disease and treatment
   Many large hospitals reflect the scientific, economic and social situation of the time when they were built, i. e. the early 20th century. Distinctive operative units divided into medical disciplines deliver services according to their own independent procedures. Changes in the presentation of diseases, for example the increasing advent of chronic diseases, have led to a growth in multidisciplinary treatment based on the idea of a health care chain. These scientific and technological changes in disease management (► disease management programs) require a redesign of most hospital structures as rigid and hierarchically organized disciplines do not favor the cooperation of interdisciplinary care-teams.
2. Health policies and payment systems
   The regulatory framework resulting from health policy changes as well as from changes in payment systems influence the investment and delivery of care in hospitals. Payment systems may, for example, privilege investments in hospital equipment but not in the maintenance of hospital buildings. ► Per-case payments based on DRGs may lead to higher admission rates or extensive equipment use not directly related to the health gain but to the higher reimbursement rate.
3. Progress in medical technology
   Advances in health technology, such as diagnostic imaging, intravascular ultrasound and minimal invasive surgery, have led to a considerable reduction in the average length of stay of a patient. This has led to an overall reduction in the number of hospital beds and a higher turnover in patients.
4. Improving quality programs
   Hospitals need to improve their quality of services in many aspects (► health care quality). There is a lack of coordination between services, often an inappropriate use of resources with respect to the quality delivered and scarce maintenance of building and equipment as well as a lack of information among hospital staff on costs and outcome. Improvement in the quality programs necessitates changes in the organization and management of hospitals. The current trend is to consider hospitals as industrial companies which must be organized, managed and evaluated. In this sense, management functions and clinical activities have to be provided with the shared common goal of health care quality. Many initiatives aiming to improve health care quality have been started: for example the introduction of ► clinical guidelines, continuing medical education, disease management programs and standards for health technology assessment.

The continuous development of medical knowledge and treatment practices together with the financial pressure of cost-containment and the rising expectations in terms of quality of care will inevitably lead to further changes in the organization and management of hospitals. The future challenges are two-fold:

1. to change the functional interaction between the levels of care, incorporating the idea of a health care chain to provide effective and integrated health care to the patients, and
2. to change the reporting measures in order to make the effectiveness of health services transparent with regard to patients' health quality.

Cross-References

- ► Activity-Based Bugdets
- ► Clinical Guideline
- ► Cost Containment
- ► Diagnosis Related Groups (DRGs)
- ► Disease Management Programs
- ► Emergency Care
- ► Health Care Quality
- ► Per-case Payment
- ► Prospective Budgets

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Host

Definition

The host is the human or animal to which an agent acquires entry and in which it multiplies. The reaction of the host to infection is variable, resulting in an unapparent or clinical, mild or severe infection.

House Dust Mites

Synonyms

HDM; Dust mites; Domestic mites

Definition

House dust mites (HDM) are small arthropods approximately 0.3 mm in length. The biological family includes 47 species in 17 genera but those most frequently detected in human dwellings are *Dermatophagoides pteronyssinus*, *D. farina*, *Blomia tropicalis* and *Euroglyphus maynei*. The optimal air temperature for dust mite growth is between 18 and 27°C. Their major food source is skin scales and organic debris, but they are almost entirely dependent on ambient humidity for moisture. Feces, in the form of small airborne particles, have great allergenic potential due to protein residues, and inhalation of fecal particles is the main way of exposure. High levels of domestic mites and their allergens are usually observed inside homes in hot and wet climatic zones of the world but have now been found even in northern parts of Europe and North America, where cold and dry climates predominate. The highest mite densities are found in bedrooms and living rooms because these indoor spaces usually have large areas covered by textile materials. The most important adverse health effects due to biological indoor air contamination are asthma (primarily in children), atopic dermatitis, eczema, urticaria, allergic rhinitis, and conjunctivitis. Asthma is strongly associated with sensiti-

zation to indoor allergens, and among them HDM allergens are thought to be a major cause. Indoor relative humidity is the key factor that determines survival and development of house dust mites. For this reason, the most effective recommendations for reducing the HDM population and accumulation of allergens are maintaining relative air humidity below 50%, and encasing mattresses with a special mite-impermeable membranous material. Other recommended measures are improving ventilation, intense and frequent vacuum cleaning, reducing the total textile area in indoor spaces, and even removal of carpets and other floor coverings from the homes (especially from bedrooms) of those who suffer allergies to house dust mites.

Housing

► Urban Environments

HRQL

► Quality of Life

HTA, Aspects of

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Definition

Health Technology Assessment (HTA) is carried out by a multidisciplinary group because it requires wider expertise than any individual or single disciplinary group could be expected to have. While conducting a HTA, medical, methodological, ethical, social, legal, and economic aspects have to be considered, discussed and judged prior to formulation of the recommendations.

Basic Characteristics

Compared to assessing published medical evidence, the methods for assessing the ethical, legal, and social aspects of health technology by HTA are relatively undeveloped. One reason for this might be that integrating ethical inquiry into HTA is methodologically difficult. However, policy makers can only make well-founded decisions on the basis of HTA reports dealing with all of the aspects mentioned below.

Methodological Aspects

The core mission of HTA methodology is to promote the identification, development, and use of appropriate research methods so that health and social care can be built on the best possible evidence base. Consequently, the main purpose of HTA is to determine the available ► scientific evidence, including ► patient safety and risks, ► efficacy, and ► effectiveness.
Methodological aspects are discussed in detail under ► HTA methodology.

Economic Aspects

Because costs and efficiency have made technology prominent in health care policy-making, HTA has become much more focused on (and limited to) economic aspects of health technology, whereas general technology assessment lays greater emphasis on the societal context of technology, or the interactions between technology and society. Consequently, in HTA, different methods are seen as valid and viable. For example, HTA is much more dominated by quantitative (► quantitative research), comparative research than general ► technology assessment, where ► qualitative research is more often regarded as appropriate.

Ethical Aspects

Moral aspects have been on the HTA agenda since HTA itself was first used in Western societies in the early 1970s. The growing importance of biotechnology in medicine since then has added to an increasing awareness of ethical aspects. With relatively new issues like ► genetic testing, ethical questions have entered the agenda, going beyond the traditional clinical considerations. These ethical questions concern the possible impacts on society, and challenge our concept of health and disease as well as our understanding of human dignity, thus introducing a new quality into debates on health care and medicine. Regarding moral aspects, HTA has not matured as a comprehensive approach to evaluating health technology. Instead,

HTA has become much more focused on (and limited to) economic aspects of health technology, often with the consequence of insufficient consideration of ethical aspects of the new technology before a recommendation is made. Although there is no validated method for assessing values or ethics (in healthcare), at least three categories of ethical questions can be distinguished in HTA (Reuzel et al. 2004a):

- Issues related to essential concepts and definitions
- Issues related to the technology, which in health care focus on diagnosis, prevention, and therapy
- Issues related to resource allocation

Social Aspects

There is a need for ethical inquiry in HTA from the perspective that policy-making never appears to be based exclusively on economic (► cost effectiveness) data. Health technologies may have social and ethical consequences that influence policy-making and therefore need to be addressed in HTA. Typically, an ethical inquiry is carried out as an addition to conventional HTA, by including ► patient preferences or ► patient orientation of the procedure assessed in decision modeling, or by ► quality-of-life studies or discussions on equity and distributive justice (Reuzel et al. 2004a).

Legal Aspects

The structure of the legal systems in each particular country is determined by the basic structures of the medical and health care systems themselves. The difference between national health care systems, where the state determines the rules for accepted medical methods and products, and social insurance systems, which are more or less self-governing bodies, has to be observed within the framework of public legal regulations. Another important aspect relates to the local scope of decisions. In some countries, decisions based on HTA reports have effects at a national level, in other systems, only at a regional level. One problem is that the legal concepts for dealing with HTA recommendations, which leave considerable scope for interpretation, are relatively undetermined. Furthermore, the lack of consensus on the criteria and procedures of decision-making in HTA concerning health sciences as well as practice constitute unsatisfactory empirical facts, as well as a normative challenge.

A legal constitution of HTA has to guarantee the coherence of regulations in the different fields of law related to HTA (e. g. pharmaceutical law, law of medicinal products, statutory health insurance law) and the harmonization of their effects in the process of application (Francke 2006).

Cross-References

► Consumer Safety
► Cost-Effectiveness
► Effectiveness
► Efficacy
► Genetic Testing
► HTA, Methodology
► Patient Orientation
► Patient Preferences
► Qualitative Research
► Quality-of-Life Studies
► Quantitative Research
► Scientific Evidence
► Technology Assessment

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HTA, Context of

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Definition

Health Technology Assessment (HTA) has been compared to a bridge between the world of research and the world of decision-making. This bridge is intended to

allow the transfer of knowledge produced in scientific research to the decision-making process. A commonly accepted definition for the context of HTA does not exist because the context of HTA has to take a lot of different aspects into consideration. Besides the published evidence, for example, methodological, social, ethical, and legal circumstances have to be judged prior to giving a recommendation via a HTA report.

Basic Characteristics

Technology Assessment and Health Technology Assessment

► Technology assessment has been described as a comprehensive form of ► policy research that examines short- and long-term social consequences of the application of technology. Developing and/or using (health) technologies is based on value judgments, meaning that social, cultural, ethical, and legal factors are intertwined with the place of (health) technologies in society (Oortwijn et al. 2004). There is no sharp distinction between the terms technology assessment (TA) and health technology assessment with regard to the content because general TA tools can be and are applied to health technologies. Conducting HTAs does not begin and end with the HTA itself, but it is ideally embedded in a course of activities: first, the classification of pending problems; second, the prioritization of topics; third, conducting the research or assessment; fourth, appraisal of the recommendation; and last, its implementation.

Unfortunately, in many countries, the role of TA and HTA in the preparation of decision making and later implementation of these decisions is not well defined.

Perception of HTA

HTA exists alongside policy decisions and is often insufficiently recognized by politicians and health care managers. It is crucial to explain the context of a HTA report clearly, so that readers can better assess whether the report is relevant to their own problems. The context-embedded approach of HTA is a key advantage of these assessments, because ► evidence-based medicine is mainly focused on ► randomized controlled (clinical) trials, with questionable transferability of the results into policy decisions. In order to give an evidence-based solution to the problems addressed in the policy question, the researchers have to define the policy question in terms of safety, ► efficacy, ► effectiveness, and psychological, social, ethical, organizational, professional, and economic aspects of HTA (► HTA, aspects of). These questions determine how the rest of the assessment will be conducted, the aspects that will be evaluated and those that will not, as well as the profundity of the research regarding each of the aspects mentioned.

In each country, the adoption and use of health technology is influenced by many factors, including the perception and experience of health and disease, cultural responses to technology, the nature of the medical profession in the particular country, industrial information and promotion, and the financial and regulatory system.

Cross-References

► Decision-Making Process
► Effectiveness
► Efficacy
► Evidence Based Medicine
► HTA, Aspects of
► Policy Research
► Randomized Clinical Trials
► Technology Assessment

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Oortwijn W, Reuzel R, Decker M (2004) Introduction. Poiesis Prax 2:97–101

HTA, Databases

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Definition

Sources for assessing studies to consider within a health technology assessment (HTA) report are mainly literature databases like Medline, EMBASE, Current Contents, etc. For assessing HTA reports themselves, specialized *HTA databases* exist. Normally, these databases are full-text databases (► databases, full text).

Basic Characteristics

Because many organizations throughout the world assess healthcare technology with different focuses, there is an evident need to cooperate and share information from different cultures. The most important medium for sharing such information are HTA databases. The most important of these databases are:

The Cochrane Library

The major product of the ► Cochrane collaboration is the Cochrane Database of Systematic Reviews. The Cochrane Library is published four times a year and is available on CD-ROM and the Internet. Each issue contains all existing reviews plus an increasingly wider range of new and updated reviews. It is published and distributed by Wiley InterScience and is also distributed by a number of other distribution partners. The Cochrane Library is a single source of reliable evidence about the effects of health care. Cochrane reviews are based on the best available information about healthcare interventions. They explore the evidence for and against the effectiveness and appropriateness of treatments (medications, surgery, education, etc.) in specific circumstances. The reviews are mostly prepared by health care professionals who volunteer to work in one of the many ► Cochrane review groups, with editorial teams overseeing the preparation and maintenance of the reviews, as well as applying the rigorous quality standards for which Cochrane Reviews have become known. The activities of the Collaboration are directed by an elected Steering Group and are supported by staff in Cochrane Entities (Centers, Review Groups, Methods Groups, Fields/Networks) around the world.
The following Databases are included in The Cochrane Library:

- The ► Cochrane Database of Systematic Reviews
- The ► Database of Abstracts of Reviewsof Effects (DARE)
- The ► Cochrane Central Register of Controlled Trials (CCTR or CENTRAL)
- The ► Cochrane Database of Methodology Reviews (CDMR)
- The ► NHS Economic Evaluation Database(NHS EED)
- The Health Technology Assessment Database
- The ► Cochrane Database of Methodology Reviews (CDMR)

Databases of the Centre for Dissemination and Reviews (CRD)

The ► centre for reviews and dissemination (CRD) of the National Health Service (NHS) in the United Kingdom was established in January 1994, and aims to provide research-based information about the effects of interventions used in health and social care. It offers three databases: DARE, NHS EED and the HTA database.

Database of Abstract of Reviews of Effects (DARE)

The CRD created this database for reviews and dissemination in 1994. Potential reviews are identified by hand searching key medical journals, regular searching of bibliographic databases, and by scanning gray literature and selected websites. The database includes reviews of health and social care topics. It contains summaries of systematic reviews, which provide a critical commentary on the quality of the review.
Different kinds of records (structured and provisional abstracts, Cochrane Reviews published in journals, Cochrane "flag" reviews) are added to DARE at the end of every month.

NHS Economic Evaluation Database (NHS EED)

Databases like MEDLINE and EMBASE as well as magazines (which are hand searched) and working papers of specialized working groups and ► HTA institutions are the sources of the NHS EED. The database contains bibliographical information and appraisals of economic evaluations in which costs, outcomes of treatment, and care alternatives in health care are compared. Experts in the NHS write appraisals that give information about different aspects of the original study, like study population or study design. Study types that are investigated include economic studies, cost-benefit analyzes, cost-utility analyzes, cost-effectiveness analyzes, cost-minimization analyzes, and cost-consequence analyzes, as well as ► systematic reviews of economic studies.

International Health Technology Assessment (IHTA) Database

The ► IHTA database contains information on HTAs and is produced in collaboration with the ► INAHTA Secretariat, based at SBU, Sweden.

The database contains records of ongoing projects being conducted by members of INAHTA, as well as publications reporting completed technology assessments carried out by INAHTA members and other HTA organizations. The abstracts in the database are descriptive rather than analytical and do not form critical appraisals of the reports (i. e. the reports have not been evaluated by reviewers from the Centre for Reviews and Dissemination).

Many different types of research are included in the HTA database. As well as systematic reviews, the database contains ongoing and completed research based on trials, questionnaires, and economic evaluations. Where possible, the research type is stated in the title or abstract. In some cases there is an overlap between the DARE database (systematic reviews) and the NHS EED database (economic evaluations).

Database of the International Network for Agencies for HTA (INAHTA)

This database was developed in cooperation with the international network of public HTA agencies (International Network of Agencies for Health Technology Assessment, INAHTA) and contains information on the current HTA projects and published HTA reports of INAHTA members. Information includes evaluation of medical procedures and technologies in health care, and is available as various kinds of documents, such as HTA reports, studies, survey results, economic appraisals, and systematic reviews.

DAHTA Databases

The ► DAHTA database contains HTA reports and projects provided by the German Agency for Health Technology Assessment ► DIMDI (DAHTA@DIMDI). In addition, other institutions like the Federal Physicians' Chamber (Bundesaerztekammer) and the National Association of SHI-Accredited Physicians (KBV) use the database to publish their HTA projects. Current international HTA reports are continuously included, with German abstracts of international HTA reports added by the DAHTA database staff. The database contains studies concerning medical evaluation and cost-efficiency of drugs, therapies, and surgical procedures, as well as studies supporting management and organization systems of health services.

Cross-References

- ► Centre for Reviews and Dissemination (CRD)
- ► Cochrane Central Register of Controlled Trials (CCTR or CENTRAL)
- ► Cochrane Collaboration
- ► Cochrane Database of Methodology Reviews (CDMR)
- ► Cochrane Database of Systematic Reviews
- ► Cochrane Review Groups
- ► DAHTA
- ► Database of Abstracts of Reviewsof Effects (DARE)
- ► Databases, Full-Text
- ► DIMDI
- ► HTA, Institutions
- ► IHTA
- ► INAHTA
- ► NHS Economic Evaluation Database(NHS EED)
- ► Systematic Reviews

References

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Database of Abstracts of Reviews of Effects (DARE): http://www.york.ac.uk/inst/crd/crddatabases.htm#DARE

Database of the International Network for Agencies for HTA (INAHTA): http://www.inahta.org/inahta_web/index.asp

Health Technology Assessment (HTA) Database: http://www.york.ac.uk/inst/crd/crddatabases.htm#HTA

NHS Economic Evaluation Database (NHS EED): http://www.york.ac.uk/inst/crd/crddatabases.htm#NHSEED

Ongoing Reviews Database: http://www.york.ac.uk/inst/crd/crddatabases.htm#ongoing

HTA-Europe Project

Definition

The HTA-Europe project was developed from a recommendation in the ► EUR-ASSESS project. In the HTA-Europe project, partners examined several preventive technologies in their respective countries, showing that prevention and screening procedures often seem to be prematurely adopted, without adequate assessment. The HTA-Europe project, as well as the EUR-ASSESS project, was aimed at improving coordination of HTA activities in the European Union. The main conclusion of this report was that it would be beneficial for the healthcare system of European Union countries for the European Commission to assist the establishment

of a coordinating mechanism for HTA at the European level.

HTA, Impact of

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Definition

The Impact of Health Technology Assessment (HTA) is the sum of the broad and diverse effects stemming from a ► HTA program's activities.

Basic Characteristics

Like other health technologies, HTA should be judged on the quality and size of its effects. In recent years, this aspect has received increased attention. HTA has begun to become an important part of health care policy-making in many countries.

The goal of HTA is change; it should help to demonstrate problems and potentials in disease control. Topics chosen for assessment must be important to society and information should be presented in a form that is useful to the intended audience. Technology assessment identifies the groups that will be affected by the proposed technology and evaluates the impact of the technology on each party.

Furthermore, together with the dissemination and implementation of HTA recommendations, the evaluation of their effects is an important factor of HTA.

However, the response of policy-makers shows that many of them do not see the importance of assessment. There is more interest in controlling costs then in steering health care. That means that even when good assessments are done, their impact on policy-making has been modest. Some factors cause some HTA to have little impact; a prerequisite for the assessment to be effective is that it must be comprehended and accepted by those who use it. Furthermore, content and preparation of the assessment must be properly formulated for it to be interesting.

The effects of HTAs are linked with the assessing institution and the motivation of its commissioner (Gerhardus et al. 2006).

For best use of HTAs, exact formulation of the impact aims is needed. As a first step in assessing a technology, the people concerned should be defined. These people have to formulate the aims and disseminate the recommendations of the HTA. Effects of HTA should then be evaluated, and if defined impact aims are not reached, a discussion should follow.

Impact Measures

Measuring the impact of HTA is very difficult due to the multiplicity of other influences on the policy-making process and the difficulty of measuring the longer-term impacts of HTA (Hailey 1990). Studies of HTA impact should include at least three types of evaluation: context, implementation, and outcome (Peterson 1998). Context evaluation identifies environmental enablers and barriers that influence the impact of HTA products; implementation evaluation identifies critical processes and activities in producing HTA products that influence impact; and outcome evaluation identifies the extent to which the HTA products influence healthcare policy and decision-makers. Normally, products that present evidence with clear conclusions tend to have a greater influence on decision making than those that do not.

A widely used measuring method in HTA impact analyses is direct ► client interviews. This could be "product specific", semi-structured interviews with requesters and purchasers. However, even if a HTA does not result in instrumental utilization, this is not "no impact".

In conclusion, the current impact of HTA on policy decisions has not been clearly and systematically examined, and programs on this topic are not implemented, even in the countries that have been using HTA intensively for decades.

Cross-References

► Client Interviews
► HTA Program

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HTA, Institutions

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Definition

Many organizations throughout the world assess healthcare technology. In the past twenty years, there has been a rapid expansion of the international Health Technology Assessment (HTA) community, which today includes 42 public organizations in 21 countries, and numerous private and nonprofit organizations (Mulcahy and Walley 2005). Many efforts have been made to share experiences at an international level, like establishing the International Society for Technology Assessment in Health Care. This network stretches from North and Latin America to Europe, Australia, and New Zealand.

Basic Characteristics

HTA in Europe

HTA is currently managed actively in 16 European countries, the old Member States of the European Union, plus Switzerland. These countries have established different national programs, tailored to their own healthcare environment. The leaders are Sweden and Denmark, who began to assess health technologies in the early 1970s. A number of the States of Europe are deeply involved in HTA, including Spain, The Netherlands, France, Sweden, and the United Kingdom (UK). Other countries have more recently begun to support and use HTA, including Austria, Belgium, and Germany. In the UK, a centralized National Health Service (NHS) program was established in 1993. The UK program is noted for its strong relationship with the UK appraisal organization, the National Institute for Health and Clinical Excellence (NICE), which uses HTA as the basis for its guidance for the NHS. Some of the national agencies are outlined below:

United Kingdom: National Coordinating Center for Health Technology Assessment (► NCCHTA)

France: National Agency for Accreditation and Evaluation in Health (► ANAES, formerly ANDEM)

Spain: National Spanish Agency for Health Technology Assessment

Netherlands: The Netherlands Organization for Applied Scientific Research (► TNO)

Sweden: Swedish Council on Health Technology Assessment in Health Care (► SBU)

ISTAHC and INAHTA

The foundation of the International Society for Technology Assessment in Health Care (ISTAHC) in 1985 in Copenhagen had the aim of beginning and promoting international communication and co-operation. The ISTAHC now has more than 1000 members all over the world and is today called HTAi (www.htai.org). In 1993, the International Network of Agencies for Health Technology Assessment (► INAHTA) was created. This Network presently has more than 20 members, mostly from European Countries (www.inahta.org), and provides access to a database of HTA reports and ongoing assessments. Networks across Europe are necessary to avoid the gaps and duplication in coverage of HTA that have become increasingly apparent. One project was inaugurated in 1994, and called the ► EUR-ASSESS project. Part of the aim of this project was to establish a network of those working in HTA in Europe. The need for improved co-ordination of HTA in Europe led to a subsequent project, the ► HTA-europe project, which was organized by the TNO Prevention and Health Institute in the Netherlands. A third project, the European Collaboration for Health Technology Assessment (► ECHTA), explored the possibilities of institutionalizing HTA at a European level. One of the most prominent outputs of this project was the formulation of best practice guidelines for undertaking and reporting HTAs (Busse et al. 2002). The most recent project, which was officially started in January 2006, is the European Network for Health Technology Assessment project (► EUnetHTA project).

HTA in North America and the United States

The first formal activity in HTA was the Health Program of the US Office of Technology Assessment, established in 1975. In the United States, the Agency for Healthcare Research and Quality (► AHRQ), Veteran's Administration Technology Assessment Program, and a multitude of private healthcare organizations and companies each conduct their own HTA. This

often leads to a fragmented, duplicative and highly variable quality of HTA in that country (Perry and Thamer 1999).

Cross-References

- ► AHRQ
- ► ANAES
- ► ECHTA
- ► Effectiveness
- ► EUnetHTA Project
- ► EUR-ASSESS
- ► HTA-Europe Project
- ► INAHTA
- ► NCCHTA
- ► SBU
- ► TNO

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HTA, Methodology

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Definition

Methods for assessing health technology assessment (HTA) reports have to use best scientific practices and procedures. Despite policy goals, HTA must always be firmly rooted in science and the scientific method. The process must be carried out with integrity and results must be valid.

Basic Characteristics

Research Question

For best use of HTAs, exact formulation of the impact aims is needed. In a first step of technology assessment, the people concerned should be defined. HTA promotes the decision-making of different kinds of associations, such as ► healthcare providers (e. g. ► HMOs), ► statutory health insurance providers, purchasers, patients, or policy-makers. These people have to formulate the aims and disseminate the recommendations of the HTA. A policy question, formulated by decision makers, is then transformed into the correct ► research question.

Realization of HTA

The core mission of HTA methodology is to promote the identification, development, and use of appropriate research methods so that health and social care can be built on the best possible evidence base.
Consequently, the main purpose of HTA is to determine the available ► scientific evidence, including ► patient safety and risks, efficacy, and effectiveness. HTA researchers retrieve, analyze and synthesize the available evidence. A ► systematic literature review is one important element in determining the efficacy and safety of a technology. Evaluations are based on different research categories: randomized clinical trials (► primary research), systematic reviews (► secondary research), and ► treatment guidelines or synthesis of evidence (► tertiary research). The group of studies that are considered to be the best available to answer the questions posed is called the "body of evidence". It is characterized by a combination of factors, such as the hierarchy of research design, the directness of the evidence, and the quality of execution. The strength of evidence is also influenced by other factors. In judgment of the evidence, the number of studies, size of effects, and homogeneity or consistency of results across all included studies should not be neglected. In the completed HTA report, literature is presented in tables or by ► meta-analysis. The literature used is also prepared in a useful manner for decision-makers. The challenge is to judge evidence from different studies. Research is contracted to academic researchers and investigation centers; multidisciplinary teams in scientific institutions are advantageous for the realization of HTA reports.

HTA Reports

The product of the HTA process is the assessment report or HTA report. The methodology must be exactly and transparently documented. The way researchers make their judgments about the strength of the evidence that will underlie their recommendations should be pub-

lished in a distinct manner. A review has identified 40 different systems used to rate the strength of evidence; it therefore seems intelligible to explain the used system in the report (West et al. 2002). Rating of the strength of evidence causes a grading of recommendation. There are also several systems to standardize the process of grading the strength of recommendation. Using letters is a typical way to describe the strength of recommendations (West et al. 2002).

The HTA program of each country normally publishes its generated HTA reports. In addition, they should be included in the ► cochrane library and other worldwide ► HTA databases.

Quality of HTA Reports

There are high claims for the quality of HTA reports and their recommendations. However, different problems may be present in these reports, especially the risk of unsystemic literature research and valuation. To prevent these risks, many countries have established HTA methodology programs. The most well-known of these programs is the ► UK HTA methodology programme, coordinated by the National Coordinating Centre for Research Methodology (NCCRM) in Birmingham.

Outcomes of HTA Reports

The outcome of a HTA report is normally a determination of the appropriateness of payments for services in health care systems.

Generally, HTA is intended to assist decision-makers in adopting rational decisions concerning three principal issues related to new health technologies (Pan American Health Organization 1998):

- approval for market access,
- approval for their inclusion in services financed with public funds, and, if appropriate,
- proper dissemination within the health system.

With regard to existing health technologies, HTA is intended to orient rational decision-making with respect to three principal issues:

- withdrawal of financing for technologies proven to be inefficient,
- generalization of new applications of technologies that already exist in the public health system, and
- withdrawal of technology (or suppression of one of its indications) from the market (e. g. a drug such as thalidomide, which was withdrawn because of its side effects).

Cross-References

► Cochrane Library
► Consumer Safety
► Healthcare Providers
► Health Maintenance Organizations (HMOs) (U.S.)
► HMO
► HTA, Databases
► Meta-Analysis
► Primary Research
► Research Question
► Scientific Evidence
► Secondary Research
► Statutory Health Insurance
► Systematic Literature Review
► Tertiary Guidelines
► Treatment Guidelines
► UK HTA Methodology Programme

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HTA Program

Definition

A HTA program is any governmental or private effort or structured program to promote HTA or several aspects of HTA in specific regions or worldwide. HTA programs include, for example, ► EUnetHTA and ► EUR-ASSESS.

Human Activity Integrating Risk Identification

► Risk Management

Human Capital Approach

Definition

The human capital approach is a method to estimate the ► indirect cost due to productivity loss. The value of the human capital is approximated by the value of an average individual's future earning. The entire period of absence from work due to illness is considered and valued by the achievable gross income. Over a long-time perspective, the human capital approach estimates higher indirect costs compared with the friction cost method.

Human Engineering

► Ergonomics

Human Factors

Definition

The terms ► ergonomics and human factors engineering are often used interchangeably. Initially ergonomics was more physiology and comfort oriented, while human factors engineering was more oriented to physical sciences. Ergonomics has traditionally focused on how work affects people, while the emphasis in human factors (engineering) is on the cognitive and perceptual factors leading to the design of systems that reduce the operation errors. "Human factors" is an umbrella term for several areas of research that include human performance, technology, design, and human-computer interaction.

Cross-References

► Ergonomics

Human Factors Engineering

► Ergonomics

Human Health Aspects of Disasters

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Synonyms

Disaster impacts on human health

Definition

Relations of disasters to human health

Basic Characteristics

Even if disasters (► hazards, natural; ► hazards, technological) are not commonly perceived as public health events, they clearly lead to deterioration of human health over vast disaster-affected areas.

Direct health-related impacts of disasters are: deaths, injuries, ► communicable diseases, and mental health problems. Health effects may result from unsafe or unhealthy conditions (lack of safe drinking water, spoiled food supplies) following the disastrous event. Indirect effects arise through social and economic disruption, infrastructure damage, and population displacement.

There are short-term health effects, such as injuries and stress associated with the disaster, and long-term health consequences, such as malnutrition, psychiatric disorders, depression, anxiety, alcohol or substance abuse, functional disabilities, and domestic (children and spouse) violence.

Life-threatening situations may arise, e. g. in elderly and lonely people with severe health problems who were trapped and abandoned in their homes.

Population displacement following disasters leads to increases in communicable diseases resulting from crowding, lack of clean water and shelter, and poor nutritional status. Due to the very large number of people that may be affected, malnutrition and famine triggered by disastrous events may be among the most important consequences of natural disasters, and the resultant deaths may outnumber the direct fatalities.

In areas hit by a disaster with no evacuation warning, the hardship can be even more intense. Families spend nights huddled together in places they believe to be relatively "safer", which may not necessarily be safer in reality.

Disasters test the integrity of water supply systems and increase the risk of outbreaks of water-borne diseases. The impacts of disasters are particularly severe in less developed areas featuring environmental degradation and in communities lacking basic public infrastructure. Populations with poor sanitation infrastructure and a high burden of infectious disease often experience increased rates of diarrheal diseases after disaster events. Post-disaster increases in cholera and typhoid have been reported. After some disasters in less developed countries, such as the 2004 tsunami, there was a higher risk of disease outbreaks caused by polluted drinking water and a higher risk of communicable diseases.

There is much evidence of the impact of disasters on mental health. There may be considerable prolonged impairment by common mental disorders (anxiety and depression). Depending on how much suffering, death, and destruction they witness during a catastrophe, some survivors suffer from ► post-traumatic stress disorder (PTSD), the same disorder that afflicts combat veterans. PTSD is psychological damage that develops after a traumatic experience and is almost always a delayed reaction to the trauma. Symptoms might appear soon after the event, but they might not surface until several months or even years have passed.

Among the symptoms of PTSD are a vanished sense of security, fear of another disaster, hypervigilance, fatigue, poor concentration, somatic problems (sleep disturbances, appetite difficulties, etc.), feeling nervous or tense, depression, and anxiety/stress. These are the expected reactions of a person who is suffering PTSD and facing the fact that their life circumstances have changed dramatically. Dealing with death or injury of family members, loss of a home, radically transformed neighborhoods, joblessness, the inconvenience of extensive repairs, etc., can cause a state of long-lasting shock and the rational thinking processes of those affected may not function normally.

Those who experience disasters are prone to severe stress. Children suffer ongoing nightmares. They often cling to their parents and refuse to go to school. Moreover, children who do attend school after a traumatic disaster – even those who have typically behaved well – may develop serious discipline problems.

Health impacts of disasters also fall under the categories of ► medically unexplained physical symptoms (MUPS) and ► functional somatic syndromes (FSS).

Many survivors of a disaster have two life-changing experiences. First, when they endure the trauma itself (e. g., seeing floodwaters sweep away their homes, watching gale-force winds destroy their neighborhoods, or witnessing the sudden death of their family members, friends, or neighbors), which might undermine (even permanently and irreparably) their sense of security and their ability to cope with life's problems. Second, they may face ongoing disorder in their day-to-day lives.

Cross-References

► Communicable Diseases
► Hazards, Natural
► Hazards, Technological

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Human Immunodeficiency Virus (HIV) / Acquired Immune Deficiency Syndrome (AIDS)

Synonyms

Human t-cell leukemia virus type III; Human t-cell lymphotrophic virus type III; Lymphadenopathy-associated virus

Definition

HIV is a retrovirus that is the cause of AIDS. The retrovirus gradually weakens the immune system by attacking Helper T cells. Two types of HIV exist: HIV-1 and HIV-2. HIV-1 is common worldwide, while HIV-2 is only common in West Africa. HIV is spread from person to person through blood, breast milk or other bodily fluids. This may occur through blood transfusions, hypodermic needles, or sexual contact. Mothers who have HIV while they are pregnant may spread the infection to their unborn child. An individual who has the retrovirus in their blood is called "HIV-positive". AIDS occurs when the HIV infection has severely damaged the immune system, a process that may take years. An HIV-positive person may or may not develop AIDS; however they can infect other people with the HIV virus.

Cross-References

► HIV-Infection and AIDS

Human Interaction

Synonyms

Interpersonal; Organizational interactions or relations

Definition

Human relations are defined as network of many different relations between humans either interpersonal or organizational relations.

Cross-References

► Human Relations

Humanitarian Agency

Synonyms

Aid agency; Aid organization; Relief organization

Definition

An aid agency is an organization dedicated to the support of people, animals, and nature in time of need. There are organizations within government as well as between governments as multilateral donors and as private voluntary organizations. Often humanitarian agencies are engaged in a special theme, such as the United Nations Children's Fund that supports children.

Humanitarian Aid

► Humanitarian Relief Operations

Humanitarian Relief Operations

Synonyms

Supporting measures; Humanitarian aid

Definition

Humanitarian relief operations assist victims of war, civil conflict, and natural disasters with material or logistical help. Particularly, it provides food and medicine. Aid is delivered by governmental agencies, non-governmental organizations, and humanitarian agencies to save lives, alleviate suffering, and maintain human dignity.

Humanity

Definition

It is based on humanitarian principles that ones duty is to strive to promote the welfare of mankind.

Human Relations

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Synonyms

Social relations; Human interaction

Definition

Most commonly, the term 'human relations' refers to any interaction between individuals or groups. Over the last century a number of disciplines, particularly in the social science and humanities areas, have contributed to understanding and analyzing the complexity and character of human relations and how they operate at the individual, group and societal levels.

Basic Characteristics

Describing 'Human Relations'

People take part in many forms of 'human relations' every day, whether it is in one-to-one situations, with family, at social gatherings, as part of a group or work organization, at a political level and through interaction with their ecological environment (McMichael 2001). Human relations are an important focus across a range of disciplines within the social science field including psychology, sociology, politics, anthropology and economics. Although concepts and interpretation may vary between disciplines, it is generally recognized that a defining feature of human relations is its focus on interaction and communication. The term 'human relations' is often used interchangeably with that of '► social relations' having connotations of association, co-operation, mutual dependence and belonging.

Individual and Group Human Relations

Social relations form the basis of concepts such as social organization and social structure and a central focus for human relations has been the examination and analysis of relationships between individuals and groups of people. At the individual level, areas such as interpersonal behavior focusing on socialization and personality development, attitude formation and perception of self are all seen as being important aspects of human relations (Cooper and Denner 1998). Equally, the culture of families, which may be viewed as a social system with their own particular group processes, or whole communities, which also have their own structures and organization, and may be influenced by, for example, changing patterns in employment opportunities or altered patterns of demography in urban and rural communities, reflect a group level focus in the broader context of human relations.

At the societal level, analysis of unequal positions such as by class, ethnicity, and sex/gender may have a substantial political impact and assist in understanding the structural cause of such inequalities, offer potential solutions for resolving the problems and assist in the formulation of public policy, at national and international levels (Macionis 2005). For example, the recognition of indigenous rights in many countries has led to the establishment of health initiatives involving community workers, health professionals and educators, all committed to addressing health inequalities amongst indigenous peoples and facilitated information sharing between indigenous peoples (Ellison-Loschmann and Pearce 2006).

Human Relations Theory

The social world of adults is primarily patterned around work activity and it is within this area that human relations theory first developed as part of a wider focus on organizational structure and management in the work place. These trends were enhanced with increasing industrialization and the era of mass production and assembly-line work which became more common from the mid 19th century onwards. Human relations theory was developed in the early 1920s based on the work of Elton Mayo who examined the effect of social relations, motivation, and employee satisfaction on factory productivity (Rotemberg 1994). Other schools were established, for example, the 'Neo-Human Relations School' introduced in the 1950s, by Abraham Maslow and Frederick Herzberg which focused primarily on the psychological needs of workers (Adair 1990). The human relations approach stressed that organizational structure did not necessarily take precedence over social and emotional aspects associated with being part of a team or

feelings of job security and recognition, which were all important aspects in employee motivation.

Human Relations and Health

Human relations are constantly changing, adjusting and shifting to fit the context and environment in which they occur and all of these changes have health effects (Pearce and McMichael 2001). The *agricultural revolution* probably began in the "fertile crescent" of Southwest Asia and involved major environmental changes from the development of organized agriculture and the establishment of cities. These changes were initially reflected in a smaller human body size and, apparently, shorter life expectancy, but were followed by increased population growth. The *industrial revolution*, and the associated period of imperialism and colonialism, commenced in Great Britain in the late 18th century, and initially involved widespread social, environmental and economic disruption and life expectancy initially fell before beginning to increase again in the second half of the nineteenth century. We are currently undergoing the *information technology revolution* and an associated process of economic, social and cultural globalization. In industrialized countries, this is likely to prolong life expectancy for some, but not all, sections of the population. In developing countries, the benefits have been even more mixed, while the countries of Eastern Europe are experiencing the largest sudden drop in life expectancy that has been observed in peacetime in recorded human history with a major rise in alcoholism and "forgotten" diseases such as tuberculosis and cholera (Men et al. 2005).

These changes particularly affect those who may be most vulnerable in a society due to, for example, poverty, ethnicity, illness or political beliefs. It has been recognized that indigenous peoples may be exposed to an unequal burden of risk as a result of historical injustices which are perpetuated by present day government policies. For example, the major restructuring of health and social services in New Zealand during the 1980s resulted in a widening gap in inequality as evidenced in key determinants of health such as income, employment, and housing between Māori, the indigenous people, and non-Māori (Ellison-Loschmann and Pearce 2006). More recently, a number of studies have shown associations between (lack of) social networks, income inequality and (lack of) social capital and poor health in populations, although it is not clear that the observed associations are causal (Pearce and Davey Smith 2003).

Conclusions

Human relations draws on an eclectic range of ideas from across a number of disciplines, notably sociology and psychology, in order to understand the behavior and interaction between individuals, groups, organizations and societies and the ways in which these varying levels of interaction may be used to promote and influence change both locally and globally. Developments in the way people thought about work in the early 20th century helped shift the focus from a purely productivity driven environment towards one recognizing the 'human' elements of organizations albeit focused primarily on maintaining profitability. The constantly changing nature of human relations has various health effects at the individual, societal and global levels. Negative health effects are more likely to be experienced by vulnerable populations and a recent focus in a number of countries has been on addressing inequalities amongst indigenous peoples across a range of areas such as culture, education, health, and social and economic development.

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Human Rights

Synonyms

Natural rights

Definition

Human rights are minimum standards of legal, civil, and political freedoms which guarantee dignity to people. To treat people as if they were not human beings is a violation of their rights. A basis for a universal and internationally protected code of human rights was established by the adoption and proclamation of the United Nations' Universal Declaration of Human Rights in 1948. The UN and other organizations work for the protection and promotion of human rights of all people around the world.

Human Rights and Public Health

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Synonyms

Basic rights; Natural rights

Definition

The human rights are the elementary, natural and inalienable rights attributed to all on account of their existence as human beings. Human rights represent the institutionalized legal, philosophical, political and moral considerations about the inherent dignity and equal rights all human beings are entitled to and which the state has to respect and protect. The human rights aim to provide individuals with the basic personal, political and property rights as well as the basic freedoms. They ensure the individual's protection from state actions ("defense rights") and provide them with claims vis-à-vis the state to ensure their participation in the society's political, cultural and social life.

Basic Characteristics

History of Human Rights

The institutionalization of human rights derives from the idea that all human beings are naturally provided with basic rights that are inalienable and must be respected by the state and its institutions. The history of human rights goes back to ancient times. As one of the earliest legal documents, the Magna Carta of England (synonym: Magna Carta Libertatum) from the year 1215 acclaimed the existence of certain personal rights vis-à-vis the kingdom's powers. Among others, the Magna Carta proclaimed the individual rights that no "free man" should become arrested, deprived of his properties, attacked or imprisoned without a "lawful judgment". The Magna Carta must be regarded as one of the fundamental documents for the institution of the contemporary constitutional state.

Later, in the 17th century, several acts were created that implemented human rights into national law, such as the Habeas Corpus Act (1679) in England, protecting persons from unlawful detentions and, particularly, the English Bill of Rights (1689). Therein, positive personal rights were codified, which becomes obvious when reviewing the longer original title of the bill "*An Act Declaring the Rights and Liberties of the Subject and Settling the Succession of the Crown*". The English Bill of Rights has influenced future national constitutional documents as well as the Universal Declaration of Human Rights proclaimed by the United Nations in 1948. For example, "The Virginia Declaration of Rights" (1776) and the "United States Bill of Rights" (1791) were declared. Article 1 of the Virginia Declaration of Rights stated "*[T]hat all men are by nature equally free and independent, and have certain inherent rights, of which, when they enter into a state of society, they cannot, by any compact, deprive or divest their posterity; namely, the enjoyment of life and liberty, with the means of acquiring and possessing property, and pursuing and obtaining happiness and safety.*"

In 1789, France proclaimed the "Declaration of Human and Citizen Rights" ("*Déclaration des Droits de l'Homme et du Citoyen*") which similarly included positive human rights. After World War II, the United Nations then took on and furthered the acceptance of human rights. On 10 December 1948, the General Assembly of the United Nations adopted and proclaimed the "Universal Declaration of Human Rights" (United Nations 1948). A profound explication of single human rights would go far beyond the scope of this essay. However, in order to provide a full picture of the protected rights and because of its fundamental world-

wide importance, the "Universal Declaration of Human Rights" is reproduced in verbatim:

"Universal Declaration of Human Rights

Adopted and proclaimed by General Assembly resolution 217 A (III) of 10 December 1948

On December 10, 1948 the General Assembly of the United Nations adopted and proclaimed the Universal Declaration of Human Rights the full text of which appears in the following pages. Following this historic act the Assembly called upon all Member countries to publicize the text of the Declaration and "to cause it to be disseminated, displayed, read and expounded principally in schools and other educational institutions, without distinction based on the political status of countries or territories."

PREAMBLE

Whereas recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world,

Whereas disregard and contempt for human rights have resulted in barbarous acts which have outraged the conscience of mankind, and the advent of a world in which human beings shall enjoy freedom of speech and belief and freedom from fear and want has been proclaimed as the highest aspiration of the common people,

Whereas it is essential, if man is not to be compelled to have recourse, as a last resort, to rebellion against tyranny and oppression, that human rights should be protected by the rule of law,

Whereas it is essential to promote the development of friendly relations between nations,

Whereas the peoples of the United Nations have in the Charter reaffirmed their faith in fundamental human rights, in the dignity and worth of the human person and in the equal rights of men and women and have determined to promote social progress and better standards of life in larger freedom,

Whereas Member States have pledged themselves to achieve, in co-operation with the United Nations, the promotion of universal respect for and observance of human rights and fundamental freedoms,

Whereas a common understanding of these rights and freedoms is of the greatest importance for the full realization of this pledge,

***Now, Therefore THE GENERAL ASSEMBLY proclaims THIS UNIVERSAL DECLARATION OF HUMAN RIGHTS** as a common standard of achievement for all peoples and all nations, to the end that every individual and every organ of society, keeping this Declaration constantly in mind, shall strive by teaching and education to promote respect for these rights and freedoms and by progressive measures, national and international, to secure their universal and effective recognition and observance, both among the peoples of Member States themselves and among the peoples of territories under their jurisdiction.*

Article 1.

All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood.

Article 2.

Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. Furthermore, no distinction shall be made on the basis of the political, jurisdictional or international status of the country or territory to which a person belongs, whether it be independent, trust, non-self-governing or under any other limitation of sovereignty.

Article 3.

Everyone has the right to life, liberty and security of person.

Article 4.

No one shall be held in slavery or servitude; slavery and the slave trade shall be prohibited in all their forms.

Article 5.

No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment.

Article 6.

Everyone has the right to recognition everywhere as a person before the law.

Article 7.

All are equal before the law and are entitled without any discrimination to equal protection of the law. All are entitled to equal protection against any discrimination in violation of this Declaration and against any incitement to such discrimination.

Article 8.

Everyone has the right to an effective remedy by the competent national tribunals for acts violating the fun-

damental rights granted him by the constitution or by law.

Article 9.

No one shall be subjected to arbitrary arrest, detention or exile.

Article 10.

Everyone is entitled in full equality to a fair and public hearing by an independent and impartial tribunal, in the determination of his rights and obligations and of any criminal charge against him.

Article 11.

(1) *Everyone charged with a penal offence has the right to be presumed innocent until proved guilty according to law in a public trial at which he has had all the guarantees necessary for his defence.*

(2) *No one shall be held guilty of any penal offence on account of any act or omission which did not constitute a penal offence, under national or international law, at the time when it was committed. Nor shall a heavier penalty be imposed than the one that was applicable at the time the penal offence was committed.*

Article 12.

No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks.

Article 13.

(1) *Everyone has the right to freedom of movement and residence within the borders of each state.*

(2) *Everyone has the right to leave any country, including his own, and to return to his country.*

Article 14.

(1) *Everyone has the right to seek and to enjoy in other countries asylum from persecution.*

(2) *This right may not be invoked in the case of prosecutions genuinely arising from non-political crimes or from acts contrary to the purposes and principles of the United Nations.*

Article 15.

(1) *Everyone has the right to a nationality.*

(2) *No one shall be arbitrarily deprived of his nationality nor denied the right to change his nationality.*

Article 16.

(1) *Men and women of full age, without any limitation due to race, nationality or religion, have the right to marry and to found a family. They are entitled to equal rights as to marriage, during marriage and at its dissolution.*

(2) *Marriage shall be entered into only with the free and full consent of the intending spouses.*

(3) *The family is the natural and fundamental group unit of society and is entitled to protection by society and the State.*

Article 17.

(1) *Everyone has the right to own property alone as well as in association with others.*

(2) *No one shall be arbitrarily deprived of his property.*

Article 18.

Everyone has the right to freedom of thought, conscience and religion; this right includes freedom to change his religion or belief, and freedom, either alone or in community with others and in public or private, to manifest his religion or belief in teaching, practice, worship and observance.

Article 19.

Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers.

Article 20.

(1) *Everyone has the right to freedom of peaceful assembly and association.*

(2) *No one may be compelled to belong to an association.*

Article 21.

(1) *Everyone has the right to take part in the government of his country, directly or through freely chosen representatives.*

(2) *Everyone has the right of equal access to public service in his country.*

(3) *The will of the people shall be the basis of the authority of government; this will shall be expressed in periodic and genuine elections which shall be by universal and equal suffrage and shall be held by secret vote or by equivalent free voting procedures.*

Article 22.

Everyone, as a member of society, has the right to social security and is entitled to realization, through national effort and international co-operation and in accordance with the organization and resources of each State, of the economic, social and cultural rights indis-

pensable for his dignity and the free development of his personality.

Article 23.

(1) *Everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment.*

(2) *Everyone, without any discrimination, has the right to equal pay for equal work.*

(3) *Everyone who works has the right to just and favourable remuneration ensuring for himself and his family an existence worthy of human dignity, and supplemented, if necessary, by other means of social protection.*

(4) *Everyone has the right to form and to join trade unions for the protection of his interests.*

Article 24.

Everyone has the right to rest and leisure, including reasonable limitation of working hours and periodic holidays with pay.

Article 25.

(1) *Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control.*

(2) *Motherhood and childhood are entitled to special care and assistance. All children, whether born in or out of wedlock, shall enjoy the same social protection.*

Article 26.

(1) *Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit.*

(2) *Education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms. It shall promote understanding, tolerance and friendship among all nations, racial or religious groups, and shall further the activities of the United Nations for the maintenance of peace.*

(3) *Parents have a prior right to choose the kind of education that shall be given to their children.*

Article 27.

(1) *Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.*

(2) *Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.*

Article 28.

Everyone is entitled to a social and international order in which the rights and freedoms set forth in this Declaration can be fully realized.

Article 29.

(1) *Everyone has duties to the community in which alone the free and full development of his personality is possible.*

(2) *In the exercise of his rights and freedoms, everyone shall be subject only to such limitations as are determined by law solely for the purpose of securing due recognition and respect for the rights and freedoms of others and of meeting the just requirements of morality, public order and the general welfare in a democratic society.*

(3) *These rights and freedoms may in no case be exercised contrary to the purposes and principles of the United Nations.*

Article 30.

Nothing in this Declaration may be interpreted as implying for any State, group or person any right to engage in any activity or to perform any act aimed at the destruction of any of the rights and freedoms set forth herein."

This declaration became internationally important and strengthened the basis and international acceptance of human rights even though it is not legally binding to the nations. This movement has led to the conclusion of international agreements on the furtherance of civil, political, cultural, economic and social rights and agreements against racial discrimination. The "Universal Declaration of Human Rights" formed the basis for the European "Convention for the Protection of Human Rights and Fundamental Freedoms" (synonym: "European Convention on Human Rights") in 1950. By virtue of this Convention, the "European Court of Human Rights" was instituted. Both the European Convention on Human Rights and the European Court of Human Rights have contributed significantly to the protection of human rights in Europe. Most national constitutions

worldwide have enacted national laws to include the human rights and values proclaimed in the "Universal Declaration of Human Rights" (Feldman 2006). The "Universal Declaration of Human Rights" is regarded as setting forth "the ethics of public health", as both pursue the same goal, which is "to provide the conditions under which people can flourish" (Annas 1998).

Human Rights and Public Health

With respect to the relation between human rights and public health practice, actions taken by public health departments can impact most of these human rights although some of them are more often affected. For example, isolations invade the individual's right to liberty, freedom of movement and assembly. Surveillance and data collection by public health departments invade the private sphere and the right to privacy, as may overreaching press coverage (*See* Kirchhoff 2005). Human rights with particular relevance in public health practice are the following:

- The right to life, liberty and security;
- The right to a standard of living adequate for health and well-being, including food and medical care;
- The right to social security;
- The right to property and not to be deprived of own property;
- The right to work and free choice of employment;
- The right to just and favorable conditions of work;
- The right to respect privacy and family life;
- The right to be treated equal before the law;
- The right to a fair trial (due process);
- The freedoms of movement and residence;
- The freedom from arbitrary arrest and detention;
- The freedom of expression and of assembly;
- The right to an effective remedy for violations of rights.

Human rights and public health are interwoven in many ways. As described in the essay about the legal basis of public health, the state's powers to conduct public health activities derive from the human rights of the people as members of the population. All individuals' rights to health, safety and life and their corresponding right to protect themselves (self-defense) are delegated to the state and its institutions. Therefore, it is the state's core duty and authorization to protect its people (i. e., the population) from harm to their health, safety and lives. Therefore, the public health service is not an end in itself but is aimed at the protection and promotion of the respective rights of the population. In this sense, the public health service is an instrument of human rights protection. Both act in the same direction and are "concordant in many important ways" (Bernheim et al. 2007) and "synergistic" (Mann 1997; Childress et al. 2003).

The concordance between public health practice and human rights is not disproved by the fact that public health actions may infringe the human rights of persons posing risks to the population. Public health practice has to protect the (rights to) health, safety and life of the population and, in so doing, must take measures against individuals who endanger the population. The elimination of risk by intruding individual rights is the result of prior legal balancing of the endangered human rights of the population and the human rights of the dangerous person. The fact that public health encroaches the rights of the latter in order to protect the rights of the former does not generally cause tension between human rights and public health. In such cases, the human rights of the population and the respective dangerous individual are in conflict and such conflicts must be resolved by legal balancing. In some situations, the public health actions may be inadmissible because the endangered goods of the population do not outweigh the affected individual's rights. In such cases, human rights are limits to public health practice. However, such conflicts do not constitute an antipodal position between human rights and public health.

Public health practice operates with relevance to human rights. The population members' rights to health, safety and life are the fundament, and the respective self-defense rights are the basis and justification for the existence of public health. In public health practice, conflicts regularly arise between the human rights of the protected population and the human rights of individuals who threaten the population's health (*See* also Childress et al. 2007). Such conflicts need legal resolution. This resolution must be grounded in a careful legal balancing of the conflicting rights.

Cross-References

- ► Administrative Law and Public Health
- ► Ethics
- ► Legal Balancing of Conflicting Rights
- ► Legal Basis of Public Health
- ► Public Health Law, Legal Means

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Human T-Cell Leukemia Virus Type III

► Human Immunodeficiency Virus (HIV)/ Acquired Immune Deficiency Syndrome (AIDS)

Human T-Cell Lymphotrophic Virus Type III

► Human Immunodeficiency Virus (HIV)/ Acquired Immune Deficiency Syndrome (AIDS)

Humidity

Synonyms

Moisture

Definition

Humidity is the amount of water vapor in an air sample. There are three different ways to measure humidity: *absolute* humidity, *relative* humidity, and *specific* humidity. Humidity is important in climate change (► climate and microclimate). Water vapor in the air, the humidity, plays an important part in the global climate. Like carbon dioxide, water vapor is a greenhouse gas. Relative humidity is the amount of water vapor actually in the air divided by the amount of water vapor the air can hold. Relative humidity is expressed as a percentage and can be computed in a variety of ways. One way is to divide the actual vapor pressure by the saturation vapor pressure and then multiply by 100 to convert to a percent. A device used to measure humidity is called a psychrometer or hygrometer. The US Environmental Protection Agency recommends keeping relative humidity between 30% and 60%, with below 50% preferred to control dust mites.

Hunter-Gatherers

► Indigenous Health Care Services

Hydatid Disease

► Echinococcosis

Hygiene

Definition

Hygiene is a discipline of social medicine. It refers to practices associated with ensuring good health and cleanliness. In a broader view, in scientific terms, hygiene is the maintenance of health and healthy living. Hygiene ranges from personal hygiene, through domestic, and up to occupational hygiene and public health.

Cross-References

► Public Health

Hygienic Hand Disinfection

Definition

Hygienic hand disinfection is performed to eliminate transient microorganisms from the skin. The hands are

rubbed with 3 ml of an alcoholic disinfectant (pressing twice on the pump dispenser) for at least 30 seconds. During the procedure, one has to bear in mind the nail folds and the area between the fingers. Rings and watches should not be worn. Hygienic hand disinfection should be performed before and after each contact with a patient, before and after contact with drains, urethral or venous catheters, tracheal tubes or other indwelling devices, and after contact with material which is suspected of contamination (blood, secretions, contaminated surfaces or objects). Furthermore, hygienic hand disinfection is necessary before all invasive procedures.

Hyperkinetic Disorder

Synonyms

Attention deficit/hyperactivity syndrome (ADHS); Attention deficit disorder (ADD); Attention deficit/hyperactivity disorder (ADHD); Childhood hyperkinesis

Definition

ADHD is a developmental and behavioral condition that affects children's ability to focus and pay attention. ADHD refers to inattentiveness, over-activity, impulsivity or a combination. Diagnosis of ADHD implies that the symptoms are out of the normal range of the child's age and development and affect family life, social life, and / or education. ADHD always begins in childhood but may also persist through adulthood. The disorder affects 3 to 5 percent of school-aged children.

Hyperkinetic Disorders

► Attention Deficit Hyperactivity Disorder (ADHD)

Hyperpyrexia

► Hyperthermia

Hypertension, Arterial

Synonyms

High blood pressure

Definition

Blood pressure is the force of the blood pushing against the walls of the arteries. Hypertension is defined as either systolic pressure consistently at 140 or higher or a diastolic pressure consistently at 90 or higher. The limits of a normal blood pressure are age-dependent. The higher the pressure over 120/80, the higher the risk of developing cardiovascular complications.

Hyperthermia

Synonyms

Hyperpyrexia; Heat stroke

Definition

Hyperthermia is an acute condition occurring when the body produces or absorbs more heat than it can dissipate. The heat-regulating mechanisms of the body eventually become overwhelmed and unable to effectively deal with the heat, and body temperature climbs uncontrollably. Symptoms include confusion, headaches, and low blood pressure, leading to possible fainting or dizziness. The skin is pale or bluish, and the subject complains of chills and trembling. This serious medical emergency requires immediate medical attention. Treatment includes immediate lowering of body temperature, and re-hydration.

Hypnotics and Sedatives

Synonyms

Tranquilizers; Depressants; Anxiolytics

Definition

Hypnotics and sedatives are central nervous system depressants with the capacity of relieving anxiety and inducing calmness and sleep. Several such drugs can

also induce loss of memory (amnesia), muscle relaxation or have anticonvulsant properties. In the past barbiturates were mainly prescribed as hypnotics and sedatives but their use decreased over the last decades because of a narrow therapeutic range. Today benzodiazepines as well as zolpidem and zopiclone are mainly prescribed.

Hypochondria

Synonyms

Health anxiety; Health phobia

Definition

Hypochondria is an exaggerated, uncorrectable fear that one is suffering from a physical illness even though, objectively, there is only a minor, if any, physical problem. The least variation of body function or feeling is constantly and erroneously interpreted as proof of a severe disease.

Cross-References

► Anxiety Disorders

Hypochondriacal Disorder

Definition

The essential feature of a hypochondriacal disorder is a persistent preoccupation with the possibility of having one or more serious and progressive physical disorders. Patients manifest persistent somatic complaints or a persistent preoccupation with their physical appearance. Normal or commonplace sensations and appearances are often interpreted by patients as abnormal and distressing, and attention is usually focused upon only one or two organs or systems of the body. Marked depression and anxiety are often present, and may justify additional diagnoses.

Hypomania

Definition

According to ICD-10, individuals with hypomania show a persistent mild elevation of mood, increased energy and activity, and usually marked feelings of well-being and both physical and mental efficiency. Increased sociability, talkativeness, over-familiarity, increased sexual energy, and a decreased need for sleep are often present but not to the extent that they lead to severe disruption of work or result in social rejection. Irritability, conceit, and boorish behavior may take the place of the more usual euphoric sociability. The disturbances of mood and behavior are not accompanied by hallucinations or delusions.

Hypothermia

Definition

Hypothermia is a medical condition in which the victim's core body temperature has dropped significantly below normal and normal metabolism begins to be impaired. This begins to occur when the core temperature drops below 35°C. If body temperature falls below 32°C, the condition can become critical and eventually fatal, and body temperatures below 27°C are almost uniformly fatal. Symptoms include ataxia, confusion, cold skin, gray complexion, peripheral cyanosis, shivering, tremor, weakness, and rapid breathing and heart rate, which slow and weaken as temperature decreases, leading to death. Treatment for hypothermia involves re-warming and warm intravenous fluids or "lavage" of the abdominal cavity with warmed fluids in a hospital setting.

Hypothesis Testing

Definition

Part of the statistical decision making process which uses sample data to evaluate the truthfulness of a hypothesis tested in a given population. The process is based on sample data with the aim of determining which of the two exclusion hypotheses (Null and Alternative Hypothesis) is probably true. Decision making regarding whether or not the null hypothesis is rejected is based on the group of observations. The process of statistical decision making regarding whether the results of the research depict only a coincidence or a real effect at the given probability level.