HEALTH PROMOTION AND DISEASE PREVENTION **A Handbook for Teachers, Researchers, Health Professionals and Decision Makers**	
Title	**Cardiovascular Diseases Prevention and Control**
Module: 5.3	**ECTS: 2.0**
Author(s), degrees, institution(s)	**Samuel Sadikario,** MD, PhD, Professor Institute of Heart Diseases, Medical Faculty, Skopje, Macedonia **Doncho Donev,** MD, PhD, Professor Institute of Social Medicine, Institutes, Medical Faculty, Skopje, Macedonia **Lijana Zaletel Kragelj,** MD, PhD, Assistant Professor University of Ljubljana, Faculty of Medicine, Chair of Public Health, Slovenia
Address for Correspondence	**Samuel Sadikario,** MD, PhD, Professor Institute of Heart Diseases, Medical Faculty Vodnjanska 17 1000 Skopje, Macedonia Tel.(W)+389 2 3147147 Tel. (H): +38923177812 E-mail: samis@endocrinology.org.mk
Key words	cardiovascular diseases, health promotion, disease prevention, epidemiology, health belief model
Learning objectives	After completing this course the attendants should be: • acquainted with the dimensions of the overall CVD problem; • acquainted with the epidemiological methods and surveillance of CVD; • capable for creative thinking for new approaches and programmes for CVD prevention and care improvement in their environment; • coordinate market-oriented strategies and activities with the Health For All ideologies; • teaching new highly effective and inexpensive methods i.e.: self-control, self-management, home therapies of chronically ill and difficult patients, teams, volunteers, family, neighbours; • inventing activities and programmes for strengthening intersectorial cooperation and cooperation with the Government; • able to manage activities at PHC level for CVD prevention; • acquainted with the new technologies in CVD: diagnosis, treatments, trends, imaging, invasive, surgery, genetic, molecular epidemiology, self-regulation of risk factors; • envisioning the future: new methods in teaching, information diffusion, mass detection and diagnosis of CVD, decreasing the costs and the mortality, prolonging the life and improving the quality of life.

Abstract	The CVD (heart disease and stroke, atherosclerosis, high blood pressure) today are the cause of the greatest public health pandemic globally in the history of the world ever, with very high morbidity and death rate, and economical and social consequences. CVD are the number one killer and cause more than 50% of all deaths. CVD are a major cause of disability, health and human suffering. Social and economic losses are high and CVD cause 25-30% of all medical expenses. The risk factors for CVD are well known and largely preventable through health education and health promotion. The medical knowledge for effective prevention is available and health promotion programmes for prevention of CVD have a huge public health potential leading to increased productivity among the working age population, to improved functional capacity among elderly, to diminishing health inequalities, to a reduced needs for health and social services, and to an increased quality of life to everybody. The resources needed for CVD prevention and heart health promotion are modest in relation to the huge health service costs to society caused by CVD. There is a marked divergence between the advances in the expensive clinical medicine management and the much lower costs for prevention of the CVD. The output is a condensed informative, educative and action programme encompassing the following aspects of the CVD: epidemiology, social medicine, economics, information, clinical aspects, quantization, "home medicine", research, and the future. There is a significant weakness and under-motivation of the CVD prevention in many countries. The action for CVD prevention should be comprehensive encompassing health education and health promotion activities toward healthy life styles, capacity building and strengthening, monitoring and evaluation of the policy and programme interventions impact, advancing public health policy, and engaging relevant stakeholders and sectors in partnerships in order to reverse the CVD epidemic.
Teaching methods	1. A modular approach: ten modules with appropriate and flexible sub-modules are as follows: • epidemiology of the CVD; • social aspects and economics of the CVD; • financing and other resource finding for the CVD; • elementary clinical aspects; • prevention; • "home medicine" related to the CVD; • future: science, technologies, strategies, optimizations. 2. For the practical action programme, one or more modules could be chosen. It will be performed in individual or small group basis. 3. Accessories: For the purpose of the education, the following facilities will be used: medical and nursing schools, clinical centres, public health schools, hospices, libraries, personal computers, additional written materials, etc. 4. The programme is designed for postgraduate students and professionals in: medicine, public health, health management, health administration, other interested profiles.

Specific recommendations for teachers	1. Interactive modes of teaching are preferable. Students should take part in the teaching. 2. All modern technologies should be applied, but also terrain discussions will be practiced thoroughly. Constructive and heuristic improvisations are welcome. 3. Two groups of attendants should be identified by the basic approach and responsibility: Public health and clinical practice providers.
Assessment of Students	1. Very quick tests will be designed before and after the sessions. 2. Students might design questions as well (desirable). 3. The assessment should give an esteem of general knowledge, special subject knowledge, teaching abilities, propagandistic abilities, creativeness (innovativeness in new methods), practical abilities, enthusiasm, the area of greatest interest and particular abilities. 4. The professor (or a commission) might decide on whether a final examination is needed for individual attendants.

CARDIOVASCULAR DISEASES PREVENTION AND CONTROL

Samuel Sadikario, Doncho Donev, Lijana Zaletel Kragelj

Introduction

The miracle of the 20th century in the medical world has attained few outstanding, and we would say almost-magical effects on modifying the nature of being. Such are the basic solutions of the treatment and the prevention of the infectious diseases, the exponential decrease of children mortality, doubling of the average human life from 40 to 80 years, novel surgeries, the DNA structure and gene manipulation, and inception of life in artificial conditions. However, it opens the door for other life-related problems and complexities to be solved in the future.

There are four imminent plagues in the 21st century:

- Non-communicable diseases
- Weather changes and other natural phenomena
- Poverty and other scarcities
- Wars

The two entities that cause the greatest problems including life threatening and unstoppable rise of the costs are the cardiovascular and the malignant diseases. The first will remain on the top of the list at least in the next few decades. Cardiovascular diseases (CVD) are related to about half of the deaths, 80% of the burden of disease, and 10-30% of the overall health care costs in the world. The main factors for the increase of the frequency of the CVD are the arteriosclerosis, aging, the metabolic syndrome, and the lifestyle.

Aims

There is no a single way of solving the CVD problem. Public health (PH) will certainly not bring the problem to the final solution, but it is a fundamental approach, which is expected to bring it to a considerable reduction. This chapter is a part of an advanced and ambitious course in PH, intending to provide up to date and high quality information, as well as qualification of the students in a very narrow specialized subject. The text is related to the CVD as a leading PH and medical problem, recognized as such from very recently. Because of its enormous consequences, we insist on the urgency of spreading the information related to the CVD to both the expert community and the general population. Therefore, the orientation of this course should meet the following requirements: high quality, inventiveness, information and action.

Historical overview of the epidemiological transition

About a hundred years ago, there has not been such an entity as epidemiology of CVD, or even the more distant public health (PH) of the CVD. The three historical stages of the epidemiological transition as defined by Gaziano and Omran (1) are:

1. Pestilence and famine (before 1900, expected life 35 years);
2. The Receding pandemics (until around 1960, decrease of famine and infections, and increase in rheumatic and ischemic heart diseases, expected life 50 years);
3. The Degenerative and man-made disease (until 1980, CVD, cerebrovascular diseases, malignancies, expected life over 60 years). There are two additional phases appearing in the literature:

4. Delayed degenerative diseases (after 1980, CVD, and cerebrovascular disease, with life expectance over 70 years);
5. The epidemic of obesity and diabetes (after 2000, in the world one billion people are obese, and 200 millions have diabetes).

It is actually after the 1948 period when the notion of the epidemiology of CVD has appeared in the major textbooks and journals, while the PH of CVD appeared very recently as a part of the PH of the non-communicative diseases. Presently, parts of South Asia, South America and Africa are at the phase one, parts of Northern Asia and Europe are at the peak of the third or fourth phase, while Northern America and parts of Europe are in the fourth and fifth phase (1-4).

Modules

The achievement of the highest quality of learning (HQL) implies the following assumptions: information selectivity, efficient information provision, experience integration, and task qualification provision, the most simple approach is the modular system. The future editions of this manual will certainly contain "constant knowledge" (CK) and "variable knowledge" (VK) quantities.

The course is designed of 10 modules.

1. CVD entities and risk factors;
2. epidemiology of the CVD;
3. the social aspects and the economics of the CVD;
4. resource finding, including financing of the CVD prevention;
5. the private sector and the public health (PH) of the CVD;
6. prevention;
7. "home medicine" and the prevention of the CVD;
8. information and health communication;
9. CVD in the rural medicine and in the developing countries;
10. future: science, technologies, strategies, optimization and information.

Altogether, they cover a wide range of the problem, which by the nature of the subject, are inter-connected between them. The student should be able to perform a specific practical task, and may choose one or more modules. According to a wide experience, the best approach is the candidates to prepare a lecture or lectures, using this manual, information research, and supervision. A feedback from a valuable work will provide high quality improvements of the mentioned VK and even the CK. Each module is divided in sub-modules.

CVD entities and risk factors

The Public Health and the clinical aspects of the CVD are related to several entities (listed on table 1), which in general could be divided in two categories: atherosclerotic and non-atherosclerotic diseases (3-5).

Sub-modules

Sub-module A

This sub-module is a list of CVD entities. A brief listing of categories of CVD is given in Table 1.

Table 1. Categories of cardiovascular diseases (CVD).

	Category
1.	Coronary heart disease (CHD) including: myocardial infarction, unstable angina, stable angina, and sudden death syndrome (SDS);
2.	Cerebrovacular disease (CVD or stroke);
3.	Peripheral vascular disease (PVD);
4.	Dissection and major vessel aneurysms;
5.	Diabetic angiopathies;
6.	Hypertensive heart disease;
7.	Heart failure (HF);
8.	Cardiomyopathies;
9.	Rheumatic heart disease;
10.	Congenital heart disease.

Sub-module B

Second sub-module is a list of the risk factors. A brief listing of the risk factors for CVD is given in Table 2 (3-5):

Table 2. The identified risk factors for the CVD.

Modifiable	**Non-modifiable**	**Other**
Diabetes	Heredity	Inflammation (markers)
Hyertension	Age	CRP
Insulin resistance	Previous CVD events	TNF
Obesity	Gender	sICAM
Hyperlipidemia	Ethnicity	IL 6
Smoking		IL 18
Alcohol		Metabolic
Drug addiction		NO (def.production)
Hyper-coagulation		D-Dimer
Stress		Fibrinogen
Physical inactivity		Homocystein
Depression		
High altitude		
Dietary habits:		
salt intake		
water hardness		
processed food		
high thyramine content		
Other co-morbidities		
endocrine disease		
hyper-uricemia		
renal disease		
rheumatic disease		
vasculitis		
connective tissue disease		
trauma		
hyperviscosity syndromes		
Indirect factors		
poverty, culture		
pharmaceuticals		

LEGEND: CRP = C-reactive protein; TNF = tumor necrosing factor, IL interleukin; NO = nitric oxide

The main risk factors are aggregated in the entity of "metabolic syndrome", including smoking, hypertension, diabetes, insulin resistance, obesity, hyperlipidemia and low physical activity. This needs discussions, experience, classifications, practical work with physicians, nurses, patients and media professionals. Introduction of quantifiers (Framingham index, SCORE) in everyday practice and epidemiological studies is mandatory. Lemma: any kind of prevention of the CVD and modification of the outcome of the CVD (disease outputs) depend on the modifications of the risk factors (inputs) (3-5).

Epidemiology

The epidemiology is both "anatomy", "pathology" and "patho-physiology" of the PH. Any strategic, economic, or preventive project should be built up over a previous epidemiological study. In our case, it includes the epidemiology of the CVD and the risk factors. The mortality rates have declined in the developed countries, but in the developing countries, they increased or remained the same. The prevalence and the incidence rates have increased in all countries, which is due to the increased survival, the aging population, and the increase of the frequencies of most of the risk factors (3-6).

The "discovery" of the epidemiology of the CVD is an achievement of the second half of the 20-th century (1,2). It started with the models of the epidemiology of some risk factors, i.e. diabetes, hypertension and rheumatic diseases, and it was recognized as a problem after noting the enormous mortality rates and the increase of the costs. The CVD today pause greater problem than the tuberculosis and the syphilis together in the former centuries. Looking at the history of medicine, until 200 years ago, less than 10% of the population would have died from heart diseases, with the life duration being less than 40 years. They have not even had the "opportunity of becoming old". People would have mostly died either during the birth, or soon after that by infection, or by the consequences of wars. The tasks of the CVD epidemiology are the detection of occurrence, surveillance (trends of changes), natural history studies, etiological hypotheses (risk factors), comparisons (meta-analysis) and prevention programmes contribution. Those are concentrated in three categories of CVD epidemiology as revealed on the table 3 (3-6):

Table 3. Categories of CVD epidemiology.

Category	Description
Descriptive epidemiology	incidence rates, prevalence rates, mortality rates according to entity, age, sex, geographical gradient
Analytic epidemiology	estimating relationships between CVD and risk factors, actuarial analyzing, risk model development, meta-analyses, econometric analyses
Experimental epidemiology	interventions: studies, prevention strategies

The sub-modules

Sub-module A

The first sub-module: an elementary and encyclopaedic review of the basic epidemiological notions which are important for the CVD - mortality rates, prevalence rates, incidence rates, trends, gradients, study design, collection of data, data representation, and some simple mathematical modelling. It is worth noting the peculiarity that very simple mathematical concepts pause rather difficult performances in the practical executions, such are finding

prevalence rates, incidence rates, mortality rates and avoiding biases. Why? The student should be acquainted with as many biases as possible, since they are so massively present in the clinical studies, population research, and the dissertations. This is particularly the case in the developing countries, where public health institutions are either at their inception, or do not exist at all. Very serious research works have been harmed by various biases, which is followed by inevitable financial losses. Even the meta-analyses when non-including data from underdeveloped countries or regions could be considered as "damaged" or biased. There are two possible remedies for those problems:

1. The first level solution is obligatory consultation of an epidemiologist or at least a qualified medical statistician for each CVD study.
2. The second level solution is as we propose: a networking of public health schools (PHSN), which would enable high level of information flow, high level of quality control, real validity of the information, reducing expenditures, and international affirmation of each valid research work from any medical centre.

Sub-module B

The second sub-module: real figures. 50-60% of all deaths in the world are due to CVD (3-6).

1. The coronary heart disease.
   In the US 1.680.000 persons are reported annually with ACS (acute coronary syndrome), 1.5 million/y with myocardial infarction (MI), which is 600/100.000/y. There are 500.000-700.000 deaths/y in the US. In the world there are 12 million deaths from MI per year, and that is 50% of all deaths. One third of the STEMI (ST elevation myocardial infarction) die within the first 24h, and more than half of those deaths are in the pre-hospital phase. In hospital deaths from STEMI are 10%, and another 10% during the first year. The factors to prevent those still high mortality figures include: transportation, and risk factor modifications (hypertension, hyperglycemia, hyperlipidemia, hypercoagulation and smoking). Age: most of the cases are before the age of 45, and more in males until 70. The pre-45 MI incidence is increasing, with the main risk factors being the cocaine use, diabetes, renal disease, hyper-cholesterolemia, and family clustering. The infant death rate from MI is < 0.2 / 100.000/y for one year old or less, and 0.2/100.000/y for 15-24 year old. Age, sex and heredity explain approximately 50% of the deaths. Generally, angina pectoris is more frequent in females, while MI in males. MI frequency and prognosis worsens in the postmenopausal period. Unregulated diabetes increase the death rate by 30%. Each 10 mmHg increase of blood pressure above normal (130/80) double the risk of coronary heart disease.
2. Stroke.
   In the US 500.000 cases per year have the first time stroke. It is estimated to increase to 1 million by the 2050. About four million people (4.3 million in 1990) die from stroke per year in the world. In the US stroke accounts 7.1% of all deaths. The incidence is higher in males, mainly over 65. However, 25% of the cases occur before 65. It is estimated that before the age of 70, 1 in 20 persons will suffer a stroke. A sharp decline of mortality rates were registered between 1972 and 1980, which reflects improved diagnostic criteria and facilities, and the increased awareness. The main risk factors include: age, hypertension, smoking, heart disease (atrial fibrillation, MI), diabetes, hyperlipidemia, and oral contraceptive use (especially in smokers).

The socio-economics of the CVD

If you want to do something for your country, do something for the social medicine. This expresses the importance of the social medicine in modern life. There is a diversity of opinions on whether the socioeconomic status (SES) influence on the outcome of the CVD is a "direct" or "indirect" factor or complex of factors (7-9). It is unanimously accepted that there is a correlation between the SES and both the incidence and the mortality of the CVD.

The "rule of 3's" is as follows: one third of the population does not feel healthy; the poor population feels ill three times more frequently than the wealthy and the educated; the poor are three times more frequent than the wealthy in the developed countries; the three levels of SES consist of: material, behavioural and psychological status.

In-deep evaluation of the SES, including quantification originates from very recent dates with the important works of Kunst, Mackenbach and Regidor (10-12). Inequalities in health care make a very sensitive and painful issue in the developed countries. They are found to influence strongly the incidence and the outcome of CVD. In the next few decades it will be very important to develop further the quantitative instruments for measuring the socioeconomic inequalities in a given society or state.

Lemma: It is more beneficial to engage or educate the local intellectual resources in planning and organizing the social medical and PH programmes in your country, rather than engaging foreign experts. The experiences in the developing countries, and the cost-benefit estimates reveal that in most developing countries, especially the former socialist states, have achieved considerable amount of high education, experience, motivation and infrastructure. Cultural disparities and high costs are frequently the background factors of those "tutoring" approach inappropriateness. The solution is in the more efficient and cost-benefit inter-cultural communications (12), and improved expert communications i.e. the case of PHSN.

The sub-modules

Sub-module A

The parameters of the SES: defining and evaluating. There is considerable level of subjectivity and self-estimation on the quantification of the SES. The SES parameters that have been considered in the studies of the CVD include: the income of the patient, the income of the patient's parents, the education of the patient or the parents, ethnicity, the neighbour context, unemployment, risk factors related to the SES – smoking, alcohol, obesity, diabetes, nutrition, stress, and hypertension (3-5, 10-12).

Sub-module B

There are a variety of mathematical models and calculators of the socioeconomic status of a given population as determined by Kunst, Regidor, Mackenbach, Lorenz etc. (10-12). Those models are useful in the determining of the impact of the social strata, education, poverty, education of the parents, social status of the parents and other related factors, on the incidence and mortality of a chronic disease, in particular the CVD. It has been found that lower social class is more frequently associated with CVD, mortality, and the risk factors such are diabetes, hypertension, stress, smoking, alcohol, and hyperlipidemia.

Resource finding financing of the cvd prevention and public health

As mentioned previously, the direct costs of the treatments of the CVD are from one fourth to one third of all overall health care costs (1-5). In the US the annual expenses for the curative CVD management are near 400 billion dollars. The US costs of diabetes mounted to

130 billion dollars per year. There are no data on the costs of the CVD prevention. Thus, how are we going to make the budgeting, let alone the finance finding of the CVD prevention? Hoping that those needs signify the "transition period" for the overall CVD management (from predominantly "curative" to equally "preventive"), a flexible and innovative complex of interventions has to be undertaken (13-14). It is very important that the pursuers of this module and this professional orientation should have some previous knowledge in medical financing – best to hold a Masters Degree on medical financing, general financing, or economics.

A highly creative approach spectrum is needed to be developed, which should create "symmetry" of seemingly divergent realities – market economy, health provision inequality gap, and rapid development with the non-linear increase of the expenses (13-14).

The sub-modules

Sub-module A

Sub-module A is a review of general financing:

- consulting services (i.e. accounting, tax, management, finance planning, forensic, business valuation, fraud prevention and detection, litigation, and technology consultation),
- banking basics,
- stock marketing basics,
- portofolio models,
- derivative pricing,
- option trading,
- cash management,
- regulatory and tax issues, and
- financial instrument application.

How they function in your country? Although at "encyclopaedic" level, this knowledge should be discussed and performed with the assistance of financial experts (13).

Sub-module B

The content of this sub-module is tackling the meaning of the prevention and the PH financing (14). There are three reasons for medical compulsory insurance of prevention and PH of the CVD:

1. to avoid later treatments and their large bills;
2. optimization of the prevention, and
3. on-time detection.

Compulsory CVD prevention is a direct investment in mortality decrease and lifespan increase. There is an enormous amount of offered insurance packages on the market, as opposed to the vast majority of uninformed individuals (including the most educated), which in a given situation might not meet the best condition of coverage. The increase of the prevention and PH related insurance on the CVD should be at least parallel to the rise of the health care costs, which in the developed countries is 10-15% per year. So, individual instructors for prevention insurance packages are needed. In the US, only 32% of the Hispanics have any health care insurance (including prevention), while among the white population it is 53%, which is bellow the rates in other developed countries (14).

The private sector and the public health of the CVD

There is a tendency of intense growth of the private sector in the developing countries. Although mainly high performance "curative" oriented (15), there is a considerable tendency of preventive orientation of the private institutions. Because of the lack of financial resources at the national levels in those countries, they are being forced to the transition from state-managed medicine to a private medicine. Most of the private practitioners (GP, family doctors, internists, and paediatricians) are very much interested in CVD practice. The CVD investments become very high, consisting of equipment investments, and pharmaceutical expenses which a large portion of the overall health-related expenses. In the developing countries, the private sector is mostly concentrated in the outpatient centres, while in the developed countries a considerable portion of the in-patient institutions are in the private sector (15). It is conceivable that the private sector will grow in the next few decades. It is also a good source of medical education financing (self-financing). Although the ideal mode of practices would be those related to the preventive medicine, there are still very few programmes and activities oriented to private-medicine-based prevention. The most probable reason for that is the curative-medicine-oriented education of the medical doctors and the nurses, as well as the high-level investments required for the CVD practice. However, the cost-benefit complex of the preventive medicine and the high performance private sector is a noticeable opportunity of the recent future (15-16).

The sub-modules

Sub-module A

This sub-module is about advantages and disadvantages of the private sector concerning the CVD. High performance private sector centres have large advantages over low performance centres in the quality of care and the mortality reduction (15). On the other hand, the costs in the high performance private centres are much higher than in the relevant state hospitals. In the developing countries, the private sector has the advantage in the low cost interventions, which might be covered even on out-of-pocket basis. Although they can be adapted for emergency cases, in those countries they are still better managed in the state hospitals. Home therapies are still under the state institution coverage, although there is a high potential for the private sector. The private sector is slow growing and very difficult to develop in very poor and low income countries (i.e. less than 1000 US $ per insurance recipient per year).

Sub-module B

Establishing the predominantly preventive CVD private centre is a challenging paradigm, and a requiring for the strategists. In theory, there are not such narrow-specialized private centres. However, in the practice there are cost benefit units whose incomes are predominantly coming from CVD patients. Regarding the aging population rise and the high frequency of the risk factors, as well as the high frequency of post-event patients, there is a need of such centres – either strictly specialized, or at least 50% engaged with CVD patients. Good examples of specialized centres (both private and state-owned) are the diabetes centres, hypertension clinics, neurological centres (stroke) etc. Prepare a concept of a specialized private CVD prevention clinic.

Sub-module C

This sub-module is about the position of the nurse in CVD prevention, especially in the preventive private sector.

The nurse can be engaged individually or in a team in the preventive CVD programmes on private basis. A very good example is the experience the cases on home preventive care. The specially educated nurses can perform screening, control and education related to the risk factors (i.e. smoking, diabetes, obesity, hyperlipidemia, hypertension, exercising, screening and CVD detection, etc). In rural environments, or quarters with poor people, nursing might be the only cost-approvable or affordable PH providers.

Prevention of the CVD

This is a very difficult subject. Why? The answer to the question why is, because the plethora of the questions which are fundamental, and the answers which are superficial. Few of those questions are:

- How to improve the finances (they are not even at the starting point in most of the countries);
- How to find final solutions (such as the example of the smallpox and other infective diseases);
- If the consequences and the aim of the CVD prevention are to prolong the life of the population, how are we going to deal with the problem of the aging population (without ideas of restructuring the society, with no paradigms both individual or collective for the increasing mass of that population which tends to become the half of the world in the next decades);
- How to integrate the leading clinical minds in the public health community (the great majority of the medical intellectual capacities are concentrated in the clinical wards, challenged by the rapid advances in the field of the clinical medicine) (2-5, 17-20).

The goals of the CVD prevention are to decrease the incidence and the mortality from those entities as revealed on table 4 (3, 4, 17, 19):

Table 4. The goals of the CVD prevention at all levels.

Level of prevention	Tasks/activities
Primordial	Social Legal, ethical, human rights Economic Cultural, social marketing etc.
Primary	Risk factor control i.e. • education; • counselling (diabetes, hypertension, diet etc); • check ups (risk populations, women, professions); • treatments (diabetes, hyperlipidemia, alcoholism etc.).
Secondary	Symptomatic patients: • screening, detection; • proper treatment (proper medicaments); • risk factor elimination (rigorous); • regular control; • invasive and operative approach (if indicated); • self-control and home therapies.

Prevention should mean adding ages to healthy organisms and minds. Prevention of the CVD is not a the domain of medical doctors only, but it is a structure made up of almost all profiles of professionals and researchers dealing with the most fundamental laws of nature and the laws of society. The approach in all levels can be: individual, collective, and mass (i.e. social marketing, media, schools, regulative). Few examples of community-wide CVD prevention programmes are given on the table 5:

Table 5. Community based programmes – examples

Community based programmes
1. Framingham Heart Study (1948-). USA. Framingham risk scoring
2. Stanford Project (1972-5, 1980-6). USA
3. Minnesota Cardiovascular Health Programme (1980-8). USA
4. Multiple Risk Factor Intervention Trial (1972-9). USA
5. North Karelia Project (1972-). Finland

Sub-modules

Sub-module A

This sub-module is dealing with the atherosclerosis, the risk factors and the metabolic syndrome. Atherosclerosis is a complex biological process leading to arterial wall thickening of the large and moderate muscular arteries, leading to haemodynamic and oxygenation insufficiencies of the peripheral tissues (heart, brain, extremities, kidneys, etc), ending with tissue and organ insufficiencies and death (3-4). At the turn of the 20-th century, the Russian researchers (Anitschow, Ignjatovski, Chalatow, Sarkisov) showed that cholesterol fed rabbits increase the rate of atherosclerosis, but it was not until the fifties that recognition was given to the "possibility" of hyperlipidemia associated with atherosclerosis. The first classification of the hyperlipidemias appeared as defined by Fredrickson in 1956. Then the Nobel Prize in the field was awarded to Bloch and Lynen (1964), and Brown and Goldstein (1985) (18) for the lipid metabolism research and the atherosclerosis. In 1976 for the first time the cholesterol was proved as being an "independent factor" for atheromatosis, and in 1980's appeared the first intervention study showing that pharmacological lowering of cholesterol leads to significant decrease of the CVD incidence, while in 1988 appeared the first detailed description of the chemistry and physiology of the "statins" (HMG-Co A reductase inhibitors) (1-2). This was important for the conclusion that interventions are important factors in all phases of prevention of the CVD. Then followed the phase of the "good cholesterol" and the "bad cholesterol in the 1990's, reacting with the haemostatic complexities, followed by the era of infection, inflammation, cytokines, and inflammation markers in the 2000's, which continues now entangled with the research findings on genetic markers, mechanical factors, nitric oxide production/inhibition, endothelial hormone interactions, and the insulin resistance. Those factors are of utter importance to understand the directions of the present and the future preventive interventions. Then followed a spectrum of multi-centre clinical and intervention studies, which the involved student will have to investigate and analyze. Mathematical models and quantitative approach have been experimented recently, based on epidemiological and longitudinal data. Introducing mathematical models in clinical practice is a slow process, but simplification will lead to very useful quantitative tools. However, equation parameters might vary between populations, due to geographical, genetic and other gradients, therefore adjustments become a necessity (1-6, 17-20).

Sub-module B

This sub-module is on the levels of prevention. At the beginning there was a "simple" division of primary and secondary prevention, according to actions undertaken in the "pre-event" (before MI or stroke), or "post-event" (after MI or stroke) periods. However, in such oversimplification few very basic questions arise i.e.:

- If diabetes is MI-equivalent, then the prevention is primary or secondary in all diabetics;
- When is the period when the "primary" prevention should start;
- Is it ethical not to give the same advice to the "primary" case as to the "secondary" one, even if he/she is at mild risk? Recently, all CVD events have been considered for "secondary" prevention (3-4, 9, 19, 22);
- What about the non-event case at high risk (using calculator or SCORE systems, or assumption on heredity basis, or even empirical).

Thus, some universal model is needed. The student should collect the data from all recent major studies, as well as the guidelines, and make a report. The preventive interventions can be divided in three groups:

1. Behavioural: diets, exercise, ceasing smoking, alcohol, and regimes for eliminating the controllable risk factors; those are safely recommended for all who are at any risk, or even to the "non-risk-period"; children with risk factors are also included;
2. Pharmacological: regulation of hypertension, hyperlipidemia, hyperglycemia, antiaggregation – for all who are at high risk and/or post-event, and selected cases that cannot achieve the target values of the risk factors with the measures under point 1;
3. Invasive and surgical interventions: in high-risk pre-event and post-event cases, according to the specific guidelines and the decisions of the cardiology specialists.

Up-to date levels of target values of the risk factor indicators at the present time are given in table 6 (3-4):

Table 6. Risk factors target values.

Risk factor	Target value	
Smoking	0	
Blood pressure	120/80 mmHg	
LDL	<2.5 mmol/l (<1.5 after CVD event)	
Total cholesterol	<4.5 mmol/l	
Triglycerides	<1.1 mmol/l	
HDL	>1.1 mmol/l	
HbA1c	<6.5 %	
Glycemia (IDF)		
Fasting	<6.5 (100 mg%)	
2h postprandial	<7.2 (135 mg%)	
CRP	<0.6	
BMI	25-29.9 kg/m²	
Abdominal circumference		
Europoid	<94 cm (males)	<80 cm (females)
South Asian	<90	<80
Chinese	<90	<80
Japanese	<85	<90

Source: American Heart Association, 2004

Sub-module C

This sub-module is about assessment of cardiovascular risk using "calculators". The most popular simple quantifiers of the outcome in CVD are the Framingham calculator and the SCORE (3-4). Although they are recommended as routine procedures in all general practitioners' and relevant specialist outpatients, they are still not a routine, at least in the developing countries. On the other hand, there are some recent critics of certain inaccuracies, and inconsistencies of those systems, therefore modifications or new quantifiers are to be expected in near future. A practical work with those calculators is recommended to the candidates, on real or simulated cases as recommended by the supervisor.

Sub-module D

This sub-module is about childhood, adolescence and CVD (3, 4, 17, 19, 22). There was an increase of obesity, hyperlipidemia, and diabetes in children and adolescents in the last decades, both in the developed and the developing countries. The obesity prevalence rates mounted up to 14% of the children. The hyperlipidemias are mostly multigenic, risk factor associated, and secondary. Primary prevention measures are necessary in this population.

Sub-module E

This sub-module is about public health actions in prevention of the CVD (3-6, 17-22). Develop a community based CVD primary prevention plan. Develop screening programmes for all individuals over the age of 40, and for the vulnerable populations - elderly, rural, poor, post-menopausal women, diabetics, patients on chronic dialysis, and drug addicts. Despite the well-known and well defined problems related to CVD, and the recent preventive guidelines, the efforts remain more on the theoretical ground. The practical problems stem mainly from the following factors: insufficient awareness both in the population and among the authorities, conflict of interests (i.e. food and cigarette industries), and the financing of prevention problems as mentioned above. The SES, the social and the cultural differences play a considerable direct and indirect role. The few suggested short-term improvements for the PH ground are related to the rise of the population and the professional awareness i.e.:

1. education of the health professionals, special for-credit and non-for-credit curricula in the medical, PH and nursing schools;
2. education of the population (mass media, persistent health communication, courses, volunteer educators, school programmes);
3. education of the patients: thorough insisting on behavioural and pharmacologic therapies; self-control and regular check ups in chronically ill and those at high risk should be conducted intensely;
4. continuous improvement of the prevention – control of the measures, and creative approaches;
5. PH institutions should insist on governmental and other resource funding of periodic minimal examination of schoolchildren, young people, and the risk populations on mandatory basis.

Prevention of the CVD is a duty of the whole population (individually and collectively) – viewed the same as the elementary education or the personal and communal hygiene. Which are the measures that you are going to undertake in your country for the improvement of the CVD prevention?

Sub-module F

This sub-module is about private sector and prevention of the CVD (15). Orientation on prevention is of great interest for the private practitioners, to turn to low-expense highly profitable practice, consisting on the above mentioned measures related to the education, control, and follow up of both healthy population, risk population and the chronically ill. Private-based annual group check-ups (companies, regions) in a form of "un-expensive packets" for CVD and malignancy screening, appears a feasible, high cost-utility, and a profitable business. Make your innovative project on improvement of the prevention on cost-effective private practice based system.

Sub-module G

This sub-module is about nursing and prevention of the CVD. High performance nursing is an ideal opportunity for cost-benefit promotion of the CVD prevention (16). With special curricula and training, nursing had already become a major factor in the above-mentioned goals of the CVD prevention. High performance and low-to-moderate cost nursing home therapies are feasible and affordable for the mass of the middle class population. It appeared feasible also for the poor people in the cases of charity organizations and trusts support (i.e. Caritas, Hope, Sue Ryder Care, Lady Fatemah Trust etc.).

"Home medicine" and the prevention of the CVD

"Home medicine" has emerged not as a product of science, but rather as a derivate of a necessity and the health care pragmatism (23). In a presently empirical basis, we state that the "home medicine" is the best mode, possibly the unique one, to achieve lowering of the costs to the supportable level, in a setting of high performance in both preventive and curative medicine. Of course – a lot of work has to be done.

Lemma: the experiences of the success in the home treatments and preventive measures on individuals can be extended to populations.

This maximum should be expanded continually. This does not represent an idealism, but rather a very real necessity (23). In the underdeveloped and the developing countries, there is a "culture" of institutional (hospital) detection and treatments of all patients, including the screening of the healthy population. It was a specific paradigm in the former socialist countries, regarding the health system as an instrument and morphology of communism. That brought to enormous unnecessary expenses to the weak health care budgets of those countries, which consequences resulted in reduced-resource practice, decline in the quality of medicine, impossibility of mass prevention, and a significant fall of the economical status of the doctors and the medical staff. "Home medicine" existed in the Middle Ages both for the high class, and the rural middle class, while institutions were rather "isolation formations" or later army institutions. They have grown in France in the post-revolution period, as a part of the simultaneous growth of the civil-right system and the diagnostic medicine, while preventive medicine (institutional only) came on the stage much later. In contemporary times, the medical institutions are fortifications of the huge technological machinery, and the advances of the operative medicine, and there is an increasing feed-forward mechanism of technology proliferation stimulated expensive medicine. Home prevention oriented less expensive technologies are the forthcoming counterpart emerging slowly but surely. Again, the accumulation of unrealizable financial gaps, the insufficient infrastructure effectiveness, and the increased prevention awareness are the stimulating factors for "home medicine" and prevention expansion.

In each family, there is at least one old person, or one who has a CVD related problem. Thus, medicine is in your home. Unwillingly you are a "home medicine" performer.

Sub-modules

Sub-module A

Make an elaborate of the needs and the cost-benefit of the transition from institutional to "home medicine" in your country.

Sub-module B

This sub-module is about description of the successful existing modes of home therapies in cases of: diabetes, hypertension, stable angina, rehabilitation therapies, post-stroke patients etc.

Sub-module C

This sub-module is about self-control and safe treatment experiences, as the fundamental basis of home therapies. Case studies of elaborate examples.

Sub-module D

This sub-module is about nursing. There are two modes of home nursing: a complementary care to the chronic therapy programme,

Sub-module E

This sub-module is about Paradigms of home prevention programmes introduced by family doctors, general practitioners, nurses, patients and volunteers. There is an increasing interest of the healthy risk population (patient's families, surrounding, and well-informed individuals) for individual screening, with a tendency of preferring home laboratories (mobile) to the institutional ones.

Sub-module F

This sub-module is about Partial transforming of the institutional outpatient's departments to private communal centres or home prevention and treatment medical groups (nurses, or even educated volunteers). The home prevention paradigm (HPP) is a key for affordable and profitable market oriented prevention of the CVD. The HPP is a complex transformation, which includes:

1. Increasing the "culture" of the population for the home prevention and follow up (self-control, self-care, technological and medical culture, interaction with doctors, media, schools, religion, social marketing, nursing, volunteering, patient-to-patient and patient-to-family information and help, prevention oriented associations etc);
2. Achieving high performance home activities: institution-home interactions (emerging preventive packages contracts, including the private sector), teaching self-management and self-screening, community aid, family aid, home practitioners (nurses, doctors, defectologists, versatile volunteers), and special prevention services development (23).

Changing markets means comforting human needs – home based detection and therapies will follow the fate of the microchip – it will open a huge and demanding market. Think of the transformation from patient associations to patient corporations.

Information and health communication

This is also an important (24), yet insufficiently exploited tool of CVD prevention. In our experience, just few TV popular programmes had caused a significant interest and clinical visits of patients with CVD, hypertension and diabetes. The prevalence of detected diabetes is doubled when considering the "unknown" cases. Which are the frequencies of the "silent" CVD events? Which are the frequencies of the "known" CVD events, who do not or cannot take appropriate care of their disorder? How much the environment influences the increase of the morbidity and the mortality from the CVD? Those are not problems, which can be solved by the medical practitioners only, but rather by the joint actions of the entire population.

Education is high performance information processing, institutionally controlled, quality controlled, with feedback information return. It is certainly the most efficient mode of information delivery, however its weak sides are the always the limited number of recipients and the cost containment. Multi-level CVD education programmes are required, to promote the growth of qualified educators from community to highly specialized levels. The experts and the expert institutions of CVD are the "think tanks" of the education, information, management and prevention strategies.

What is the difference between information and health communication? Information only cannot change conviction and behaviour. Health communication is a systematic change of perceptions (individual and collective), causing action (24). Propaganda is "information times motivation". Artificially we can distinguish three levels of information processing for the purpose of medicine:

1. Education: a programmed training of professionals or patients and amateurs in performing medical manipulations or assistance; a feedback from each individual is evaluated; this is for a limited number of individuals.
2. Information: denotes providing facts to a larger population, expecting a positive effect, but without any systematic control of the effects.
3. Health communication: increased efficiency of the information, using technologies that can increase the number of the informed individuals and their positive reaction. Health communication is "information quantity" multiplied by "diffusion force". The "aggressive" media programmes have influenced the epidemics of the HIV infection, and the information system networks were the critical factor of it's discovery. They have certainly influenced the awareness of the risk factors i.e. diabetes, hypertension, hyperlipidemia, and smoking.

Mass media are instruments of the politically active groups. Thus the rate of media development is proportional to the political group dynamics. Lemma: media development in health means influence of the medicine on politics and vice versa. Information flow multiplied by health equals health policy multiplied by economics.

Sub-modules

Sub-module A

This sub-module represents an introduction to the module: elementary knowledge on CVD, socio-medical aspects, and prevention of the CVD, from the previous modules.

Sub-module B

This sub-module is an introduction to a medical journalism and information: public relations foundations, the news media and the CVD, the "power" of prevention, the need of

early detection, specialized reporting (research, conferences, economic aspects), strengthening health journalism in the developing countries, training journalism to cover news and reports on CVD subjects, analysis of media covering, improving reporting, the global impact of the CVD reporting, public relations theory and practice, gaining audience, database and web research, writing, reporting, and psychology of communication (24-25).

Sub-module C

This sub-module is about mass communication ethics (24-25): law in mass communication and journalism (legal research, critical reading, question generating), elements of ethics in journalism (consequences, norms, changing life of the readers), management in journalism, Nuremberg Process (Boston university curriculum in PH).

Sub-module D

This sub-module is about social-marketing impact on the masses. Session are prepared on the following topics:

1. How the health communication has succeeded to influence the smoking reduction in the developed countries;
2. Why it failed in the developing countries;
3. Social marketing process planning related to the CVD for the next decade.

Sub-module E

This sub-module is about how to use the Public Health School Network (PHSN) to spread the information, and to receive information. PHSN is an ideal structure for information gain and information spreading. Students are supposed to learn to establish a collaboration relation, and learn to use the most recent telecommunication systems and software.

Sub-module F

This sub-module is about health communication in elementary and secondary schools:

- how to organize health communication (e.g. health education) process,
- how to overcome the children disinterest on "serious" themes (use the positive and negative experiences from similar programmes),
- how to select the topics,
- how to prepare programmes and practical work,
- how to build a prevention culture.

Sub-module G

This sub-module is about new models of information design and information flow.

Rural medicine and CVD prevention

Rural medicine is a relatively novel programme of an old profession (26). It is based on the recognition of the medical provision "gap" between the developed and the underdeveloped areas, either between the countries, or within the countries. The "objective" reasons for that "gap" is expected to cause increase in the incidence and the mortality from the CVD. International postgraduate programmes have been developed on rural medicine. However, there are no special programmes on the CVD in rural medicine. In the developing and underdeveloped countries the larger part of the prevention and the PH are on the level of the rural medicine.

Sub-modules

Sub-module A

This sub-module is about prevention of the CVD in the rural environment. In the developing countries, there is a considerable reduction of the average life span, an increase of the infant death, and increased frequency of deaths assigned with "unknown cause", which we do consider to be due to CVD. In those environments, the "prevention culture" is very low, and there is an "inertia" and "passiveness" in terms of prevention and management of the CVD, as well as other entities (26).

Sub-module B

This sub-module is about evaluation of the level of CVD prevention and care in a given region: medical professionals, experience, technologies, transportation, awareness of the population, indicators or data on frequencies and mortality, awareness of the risk factors, and other indicators (life length, SES, family histories).

Sub-module C

This sub-module is about how the situation in the country can be changed and improved:

1. opportunities to improve the conditions in the country;
2. opportunities to improve the communication with the advanced PH centres;
3. opportunities of training the local medical staff on CVD prevention.

Sub-module D

This sub-module is about information and health communication. Information providing is probably the most important instrument of CVD detection and prevention in the rural places and the developing countries. Some of the activities include:

1. how to use the mass media, the modern technologies, and the direct contact for increasing the population awareness of the CVD;
2. information in schools and in working places;
3. organizing and training the local non-professionals and volunteers for the purpose of the effective health communication.

Future science, technologies, optimization and information

This module is appropriate for health system planners, future private care providers, or in conjunction with the other modules. Development is going more rapidly than ever in both predictive and un-predictive directions (27-29). Why this module? In the CVD medicine, the rates of the changes are rapid enough to unable predictions even within a decade. The present expertise becomes "out of date" within such periods. The last few decades the CVD practice has evolved from physical examination to invasive procedures. The future of the CVD could be divided in the following four phases:

1. present: dominantly clinical phase (high performance imaging technologies, combined with the interventional and cellular procedures);
2. future: predominantly preventive phase (Human Genome Project as a basis for prevention, detection and treatment, new pharmacies for CVD prevention, aging modifications (29), environmental and psychological modifications, prevention market modifications, and general PH transformations.

Predictions of those and other innovations are the key to the "survival" of the future PH and medical practitioners.

Concluding remarks

1. The CVD are considered the most important subject in the present public health spectrum, since occupying the highest position in terms of the epidemiological indicators including mortality, morbidity, disability, and overall costs.
2. The tremendous success of the clinical management of the CVD and the medicine in general resulted in "three nonlinear functions": increase of lifespan, increase of the population, and increase of the health-related costs. There is also an evident increase of the awareness about the CVD, but it is still bellow the "critical point" of what is needed for collective self-control of the occurrence and the consequences.
3. The impact of the tremendous increase of the costs results in the social status related reduced accessibility to preventive and treatment facilities, disparity of the possibilities of performance and the possibilities of provision, and eventually the divergence of the incidence of the disease and the requirements for proper prevention and follow up.
4. The prevention, although theoretically well conceptualized, resides still at the bottom of the expected level. The social and the financial aspects remain a good rhetoric, with a pronounced lack of action.
5. The ten modules capture the framework of the public health problem, some of them being at the "embryonic" phase of development, requiring thorough engagement of the professionals, the students and the whole population.
6. We stress the importance of the "home medicine" and the information providing as fundamental instruments of the future PH and management of the CVD. The basic principles of the strategies for CVD management and prevention as monitored by the PH institutions should consist of the following:
   - population health;
   - effective CVD services;
   - evidence based decision making;
   - community participation;
   - health-oriented public policy;
   - holistic approach;
   - multilevel information diffusion.

Exercise

Epidemiology of CVD

Task 1:

Which are the mortality rates of the CVD in your country? Do you know the prevalence and the incidence rates of MI and ACS in your country? Which are the epidemiological data on stroke in your place? Which are the prevalence rates of diabetes, hypertension, and other risk factors? What can you do to improve data collection related to CVD in your country? How long is the average life in your population (why)? In which phase of epidemiological transition is your country?

Task 2:

Make a small terrain study, with the help of the mentor. This represents a rather difficult task, since it reveals the real difficulties of data collection, which are related to the following:

- poor registration and administration in the rural and developing regions (including some quarters in the world metropolises),
- absent motivation for such research in the remote places and the private medical institutions,
- insufficiency of relevant cadres, and
- poor "epidemiological and PH culture" in that region.

Consider an elaborate of how are you going to overcome those problems in your country?

Task 3:

Join an international group. Some enthusiasts have managed to contact with world authorities and institutions in data exchange, information exchange, participation on international conferences and congresses, and even obtaining research grants. Ideally, that would be a task of the PHS network, but individual initiatives are mostly valuable.

Task 4:

When will you perform a screening: blood cholesterol, glycemia, blood pressure, ECG and neurological screening?

Socioeconomic aspects of CVD public health

Task 1:

The student should perform research on the possible data and the articles on the CVD related to the SES in his/her country.

Task 2:

He/she should become acquainted with the quantifiers and the formulas related to the SES as presented by Regidor and other authors.

Task 3:

Find the parameters of the socioeconomic status of your country (as listed by the World Bank, IMF and CIA which can be fount on the Internet).

Task 4:

Learn about the Lorenz curve, and the Gini index and the income inequality indices.

Task 5:

Make a plan how to collect data related to the SES in your country. How do you plan to improve the status of your population? How will you make a plan for a strategy on the improvement of the social and economic performances in your country as mirrored by the CVD indicators?

Task 6:

How will you be able to activate the political and the public opinion about the weakness of the social system in your country using data related to the CVD?

Task 7:

Take the individual and the collective interests, think of the superposition theory, game theory, and the competitiveness development.

Task 8:

Hospitals are and will be "sociological monads" in the future. Lemma: social health inequalities (H) are mappings of the general social inequalities (G): H -> G. Therefore interventions on H imply interventions on G. Make your own thought experiments considering improvements in social medical inequalities, with parameters of the CVD (please look at the papers of Margaret Whitehead and the related papers (10-12).

Task 9:

The task is on cost-benefit, cost-effectiveness and cost-utility analysis (CBA, CEA, CUA). We always have some benefits (B) from the health prevention and the health care actions, which can be calculated. Those benefits require investments which means they cause some costs (C). From economical point of view $(B - C) > 0$ is an approvable action. However sometimes actions are undertaken despite the equation being < 0. In that case, the benefits are greater than they can be estimated with economical indicators only. Perform a CBA for the prevention of the coronary heart disease and stroke from the data in your country. Is there a difference? Are the interventions on the same risk factors giving the same benefits in different entities (differential risk factor CBA)?

Financing the CVD related prevention and public health

Task 1:

The student should investigate the advantages and the disadvantages of the various compulsory health insurance systems and the universal health care. The oldest systems are in France, Italy, then Australia, Norway, Ireland and Canada. How much prevention is being considered? Which proportion of the compulsory health insurance would you consider for prevention of the CVD and/or general? How would you design a compulsory CVD prevention insurance programme?

Task 2:

The student should become acquainted with some compulsory systems i.e. AMA (American Medical Association) compulsory health insurance programme, or the Massachusetts programme. There is a dichotomy between the just and the possible. The needs for medical financing are increasing, in particular for the CVD, while the resources are limited.

Task 3:

Which are the other possible (non-insurance) sources of financing the PH of the CVD?

Task 4:

Design your own "ideal" system of financing the CVD prevention.

Home prevention medicine

Task 1:

Think of the creativeness in the design of "home hospitals" (architectural, art-like, game-like, tourism-like, or economy). There are some examples of famous personalities on complex home treatments, yet building an "institution" of intellectual work in their home (i.e. Steven Hawking or Howard Hughes). Make a research and short case studies of examples you choose.

Task 2:

How can nurses and the family take part in the home prevention?

Information and health communication

Task1:

Write a report for a popular journal, on a CVD problem. Prepare (or simulate) a popular TV show on CVD. Develop methods to draw the attention of the population on the problem of the CVD pandemic.

Task 2:

Propose new innovative models of information spreading (apart from the TV and journalism) i.e.: toys, mobile phones, internet, posters, camps etc. Focus your efforts more on the psychology, rather than the technology.

Rural medicine and CVD prevention

Task 1:

Visit a rural place with a good CVD practice. Visit a place with a poor CVD practice. Write a report.

Task 2:

Give some examples (case studies) of a good rural PH on CVD.

Future of the CVD prevention and the PH

Task 1:

Discussions and elaborates on the future technological developments: novel biomaterials, markers, artificial organs, proteomics, genomic therapies, the Human Genome Project, cellular treatments, molecular imaging, multidimensional imaging, robotic surgeries, stem cell and progenitor cell technologies, chromosomal surgeries, embryonic surgeries and genomic therapies, etc and how they can be used in prevention.

Task 2:

There are few serious and very exciting research projects going on in the field of aging (29). Although in the last century the average life almost has doubled, it would be not appropriate in the present time position to discuss about the possibilities of the future aging treatments. From the social medicine aspect, it would be most appropriate for this generation to prepare for the forthcoming "old age wave" with programmes for decent housing, "home medicine", activities, and most of all – programmes for becoming realistically useful in the group and the society. Achieving recognition of the high values and the wisdom of the aged people will be a revolution. Make your (fictive) programme of integrating old people and the handicapped in the society and the economics.

Task 3:

Future institutional and home therapy models: modern mobile units, home-monitoring and telecommunication systems, future home nursing, self-diagnosis, automated diagnosis, and self-management procedures, complex-care systems kits, home care kits, "home-micro-hospitals", novel constructions and architectures, novel patient-doctor associations, novel models of companies and trusts. Contribute with new ideas to this short list.

Task 4:

Develop a CVD surveillance system for providing data on an ongoing basis in your country and on the global scale. That will provide the possibility of monitoring, evaluating the quality of service, the introduction and appropriate use of the recent discoveries in the area, upgrade the clinical and prevention guidelines, and evaluate the econometric parameters related to the CVD.

Task 5:

Discuss the future educational and information models: home learning and tuition, telecommunication information about the status of the CVD spread and the supervision of CVD patients ("telecommunication clinics"), online permanent information systems, visual facilities, new propaganda break-through, new school programmes, new feed-back models of education and treatment supervision.

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