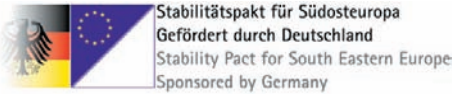

HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH

A HANDBOOK FOR TEACHERS, RESEARCHERS AND HEALTH PROFESSIONALS

Editors:
LIDIA GEORGIEVA AND GENC BURAZERI

Editorial Assistance:
Mariana Dyakova and Bosiljka Đikanović

PH-SEE Project Coordinators:
Ulrich Laaser and Luka Kovačić

Authors from:
WHO
European Commission
Albania
Bosnia and Herzegovina
Bulgaria
Croatia
England, UK
Germany
Romania
Republic of Macedonia
Serbia and Montenegro
Slovenia
Switzerland
USA

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PREFACE

Since Antonovski's salutogenetic paradigm we are used to concentrate on health instead of disease. This orientation is important as it opens the door for prevention and health promotion. However, also in this regard we need to know what factors to influence and how to measure the effects of our interventions. Therefore the analysis of the determinants of health rightfully is one of the core areas of public health research and of the health sciences in general.

Although the physical and psychosocial determinants of health and disease are widely the same in all human populations their relative importance and their interaction are more specific for a certain ethnical, geographical and historical context. For this reason it is justified and even mandatory to present the issue here with reference to the South Eastern European region. An additional argument can be derived from the given historical situation where a dynamic scientific and professional development and open exchange had been interrupted for more than half a century. Therefore it is not the least important that - as in the other books of this series - authors from many countries in the region contributed and interacted with each other and provide to the scholars of the health sciences an excellent example of international cooperation.

The editors categorized the determinants of health into genetic, social, psychological, lifestyle, environmental, occupational and policy factors where at least public health genetics opens an entirely new field with great potential for the health of the people. But astonishingly also the analysis of social gradients has long been neglected as a problem which must not exist for ideological reasons under the former communist regimes.

The book is mainly thought to support the lecturers in the new universities and teaching programmes in South Eastern Europe and provide to the students a synopsis of the relevant knowledge. Nevertheless public health practitioners and decision makers can find here useful background information for better understanding the mechanisms of health and disease, applicable in the day to day work.

Finally as the principal investigators of the Public Health Collaboration in South Eastern Europe we have again to express our sincerest thanks to the editors and authors for their dedication and patience and an enormous amount of unpaid work. The reward may be the established collegiality and friendship among us and the professional network created.

Prof. Dr. med. Ulrich Laaser
Faculty of Health Sciences
University of Bielefeld, Germany

Prof. Dr. med. Luka Kovačić
Andrija Stampar School of Public Health
Medical Faculty of Zagreb, Croatia

Prof. Dr. med. Tzekomir Vodenicharov
Dean, Faculty of Public Health
Medical University – Sofia, Bulgaria

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Assoc. Prof. Lidia Georgieva
Faculty of Public Health
Sofia, Bulgaria

Dr. Genc Burazeri
Faculty of Medicine
Tirana, Albania

LIST OF AUTHORS

Arsov Todor, Republic of Macedonia

Artnik Barbara, Slovenia

Bambra Clare, England, UK

Brand Angela, Germany

Brand Helmut, Germany

Brumen,Vlatka, Croatia

Bulat Petar, Serbia and Montenegro

Burazeri Genc, Albania

Butchart Alexander, World Health Organization, Geneva, Switzerland

Csiki Irma Eva, Bucharest

Cucić Viktorija, Serbia and Montenegro

Dabrock Peter, Germany

DeGolia Peter, U.S.A.

Dimitrova Rostislava, Bulgaria

Đikanović Bosiljka, Serbia and Montenegro

Donev Dončo, Republic of Macedonia

Dyakova Mariana, Bulgaria

Eckenfels Edward J., U.S.A.

Elkeles Thomas, Germany

Efinska-Mladenovska Olivija, Republic of Macedonia

Fimka Tozija, Republic of Macedonia

Fox Debbie, England, UK

Galan Adriana, Romania

Genchev Gencho, Bulgaria

Georgieva Jenia, Bulgaria

Georgieva Lidia, Bulgaria

Gjorgjev Dragan, Republic of Macedonia

Ilić Jelena, Serbia and Montenegro

Karadzinska-Bislimovska Jovanka, Republic of Macedonia

Kendrovski Vladimir, Republic of Macedonia

Kochubovski Mihail, Republic of Macedonia

Kovačević Lana, Croatia

Laaser Ulrich, Germany

Matejić Bojana, Serbia and Montenegro

Merkel Bernard, European Commission, Brussels, Belgium

Minov Jordan, Republic of Macedonia

Moormann Thomas, Germany

Pekmezovic Tatjana, Serbia and Montenegro

Petlichkovski Aleksandar, Republic of Macedonia

Popova Sashka, Bulgaria

Powles John, England, UK

Pranjić Nurka, Bosnia and Herzegovina

Risteska-Kuc Snezana, Macedonia

Roshi Enver, Albania,

Sbutega-Milošević Gorica, Serbia and Montenegro

Schröder Peter, Germany

Scîntee Silvia-Gabriela, Romania

Scott-Samuel Alex, England, UK

Shipkovenska Elena,Bulgaria

Spiroski Mirko, Republic of Macedonia

Stikova Elisaveta, Republic of Macedonia

Strezova Ana, Republic of Macedonia

Tavanxhi Nertila, UNAIDS, Geneva, Switzerland

Terzić Zorica, Serbia and Montenegro

Trajkov Dejan, Republic of Macedonia

Ungurean Carmen, Romania

Vodenicharov Tzekomir, Bulgaria

Zaharieva Elena, Republic of Macedonia

HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Determinants of Health**
Module: 0.0	**ECTS (suggested): 0.50**
Author(s),degrees, institution(s)	**Viktorija Cucić, MD, MSc, PhD**
Address for correspondence	**Viktorija Cucić** Cingrijina 13, Belgrade, Serbia and Montenegro E-mail : Ecucic@EUnet.yu
Keywords	Determinants, environment, health, interaction, lifestyle
Learning objectives	After completing the module students and professionals in public health should: • Broaden their knowledge and understanding in respect to factors which determine health; • Recognize the interaction between genetics and a string of environmental determinants; • Place into proper context the role of health services as a health determinant; and • Recognize their own role and activities in a network of multi-sectoral co-operation and integrated interventions aimed at several variables.
Abstract	The concept of health determinants denotes a comprehensive synthetic approach in explaining the complex mechanisms by which various factors exert influence upon health. They represent a framework for explaining the genesis of health and ways of preserving them, far larger than the one in which health services are given the most prominent place. The concept of determinants has been changing through history. Actual knowledge states that determinants act within complex mutual interactions and that they have different effects at different periods of life. Studies about effects and interactions between determinants apply knowledge gained in public health, sociology, psycho-neuro-immunology, biochemistry and other sciences. Lately, researches in the area of human genetics are exploring a new field of determinants of health and thereof new preventive possibilities. An expert in public health should recognize the role of sound public policy directed towards the overall picture of health determinants, and should also master the knowledge and skills for implementing integral programmes.
Teaching methods	Lectures, focus group discussions, nominal groups, case studies

Specific recommendations for teachers	Case studies – students should collect data on "life histories" for children with behavioural disturbances, on conditions of life for deprived groups, and on their health status.
Assessment of students	"*What Is To Be Done*": Short composition – up to 5 pages – on a solution with complex influences of several determinants for a disadvantaged group in the population.

DETERMINANTS OF HEALTH

Viktorija Cucić

It has been recognized long ago that answers related to the origin of health and sickness can be found neither in descriptions of the structure and functioning of human organism, nor in separation or quantification of individual causes (1).

The concept of health determinants denotes an encompassing and synthetic approach to explaining the complex mechanisms by which an array of factors influences one's health.

These factors extend from hereditary components, development of personal experiences and skills in early childhood, to various aspects of one's social, economic, physical, cultural, and other environments.

Understanding the inter-relations of different health determinants throughout one's life enables insight into connectedness between genetic factors and biological systems, neurobiology on one hand, and human behaviour, individual (phenotype) characteristics and influences from social and external environment, on the other (2).

Historical Context

The concept of health determinants has been changing through history. At the time of Aristotle's *Ethics and Policy* (3), the concept of health was located in the broader field of living well, both morally and socially. Aristotle identifies three kinds of resources for living well: goods of the body, goods of the soul, and external goods.

Analysis of extensive literature dealing with development of the health concept points to the existence of at least three categories, where the first focuses on internal balance, the second on external factors, and the third one on the equilibrium between the first two. The quality of interaction between an individual and his or her external environmental factors has been recognized as crucial for one's health.

Further studies focused on mechanisms of interaction and its components.

Health services and functions have long been deemed exclusively critical among a string of external factors (4-6).

Their accessibility and availability were considered to be of primary importance, along with their activities. Thus a drop in mortality rate and protection of human life span occurring by the end of the19th and the beginning of the 20th

centuries were simply accredited to the efficiency of medical innovations.

A historic role in the process of changing these attitudes is ascribed to the work of Thomas Mc Keown, a Scottish physician and epidemiologist, and to the Canadian government's document known as the *La Londe Report* (3).

Mc Keown's writings are significant for their clearly formulated critical rejoinder to the suggested standpoint which claims that the 19th and the 20th centuries' health improvements were due to medical progress.

After studying British population mortality rates since the industrial revolution, Mc Keown concluded that it was an overall betterment of nutrition among the populace that caused the downward shift of mortality. He also surmised that the contribution of medical measures undertaken was rather small, and that public health measures including better sanitation and vaccination accounted for about 25 % of the decline in mortality (7-8). In his work, Mc Keown had initially referred to various "influences" on health, but later started making references to health determinants.

La Londe's Report, published by the Canadian government in the 1970's, was largely based on Mc Keown's research (8). The Report introduces the concept of "*Health Field*", where four quadrants are located with determinants of greatest influence upon health as shown below:

The Health Field Concept

Environment	**Life style**
Human biology	**Health care organization**

Source: Glouberman, 2001

The notion points to key health determinants related to who a person is, where and in what conditions one lives, together with the assistance offered by health services, which is, as shown, just one part of the *Field*.

Later on, The Ottawa Charter for Health Promotion emphasized the existence of broader social, economic and environmental factors that affect health (9).

The Canadian Institute for Advanced Research (CIAR) introduced in 1989 the *population health concept* with its basic contention that individual health determinants do not act in isolation or separately. They function as parts of a complex interaction between one another and, as such, have considerable consequences upon one's health (10).

Data on these determinants have grown significantly in the last few years, so that numerous explanations of their activities and consequences, and interventions thereof, can be found in the literature.

Some present facts

Broadly speaking, health determinants represent an explanatory framework for genesis of health and ways to preserve it. This actual framework is far larger now than it used to be while it located health only to the sphere of dependence on health services and their interventions.

A multitude of factors connected to health have been identified, their interconnectedness determined, and next their effects in these complex relations were studied.

It was also proven that many determinants have differing effects in different phases of a life course, so that some of those particularly important during certain periods lose their importance in other stages. For example, the influence of family factors in childhood is far more important than individual behaviour, while in adulthood individual behaviour has a prominent role.

Health and sickness represent a resultant of effects of risk factors and health determinants throughout life, as well as of certain effects of some determinants during critical life stages (1).

"Determinants of health are the range of personal, social, economic and environmental factors which determine the health status of individuals and populations" (5).

There were not many attempts to formulate in literature a fixed classification and distribution of determinants, for, as already pointed out, there is much overlapping and interdependence among them. Therefore, they are often represented as a group composed of several individual determinants.

Evans's model (11) points to the following health determinants: Social Environment, Physical Environment, Genetic Endowment, and Individual Response: Behaviour and Biology.

Health Canada (10) states 12 most important health determinants as described below:

Key Determinants of Health

1. Income and social status
2. Social support , networks
3. Education
4. Employment , working conditions
5. Social Environments
6. Physical Environments
7. Personal health, Practice and Coping Skills
8. Healthy Child Development
9. Biology and Genetic Endowment
10. Health services
11. Gender
12. Culture

It has also been said that "our understanding of what makes and keeps people healthy continues to evolve and will be further refined" (12).

On some of the most important determinants

Description of any of individual determinants bears the risk of oversimplification. As it was already emphasized, the basis for their activity is interaction.

It was thus indicated that "About 60 % of preventable morbidity and mortality are located neither within individual sovereignty nor the domain of individual behaviour or life style, but within social organization" (13).

For a long time the ***lifestyle*** (nutrition/diet, physical activity, smoking and alcohol intake) was identified as one of the most influential health determinants. It was assumed that many forms of behaviour that compose this determinant are under great influence of individual choice and control and thus are liable to be coped with by educational interventions. Some results to this effect have been accomplished, though not satisfactory enough to bolster the correctness of this approach still insisted upon in many regions. Cognizance is emerging that neither life style, nor smoking or alcoholism, represent an individual choice, but are results of a combined activity of several factors in one's social environment (8).

Bobak (14) stresses that behaviour, diet, smoking, and alcohol have an identifiable impact on health and the case is indisputable, but all of these as well as

the overall life style aspects are results of social environmental influences. Social environment acts upon psychosocial well-being, wherefrom individual choice of a poor life style may result. Accordingly, due to a greater prevalence of risk factors, poor lifestyle may be observed among people of lower social status (15).

Lifestyle is determined by individual social environment – s/he chooses the style prevailing in his/her background. This is believed to be particularly characteristic for the CEE countries. Psychosocial factors may "mediate the rest of effect of political, social and economic environments on health" (14).

Researches in psycho-neuro-immunology and biochemistry suggest there is a link between emotional conflicts, socio-economic status, lifestyle, and health consequences. Emotions and mental functions affect the stimulation of the nervous system which on its part modifies the immune system – therefore resulting in health disorders. Weakening of defence forces due to stress explains the general vulnerability among people who thereafter have less control over their own lives which eventually ensues in a poor lifestyle.

A number of research studies carried out on patients with heart diseases, among disadvantaged children, widows, and also among persons with rheumatoid arthritis, have substantiated these assumptions (12).

Similar reflections refer to the impact of the *physical environment***.**

Proofs of influence of the *natural environment* (e.g. air, or water quality) have been collected and quantified a long ago. There is abundant evidence of influence of the human-built environment such as housing, workplace safety, community and road design, and others.

It is characteristic for the present concept of physical environment that, as a health determinant it does not occur in social vacuum, but is in correlation with social environment. Thus, there are studies which demonstrate that people with lower income live and work in unhealthy environments, sometimes even exposed to toxic and carcinogen substances. Settlements in which people from socially deprived groups live (Roma, refugees, and others) are often beleaguered with problems of elementary hygiene, often situated close to potentially perilous waste deposits (16).

Countries in transition, beset by numerous economic predicaments and problems, have also difficulties in preserving the "clean" physical environment, just as they have great trouble in keeping the social environment sanitary enough.

Social environment in itself represents a complex determinant of health composed of social and economic safety, social stability, acceptance of differences, human rights, cohesion in a community, and so on.

It is characteristic that socio-economic turmoil, national, religious and other conflicts bring about dramatic changes in one's social environment affecting thereafter one's health.

Conditions of war, implying not only physical threats but also a throng of stressful and crisis situations endanger physically, psychologically, and emotionally the most vulnerable categories (women, children, and the aged). Resulting health disorders are numerous and chronic.

Income and social status

The simplest form of relation between income and health expresses the fact that a higher income determines life conditions that create feasibility of a safe dwelling, provision of goods, and more comfortable living. Lower income is connected to sickness and shortening of human life cycle. There are countless studies verifying the relation between poor health and lower socio-economic strata and connectedness between one's health status and social class, income, education, and similar. Indisputable relation has also been set between the expected life span and national gross income.

In the last few years the relation between the way incomes are distributed and one's health status has been frequently discussed.

Inequality of health, as a result of unequal distribution of goods among different population groups, and causing the varying expectancy of longevity, mortality, and differing frequency of certain illnesses, is considered to be the basic cause rather than the amount of income itself.

Bobak (14) distinguishes three kinds of inequality regarding one's health: international differences, those within countries, and gender differences. It is assumed that the relation which exists between socio-economic determinants and a person's health is not of the poverty-consequence type, but rather of inequality-consequence one (14-17).

Thus, it has been stated that countries with more regular distribution of available resources, investing in reinforcing the social status of women and improving their influence and social role, score better health indicators than the countries which do not follow in their steps, even though they share the same gross national income (8).

Although the average life expectancy has been improved considerably in the 20th century, there are still notable differences which cannot be ascribed solely to different levels of national incomes. So, social scientists came to define a concept of socio-economic position (SEP) as a complex construct composed of vocation, education, income, ethnicity, and other characteristics (1).

Kreiger (18) denotes SEP primarily as the status in social hierarchy – that is, position in society, which implies much more than just allotment of certain resources. Numerous studies carried out at different times point out that better health and lower mortality can be found among groups of people with higher SEP (19).

Explanation of this connectedness was offered by the *eco-social conceptual scheme* (18). The focal point of the concept is embodiment, hence an individual literally incorporates and instils the material and social worlds in which a person lives into his/her own inner one, from the cellular level up to the highest one. This explains the fact that differences in morbidity and mortality among socio-economic groups are relatively stable, even though the causes of illnesses and deaths are changing in time. Therefore, certain factors act upon one's susceptibility to some diseases and states through generations.

Anything that happens in an environment that has negative consequences affects people with lower SEP.

One's workplace is an important segment of the social environment. Inequalities in health inside it can be analysed in the same way it is done in a wider social environment. So that workers of 'higher rank' get sick less and live longer than those of lower ranks. Stress at one's workplace increases the risk of getting a disease and choosing a poor life style through neuro-biological mechanisms.

Unemployment is also markedly connected to health. Unemployment rates are related to variations in morbidity and mortality.

Social relations that can be analysed at a primarily individual level as *social support*, and at the community level as *social capital*, are a particularly important part of *social environment*.

Social support is an extra quality in the social network, for it surmises, beside one's surroundings – a network of people and frequency of communication – that people have obligations one to another, decreed and chosen by themselves, and it includes care, attention, and readiness to help (6).

Research shows that people with strong social support risk less to die of certain diseases than those without it, and they also recuperate more quickly once a disease has been diagnosed. (20). This is of particular importance in childhood. Thus, the presence of parents in hospital conditions, especially the mother, has a favourable effect upon the course and outcome of an illness. Research also indicates that lack of social support is an additional factor in premature death of smokers, those with high blood pressure, and in other conventional risks.

Men with less social support have twice as much chance to die at certain age than their peers with greater social support.

These and similar researches brought about the observation that social factors can be rivalling with effects of other factors and well-established risks (smoking, or high blood pressure), and are therefore critical determinants of health (8, 16).

Social capital, as opposed to former social relations which are individual, is a community characteristic. Puttman defined it in 1993 as "Those features of social organization, such as network, norms and trust that facilitate co-ordination and co-operation for multiple benefits" (17).

It is also defined as "The resource imbedded in social relations among people and organizations that facilitate cooperation and collaboration in communities" (21).

This concept is closely connected to the development of civil society, the one which values solidarity, participation, integrity, and in which social, political, educational, and health institutions are connected horizontally, not vertically.

Research suggests a close correlation between the social capital and infant and child mortality – the higher the indicators of social capital the lower the mortality. There is also a connectedness with general mortality (22). This connectedness is explained by the fact that communities/societies with higher level of social capital can act so as to formulate and realize common goals.

A community infrastructure for health can be built within such a community which may then have a significant impact on environmental, behavioural, and lifestyle factors. Grossman and Scala (23) named it "The creation of a new social system for health".

Education, as one of determinants in a social environment, is mentioned as an opportunity for better job, higher income, better SEP. Education also helps people in taking greater control over their lives and health.

Culture is integrated in a string of the aforementioned determinants. "There is a growing recognition that the most powerful determinants of health in contemporary population are to be found in social, economic and cultural circumstances" (13).

Various cultural values are a contributing factor to many occurrences which lead to poor health. Migration, stigmatization, deprivation based on religious or national characteristics, result in a series of consequences upon health.

Gender points out to the necessity to recognize gender equality, the socially determined role of women, distribution of power and goods in a society, as well as those special risks for certain illnesses connected with different male and female roles in a society.

Inequality in relation to gender is an important determinant of health.

Healthy child development

Until mid-1950's, prenatal states and those of early childhood have not been considered as important determinants of health, i.e. there was no cognizance that what happens in childhood has long-term effects. Today, there is abundant evidence to prove that the way children live in early childhood and the quality of care that they receive can have considerable consequences upon health.

Development of the whole organism, and particularly of the brain in early childhood, is under the strong influence of diet and early stimulation (8).

So, it was ascertained that basic structures and functions established at this critical period affect the development of competence, which primarily refers to individual learning abilities, and to coping skills, referring to individual responses to challenges and stresses, throughout an individual's life time. Early years in life are the critical developmental period of what is called the core function of the brain.

In children neglected in their early childhood neuronal links and functions in the core brain are produced which may lead to dysfunctional behaviour.

A similar situation happens with children growing up in conflicting and violent environments who may be victims of violence themselves. It all increases the probability of developing behaviour of inadequate adaptation and wrong responses to life challenges at later age.

Socio-economic environment in early childhood produces countless consequences upon health. The simplest scheme of relations between these factors and health states that children born into families with low income are of lower weight at birth, are on poor diet, resulting later on in troubles at school and difficulties in learning.

There are two kinds of evidence in the studies on that period. The studies show, on the one hand, that consequences of a stressful perinatal development are more easily corrected in families with higher socio-economic living standard (8). On the other hand, studies prove that children born in poor socio-economic conditions as well as circumstances with other risks or stress have greater chances to diminish ensuing consequences in case their conditions are improved at the age between 3 and 5, and if well-designed developmental programmes provide them with strong stimulation and adequate diet. However, elimination of consequences is never complete.

There is also evidence that social conditions during the most vulnerable early period of life can predict future morbidity and mortality rates. Childhood spent in poverty or stressful environments may not always produce direct consequences upon health, but can significantly affect the future health status. A prospective study done in Scotland and lasting for 21 years confirmed that childhood disadvantage

(defined as father's occupation and dwelling in a poor region) contributes to development of cardiovascular troubles at a later period, even when other risks for these diseases are controlled (24).

Parents' education and their incomes determine the conditions in which children live, the quality of food, opportunities for their education which later determine their SEP, with all accompanying consequences of a low SEP upon health.

Genetic endowment

Risk for almost any disease in human populations is a result of interaction between inherited gene variations and environmental factors, which include chemical, physical, infectious, behavioural, nutritive, social, and other factors (25-26).

There is an interaction between these two groups of factors, so that a person with a certain set of genes, if subjected to certain risks, has more or less chances to develop a disease.

"It is easy to show that 100% of any disease is environmentally determined and 100% is genetically determined as well. Any other view is based on a naive understanding of causation" (26).

Socio-economic and environmental factors are significant determinants of health at the level of society – community, but when it comes to which person will get a disease and under what conditions, this is determined by genotype.

Therefore, studies on genetic factors are as important as environmental ones. Without knowing the genetic predisposition one gets an incomplete picture of potential risks and blocks preventive measures and activities from being directed onto the most vulnerable ones.

Human Genome Project and advancement in human genetics will define the science in this century (27). Some 50.000-100.000 genes are expected to be identified in the next few years. Only up to 1999 there were already 10.000 discovered and categorized genes. Tests for more than 600 genetic variations are used in practice.

Genetic variations were discovered not only in relation to rare diseases but also to those that increase susceptibility to a common chronic disease, such as cancer, heart disease, and so on (26).

New genetic discoveries pertaining to various diseases are emerging almost daily. There still a lack of a population-based information about distribution of genotypes in different populations; there is not sufficient knowledge on risks and advantage of an early intervention; there is a whole array of ethical issues – however, it does not diminish the importance of these discoveries which have changed our understanding of natural surroundings, health, and perception of risk.

They have changed and keep changing our preventive practices as we speak of "genotypic prevention" – the interruption of genetic trait transmission from one generation to the next through reproductive counselling, carrier testing, prenatal diagnosis and pregnancy termination, as well as of "phenotypic prevention" – the prevention of disease and death among people with specific genotypes (28).

There are also certain new potential risks that face humanity for the first time in history, such as exposure to "genetic pollution" by modified living organisms and production of germ-like cells passed through hereditary characteristics onto future generations.

Data on genetic health determinants opened up dilemmas and created reasons for worry, but they also brought about unforeseen possibilities, the dimensions of which are unimaginable.

Health services

Contrary to McKeown and his followers who did not consider health services to be an important determinant of health, there are those who deem it a determinant of great significance, even an underestimated one (29-30).

Certain authors are of the opinion that the specific contribution of health services to a dramatic downfall of mortality due to cardiovascular diseases in developed countries (USA, UK, Australia) is rather great, and that a half of reduction in mortality can be ascribed to health services, while the other half arises from reduction of risk factors.

These authors also suggest that physicians, particularly those employed in public health domain, should contribute to the improvement of general health status of the population by turning to modifiable determinants of health, which are part of their scope of work. This also means full use of numerous possibilities that health services offer for health protection, prevention of illness, and restoration of disturbed health status.

Message

Getting acquainted theoretically with novelties related to a series of factors which determine our health, is just one of the duties of public health professionals.

It is even more important to transform these data into efficient interventions the application of which should improve population's health status.

For experts in public health this means several levels of influence:

Policy formulation level. Health policy formulation is a complex process not to be contained within the health sector. Professionals in public health have a duty to warn and inform about the necessity of adopting an integrated policy which is to tackle the whole picture of determinants of health.

Local community level. Professionals in public health are carriers of ideas and activities referring to the need for a new partnership for health, of intersectional cooperation, horizontal links between different sectors and integral programme activities. Their immediate duty is to initiate, develop and implement the health promotion programme, offering great opportunities through enabling individuals and communities to take responsibilities for their own health and determinants that affect it.

Workplace level. A professional in public health should be aware of the primary complex and interdependent factors determining health or sickness when proposing or carrying out an activity, and should provide arguments if averring that an isolated activity aimed at a particular determinant cannot produce efficient results. Proposing the measures of individual prevention for any separate state or disease is also in the domain of work of a public health professional.

The voice of an expert in public health is of great importance in everyday life, especially in CEE countries. Only a civil society with norms and values such as equal rights, gender equality, no discrimination, social and economic safety, participation, social capital and support can create a real social environment for health.

Experts in public health have a duty to stand up for it.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Public Health Genetics – the Impact of Genetics and Genomics on Public Health**
Module: 1.1	**ECTS (suggested): 0.75**
Author(s), degrees, institution(s)	**Angela Brand, Dr. med., MPH** Professor for Social Medicine & Public Health, Director of the German Center for Public Health Genetics (DZPHG), University of Applied Sciences, Bielefeld, Germany **Helmut Brand, Dr. med., MSc, MFPH** Director of the Institute of Public Health Northrhine-Westphalia (lögd), Bielefeld, Germany **Peter Schröder, Dr. Phil., MA** Health Policy and Planning, Institute of Public Health Northrhine-Westphalia (lögd), Bielefeld, Germany
Address for correspondence	Prof. Dr. med. habil. Angela Brand MPH German Centre for Public Health Genetics (DZPHG), University of Applied Sciences, Kurt-Schumacher-Str. 6, D-33615 Bielefeld, Germany Tel:: +49 521- 10 67 864 Fax: +49 521-16 37 09 E-mail: angela.brand@fh-bielefeld.de
Keywords	Public health genetics, genomics, population health, prevention, health policy, inequalities in health, social exclusion, ethics
Learning objectives	After completing this module students and public health professionals will be able to: • Understand the principal associations between genetics, disease and the environment; • Understand basic genetic and molecular science and consider its implications for health and health services; • Identify the impact of these associations on public health, policy and clinical practice; • Understand the major results (milestones) of the human genome project; • Understand the role of public health in translating developments in genetics into policy and practice ("public health trias"); • Consider ethical, legal and social implications (elsi) of genetics and molecular science and its policy implications; and • Appreciate the importance of genetic and molecular science and its influence on future practice of clinical medicine and public health.

Abstract	The future of medicine and healthcare services will be much more dependent on new technologies based on the genetic and molecular sciences. This will require a greater appreciation and understanding of epidemiological principles and population perspectives. The science of genetics and the advances brought about by the completion of the Human Genome Project has already had a significant impact on clinical practice (such as more specific preventive strategies) and it is predicted that in due time almost every aspect of public health and clinical medicine will be influenced by it, bringing in its wake significant ethical, legal and social implications. The next decade will provide an opportunity to prepare public health professionals, the public and policy makers for the impact of this knowledge on health and health care. Public Health Genetics (PHG) is a new discipline of public health integrating genomics into public health research, policy and practice. It has been defined as the application of genetic and molecular science to the promotion of health and prevention of disease through the organised efforts of society. Therefore, appropriate training in this field, which is the aim of this module, will prepare health care providers and public health practitioners to participate in research, evaluation and decision-making related to the use of genetic and genomic information in public health programs.
Teaching methods	Teaching methods include lectures, interactive group discussion, group presentations, study of literature as well as internet searches.
Specific recommendations for teachers	This module should be organised within 0.75 ECTS, out of which one third are lectures and group discussion supervised by the lecturers. The rest is individual work (readings and searching internet mainly) in order to prepare seminar group presentations.
Assessment of students	Assessment should be based on individual participation in the interactive group discussions as well as on group presentations.

PUBLIC HEALTH GENETICS – THE IMPACT OF GENETICS AND GENOMICS ON PUBLIC HEALTH

Angela Brand, Helmut Brand, Peter Schröder

Summary

Public health practice has to date concerned itself with environmental determinants of health and disease and has paid scant attention to genetic variations within the population. The advances brought about by genomics are changing these perceptions. Many predict that this knowledge will enable health promotion messages and disease prevention programmes to be specifically directed at susceptible individuals or at subgroups of the population, based on their genetic profile. Obviously, the integration of genomics into public health research, policy and practice will be one of the most important future challenges that our health care systems will face.

Introduction

Medicine is currently undergoing extraordinary developments from its morphological and phenotype orientation to a molecular and genotype orientation (2) promoting the importance of prognosis and prediction (2, 3, 4, 5, 6).

What about public health?

"…It is clear, that the science of genomics holds tremendous potential for improving health globally…. The specific challenge is how to harness this knowledge and have it contribute to health equity, especially among developing nations..." This is a quote by Gro Harlem Brundtland, former Director General of WHO, which can be found in the year 2000 "Report of the Advisory Committee on Health Research".

At the same time Craig Venter, former president of Celera Genomics, stressed the significance of this issue at the occasion of a symposium about the future of public health at Harvard School of Public Health:

"Three years ago the human genome – the "book of life" – was largely unknown. Today, anyone can read what it contains. Genomics is already providing fascinating insights into our species' evolution and clues to the some of the differences between individuals in susceptibility of diseases. The key question for

public health, however, is whether it will improve the health of all of the world's people, or whether it will just widen the technology gap between rich and poor. Ask people what they understand of the potential of genomics for human health, and many will talk about an unprecedented opportunity to develop new drugs and vaccines. Others are concerned that the poor will gain nothing, while the rich will gain a kind of "boutique medicine": the opportunity to buy a full analysis of their personal genetic makeup, and then purchase designer therapies. If genomics is to make a major impact on global health, it will have to help provide affordable population-wide tools for combating common diseases…"

Even there are of course compelling reasons to think globally in terms of global health and genomics (7, 8) first of all, one has to act locally. The key question is whether currently "the right things" are done on local level? Are public health strategies evidence-based? Thus the public health agenda demands a vision that reaches beyond the research horizon to arrive at application and public health impact (9, 10).

What is the role of genomics in this scenario?

Viewpoints

In February 2004 the first international symposium on public health genetics entitled "Public Health Genetics - Experiences and Challenges" was hosted at the Center for Interdisciplinary Research (ZiF) in Bielefeld, Germany, internationally well-known as a "think tank" in science (11). At this symposium contrasting viewpoints about the relevance of genomics for public health were presented:

In the opinion of Neil Holtzman, em. Professor of Genetics and Public Policy Studies at the Johns Hopkins Bloomberg School of Public Health, "…there is little need for further integration of genetic services and education into public health especially in countries in which public and private health services are dichotomized…".

Almost in contrast to this opinion Ron Zimmern, Director of the Public Health Genetics Unit at the University of Cambridge, stresses, that, although public health genetics is still in its infancy, "…rapidly advancing science and patient and public expectations require a strategic approach to the assessment, development and implementation of genetic services using all the skills of the public health practitioner. The development of policy for these services must start now, given the pace of genetic science, particularly in view of need to educate and train a whole cohort of practitioners in the principles of genetics and molecular science. The focus on prevention…should seek to use to its best advantage the opportunity embraced by a better understanding of the gene, while holding back those demands of both patients and physicians where evidence is insufficient to justify

significant investment. The grasp of both medical and management perspectives available to the public health physician imposes a special responsibility to take up and develop this aspect of public health practice."

Regarding patient expectations it is already known from the fifth survey of the Eurobarometer on biotechnology, which had been conducted in 2002, that 44% of Europeans are positive about the results of biotechnology, whereas 17% are sceptical.

How can one deal with these diverging opinions (12, 13)? Where is the truth? Or furthermore, is there any truth? What is the challenge for public health?

The challenge for public health

Interestingly enough, European and US public health institutions and platforms like the Public Health Genetics Unit in Cambridge (PHGU), UK, the German Centre for Public Health Genetics in Bielefeld (DZPHG) or the US Office of Genomics and Disease Prevention at the Centres for Disease Control and Prevention in Atlanta (CDC), who work closely together with researchers from genetic and molecular science ("modern biology") as well as from population science, humanities and social science, are much more optimistic and clear about the relevance of genomics for public health than others (11, 14, 15, 16). They all have strong links or are even part of the respective national genome research projects in these countries and are translating genomic knowledge from biotechnology through genetic epidemiology into public health ("translational research"). By using methods like horizon scanning, fact finding and monitoring to identify research trends as early as possible, they are already doing a prospective evidence-based evaluation, i.e. an evaluation that is already carried out in the process of basic research and not just in the (retrospective) process of the implementation of public health strategies and policies (17), which always will tend to lack behind.

In the past twenty years, the advances in genome research have revolutionized knowledge of the role of inheritance in health and disease (18). Nowadays, it is known that the DNA determines not only the cause of single-gene disorders, which affect millions of people worldwide, but also predispositions ("susceptibilities") (19), which are based on genotype and haplotype variants (20, 21), to common diseases. The new technologies will allow researchers to examine genetic mutations at the functional genomic unit level (22), and to better understand the significance of environmental factors such as chemical agents, nutrition or personal behaviour (23) in relation to the causation of diseases like cardiovascular diseases (24), allergies, cancer, psychiatric disorders or infectious diseases (25, 26).

Evidently, these rapid advances in genomics and accompanying technologies are triggering a shift in the comprehension of health and disease as well as in the understanding of new approaches to prevention and therapy (27, 28, 29). Which consequences can be drawn from this knowledge, how can it be translated into policies (17) and practice in a responsible and timely manner?

Clarifying the general conditions under which genomic knowledge can be put to best practise in the field of public health, paying particular consideration to the ethical, legal and social implications (ELSI) (11, 15, 30), is currently the most pressing task in the emerging field within public health, variously dubbed public health genetics or public health genomics (PHG). Aiming the application of genetic and molecular science to the promotion of health and disease prevention through the organised efforts of society, integral to its activities is dialogue with all stakeholders in society, including industry, governments, health professionals and the general public (16). Thus, the integration of genomics into public health research, policy and practice will be one of the most important future challenges for our health care systems (31, 32). Expertise is already feasible and can be clustered and evaluated for a socially accountable use.

For example, in a condition like coronary heart disease, to be a heterozygote for the LDL receptor gene confers an increased risk for developing this condition. But, as it is also true for all other risk factors (e.g., social factors, diet, smoking, physical activity), which have been identified by epidemiologists in this context in the past decades, the presence of the genetic marker is not predictive, and those with it may not develop the disease, while those without it may end up with the disease (26). Obviously, the scenario is very much like that of coronary heart disease in the presence of raised blood pressure or cholesterol levels: the increased risk implies "only" a (high or low) probability, and the genetic marker is "just" another modifier in the causality of the disease and therefore not being exceptional (11, 12, 33). Nevertheless, the ethical question is how we will handle these susceptibilities. To answer this question, as a first step, population-based large-scale epidemiologic studies are needed to measure associations between specific gene variants and environmental factors and the risk of coronary heart disease (34). Such studies have already been conducted, for example within the US National Health and Nutrition Examination Survey or within the National Genome Research Network (NGFN) in Germany. For translating such discoveries into interventions it is necessary not only to quantify the impact of gene variations on the risk of the condition, but also to quantify the effect of modifiable factors that interact with gene variations (35). Based on the knowledge of these attributable risks, sound policies and effective interventions can be made (11, 34).

Regarding infectious diseases research is being expanded to include host genetic factors that influence the susceptibility to certain infectious diseases or even the severity of the condition, and that affect responsiveness to vaccines

and therapies. The identification of several gene-disease associations for parasitic (e.g., malaria), viral (e.g., HIV or hepatitis) and bacterial (e.g., tuberculosis or cholera) infections provide critical clues to control these infectious diseases. By this, public health strategies will be more effective and efficient.

Policymakers must be aware of the opportunity to improve consumer protection, to monitor the implications of genomics for health, social, and environmental policy goals, and to assure that genomic advances will be tailored not only to treat medical conditions, but also to prevent disease and improve health (31). Sound and well reflected genetics policies and programs require a timely and coordinated process for evidence-based policy making that relies on scientific research and ongoing community consultation (36). An acceptable and maybe delicate balance between providing strong protection of individuals' interests (37, 38) and enabling society to benefit from the genomic advancements at the same time must be found (11, 31, 39, 40).

Here, identifying needs of genetic tests (41), weighting benefits and risks (e.g., by using the in most European countries already well established public health method of Health Technology Assessment (HTA)) of predictive genetic tests and genetic screening interventions (28, 42, 43, 44, 45), assessing the benefits of preventive strategies as well as analysing complex new problems such as "genetic inequality" (32) is essential. On the one hand, even if, in terms of genetic susceptibilities and polymorphisms, it will turn out that "we are all at risk for something", there is potential for social inequalities in health as well as for social exclusion: if genetic tests will be not covered by sickness funds, access to genomic knowledge and thus, to individualized and stratified prevention, diagnostics and therapy will lead to a two-tire system. On the other hand, even if genetic tests will be reimbursed in most healthcare systems, what strongly should be the case, there will be another ethical and social problem, which may be much more discriminating: since genomics is triggering the complexity of knowledge, public health professionals will have the task to empower and enable people not only to understand this novel knowledge, but also to make people capable for sound decision-making regarding the application of genetic tests (46) and therefore to assure a fair equality of opportunities. Otherwise, the gap between people being able to handle this complexity and those being not, will have the potential of a new kind of social inequality (47).

In the long run, this supports a conception of public health taking leadership by implementing an evidence-based mode of policymaking. This is the reason why in the US, in the UK as well as in Germany Public Health Genetics has already been defined as "the integration of genome-based research into public health research, policy and practice".

For the public health community it is important to stress, that public health

genetics has nothing to do with modifying genes and that "genetic determinism" as well as "genetic exceptionalism" is obsolete (33). In addition it has to be clarified, that public health genetics is not synonymous with genetic epidemiology in the same way as public health is not synonymous with epidemiology, and also that community genetics (48, 49) is not synonymous with public health genetics as community health is not synonymous with public health (50). Furthermore, in terms of public health genetics the idea of integrating genomic knowledge into the aims and tasks of public health should be understood and promoted.

Public health tasks and responsibilities

During the past century, achievements in public health led to enormous improvements and benefits in the health and life expectancy of people around the world. Immunization programs and better sanitation practices resulted in the eradication or reduction of many infectious diseases as well as in safer food and water supplies. Advances in occupational safety considerably decreased the number of work-related injuries, illnesses and deaths. In the past 30 years, identification of behavioural risk factors, such as smoking, inactivity and poor dietary habits, gave rise to educational interventions and a decline in death rates from certain chronic diseases.

For the future achievements in public health the CDC Office of Genomics and Disease Prevention predicts "Perhaps because of these accomplishments, the determinants of disease and disability - whether natural or human made - are often perceived as originating outside the body. Although it has long been recognized that disease generally results from a constellation of host- and environment-specific factors, scientific and technologic limits have concentrated attention on the environment. Exogenous influences will continue to be vital for public health, but focusing solely on these influences may lead to diminishing rates of return compared to the triumphs of the past.

To continue making significant strides, the effectiveness of public health interventions must be strengthened by more fully incorporating knowledge of internal, host-specific factors and their interactions with environmental exposures including the social environment and lifestyles…"

In the realm of social policy making there is a need to come up with a clear strategy for assessing and translating this novel knowledge and application right in time. Policymakers now have the opportunity to take action. Precondition for immediate action is strategic planning across health programs, promoting genomics competencies among health professionals, enhancing surveillance and epidemiologic capacity to support evidence-based policy-making, building partnerships and seeking input from stakeholders. Here, integrating genetics information into health communication will be an essential tool to generate distributed knowledge.

Likely benefits as well as potential risks of the integration of genomics into public health interventions (assessment) should be identified. The framework (corridors) for effective, efficient and socially acceptable policies (policy development) should be described. And steps and ways should be proposed to assure these policies in public health practise (assurance). At the same time, these three steps ("public health trias") describe the core functions of public health agencies at all levels of government (51).

One specific task is to systematically analyse and evaluate every condition of public health interest such as preventive interventions by considering genomic knowledge. There is the potential for much more target-oriented and stratified prevention strategies (52) finally replacing "one strategy for all". Moreover, clearly there is potential to avoid ineffective or even "faulty" preventive strategies. For example, there is already the potential to differentiate between persons, who will respond to certain vaccinations and those who will not. Why then should non-responders take the risk of side-effects from vaccination if the vaccination will be ineffective and also will have no benefit in this case at all? In this specific situation, which is estimated to be true for at least in 10% of the population, would not primary prevention be immoral? As another example, obesity is not only influenced by lifestyle habits such as inactivity or nutrition, but also (in more than 60%!) by several genetic factors. At least 2% of these 60% are only due to mutations in the MC4R-gene. Individuals carrying the MC4R-mutation are almost "resistant" to any diet and physical activity. Is it not a "faulty" preventive strategy giving advice to these individuals that "five a day" or "a low-fat diet" will be effective? Would it not be the „better" (preventive) strategy to give support by respecting them as they are? Of course, there are much more polymorphisms triggering obesity, and there are several polymorphisms that play an important role in the effectiveness of diet and sports. There are even polymorphisms that increase the risk of dying after physical activity. It should be kept in mind that one should be careful about the message "prevention and health promotion is good for everybody", for example in terms of a specific diet or physical activity.

In this context, the "right not to know" and the "right to know" deserve the unbiased attention and must be mutually assured (11, 53). This has so far not been considered in most of the European discussions about the regulation of genetic tests. Besides the questions of reimbursement and access to genetic tests, restrictions in the provision of genetic tests such as physician's provision, which has already been considered in some countries like Germany, seem to be sheer naive in the era of e-health, globalization and integrated health services. Instead of proclaiming (ineffective) restrictions, would it not be much more effective and efficient to promote health literacy in order to protect the consumer? (53) And from an ethical point of view, would it not perhaps be more appropriate using the model of "informed contract" (54), which is based on the idea of "benefit

sharing" between the consumer and the provider, instead of continuing to use the model of "informed consent" and "informed choice" in the doctor-patient relationship?

New genetic technologies will force health communities to enhance surveillance and epidemiologic capacity for collecting and analyzing information stemming from community-based assessments of genomic variation (55), providing evidence about the burdens of various diseases. As with other fast-paced scientific and technological advancements, the intersection between genomics and public policy will continue to require close monitoring using methods like health technology assessment (HTA) (56, 57, 58, 59, 60, 61) and will continue to require timely action. By this, we will have the chance to ensure the appropriate and responsible use of new genetic technologies (62).

Concluding remarks

The next decade will provide a window of opportunity to prepare health professionals, the public and policy makers for the advent of the genomics on health and health care. This will be a doable project but will require regional as well as European as well as global coordination. Now there is the ethical obligation to prepare society to meet this challenge and to take up the opportunities provided by the science in a medically useful, effective, efficient, socially desirable and ethically justifiable manner. Here, health literacy, health communication and empowerment in managing risks are the key for opening the doors to truly beneficial public health genetics.

All in all, this can be facilitated by implementing ethical benchmarks like respect for autonomy and social justice in the context of policy development.

By promoting the communication about genomics in this way not only within the public health scientific community but also among professional groups, public health agencies and the public, perhaps, there will be a return on public investment in the human genome research.

There are already much more chances than risks in providing a better health for the population.

Indeed, there is still a discussion about stigmatization and discrimination due to genetic information not only in the public but also in the scientific community. Nevertheless, whoever continues separating genomic knowledge from medical information by defining genomic knowledge as exceptional, whoever continues promoting the obsolete idea of genetic determinism, and whoever continues claiming the "genetization", "molecularization" and "medicalization" of society, has not seriously tried to keep up with the genomic research in the past years. Explicitly, it should be emphasized at this point, that this accusation does not

necessarily imply that public health professionals do not have the obligation to consider genetic information as a highly sensitive factor in medical information.

Furthermore, it is not the question whether the combination of public health and genomics is dangerous (32). The key question is whether not rather harm is done to people by omitting to integrate genomic knowledge into public health interventions, and thus withholding the potential of stratified evidence-based prevention.

The public health community will lose credibility, if on the one hand public health is promoting health literacy in a value-pluralistic and democratic society and enabling and empowering individuals for decision-making while on the other hand ignoring and withholding genomic knowledge and therefore still not providing evidence-based public health interventions. In terms of the individual's "right to know" and in terms of best practice in public health, is this not a new form of discrimination?

The European perspective

Considering genetic determinants as a factor contributing to health and as such as a component for public health is a necessary step to enable good health for all. Thus, genetic determinants have to play an eminent role in a new EU health strategy. To create sound genetics policies and programmes public health should get involved and moreover take the lead by applying the three core functions of public health (assessment, policy development, assurance) to the provision of genetic health care services.

The European Commission has in its report on "Life Sciences and Biotechnology" (COM(2004) 250, April 7th 2004) committed itself to gain high quality in genetic testing and to increase "co-operation and exchange of information in order to enhance coherence and disseminate best practice". Furthermore, in the work plan 2005 of the "community action in the field of public health" the European Commission called for an application for a "networking exercise … to lead to an inventory report on genetic determinants relevant to public health…"

Thus, recently a European network on public health genetics entitled "Public Health Genetics European Network" (PHGEN) has been funded by the European Commission

1. to develop links with relevant Community programmes and actions and with national and regional initiatives, in order to promote synergy and avoid overlaps,

2. to gather and exchange information concerning best practice in order to assess and prepare the development of Community policies, strategies and measures,

3. to contribute to a high level of health protection and improvement of public health,

4. to take into account the need for supporting Member States' actions and enhanced co-operation in the EU-context, legal obligations and their implementation, and

5. to create self-sustainable mechanisms (63) which enable the Member States to coordinate their health-related activities in the field of public health genetics.

Coordinating institutions of the European network are the Institute of Public Health Northrhine-Westphalia (lögd) in Bielefeld, Germany, the German Centre for Public Health Genetics (DZPHG) in Bielefeld, Germany, as well as the Public Health Genetics Unit (PHGU) in Cambridge, UK.

Across Europe, there will be the chance of scientific advances being timely, effectively, efficiently and socially acceptable translated into evidence-based policies and interventions that improve population health.

The International perspective

In April 2005 an expert meeting organised by Ron Zimmern (PHGU Cambridge, UK), Muin Khoury (CDC Atlanta, USA) and Wylie Burke (University of Washington, Seattle, USA) was convened with funding from the Rockefeller Foundation at their conference centre in Bellagio to explore the possibility of establishing an international network to promote the goals of public health genomics, to share knowledge and resources, and to ensure equitable access to the benefits of genome-based knowledge by all, including those in developing countries. The meeting was attended by a multidisciplinary group of eighteen experts from Canada, France, Germany, the United Kingdom and the United States. The key outcome ("Bellagio Statement") was that the participants unanimously agreed first, the vision for and the scope of the enterprise covered by the field referred to as public health genetics (genomics) and second, to establish an international forum for its promotion, to be known as the Genome-based Research and Population Health International Network or GRAPH Int. The use of the term Int signifies that the collaboration is not only international but also interdisciplinary and integrated.

The objectives of GRAPH Int are to provide an international forum for dialogue and collaboration, to promote relevant research, to support the development of an integrated knowledge base, to promote education and training, to encourage communication and engagement with the public and other stakeholders, and to inform public policy. The vision and the ultimate goal of both the enterprise and the network is the effective translation of genome based knowledge for the

benefit of population health.

Thus, the EU-funded European network on public health genetics (PHGEN) covers the European part of the international network as GRAPH Europe.

EXERCISES

Students should search in the internet for "Public Health Genetics" and visit the recommended online resources to become familiar with the topic of "Public Health Genetics" as well as actual initiatives in this field. Furthermore, students are encouraged to write a short paper (statement) describing the challenges and tasks of public health genetics in their country considering institutional, organisational and structural issues.

ONLINE RESOURCES:

1. The Association of State and Territorial Health Officials (ASTHO), USA:
http:/www.genomicstoolkit.org
2. Public Health Genetics Unit (PHGU) Cambridge, UK: http://www.phgu.org.uk
3. Cambridge Genetics Knowledge Park (CGKP), UK: http://www.cgkp.org.uk
4. Partnership for Prevention, Washington D.C., USA
Harnessing Genetics to Prevent Disease & Improve Health. A State Policy Guide:
http://www.prevent.org
5. Centres for Disease Control and Prevention (CDC), Office of Genomics and Disease Prevention. Genomics and population health, Atlanta, USA:
http://www.cdc.gov/genomics/activities/ogdp//2003.htm
6. European Journal of Human Genetics (2003), Volume 11, Supplement 2:
http://www.nature.com/ejhg/journal/v11/n2s/index.html
7. Michigan Centre for Genomics & Public Health: Ethical, Legal and Social Issues in Public Health Genetics (PHELSI), 2004:
http://www.sph.umich.edu/genomics/media/subpage_autogen/PHELSI.pdf
8. European Commission: 25 Recommendations on the ethical, legal and social implications of genetic testing. European Commission Brussels, 2004:
http://europa.eu.int./comm/research/conferences/2004/genetic/pdf/recommendations_en.pdf

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Newborn Screening Programme and Folic Acid Fortification – Two Examples of Policy-Making in Public Health Genetics**
Module: 1.2	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Angela Brand, Dr. med., MPH** Professor for Social Medicine & Public Health, Director of the German Center for Public Health Genetics (DZPHG), University of Applied Sciences, Bielefeld, Germany **Helmut Brand, Dr. med. MSc, MFPH** Director of the Institute of Public Health Northrhine-Westphalia (lögd), Bielefeld, Germany **Peter Schröder, Dr. phil., MA** Health Policy and Planning, Institute of Public Health Northrhine-Westphalia (lögd), Bielefeld, Germany **Peter Dabrock, Dr. theol., MA** Professor of Social Ethics & Bioethics, Philipps-University Marburg, Germany
Address for correspondence	Prof. Dr. med. habil. Angela Brand MPH German Center for Public Health Genetics (DZPHG), University of Applied Sciences, Kurt-Schumacher-Str. 6, D-33615 Bielefeld, Germany Tel:: +49 521 10 67 864 Fax: +49 521 16 37 09 E-mail: angela.brand@fh-bielefeld.de
Keywords	public health genetics, prevention, health policy, newborn screening, folic acid prophylaxis
Learning objectives	After completing this module students and public health professionals will be able to: • Understand the current discussion on newborn screening issues; • Understand the current discussion on folic acid fortification; • Understand the role of public health in translating developments in newborn screening issues and folic acid fortification into policy and practice; • Consider Ethical, Legal and Social Implications (ELSI) of newborn screening issues and folic acid fortification; • Identify barriers and problems in policy-making in public health genetics; and • Identify evidence-based policies.

Abstract	The science of genetics and the advances brought about by the completion of the Human Genome Project has already had a significant impact on clinical practice and it is predicted that in due time almost every aspect of public health and clinical medicine will be influenced by it, bringing in its wake significant ethical, legal and social implications. The next decade will provide an opportunity to prepare public health professionals, the public and policy makers for the impact of this knowledge on health and health care. Thus, the following two examples of policy-making (folic acid fortification and newborn-screening) will deal with the question as to whether in the field of public health "the right prevention measures are being handled in the right way" with regard to the integration of genomic knowledge (public health genetics). This question encompasses both evidence assessment and quality management. Moreover it includes the demand for prevention measures which are more precise, more timely, more effective and have fewer side effects.
Teaching methods	Teaching methods include lectures, interactive group discussion, group presentations, study of literature as well as internet searches.
Specific recommendations for teachers	This module should be organised within 0.50 ECTS, out of which one third are lectures and group discussion supervised by the lecturers. The rest is individual work (readings and searching internet mainly) in order to prepare seminar group presentations.
Assessment of Students	Assessment should be based on individual participation in the interactive group discussions as well as on group presentations.

NEWBORN SCREENING PROGRAMME AND FOLIC ACID FORTIFICATION – TWO EXAMPLES OF POLICY-MAKING IN PUBLIC HEALTH GENETICS

Angela Brand, Helmut Brand, Peter Schröder, Peter Dabrock

1. Newborn Screening Programme

Assessment

In most European countries, the so-called Guthrie-test, a bacterial inhibition assay, was introduced almost 30 years ago for screening newborns for the early detection of congenital metabolic disorders and endocrinopathies (1). Therefore, about 98% of all newborn babies are tested for these disorders. In most countries the extent of the screening has up to now been determined by international well established screening criteria (Wilson & Jungner, 1968) (2). Routine examinations presently recommended for all newborns are the screening for the early detection of phenylketonuria (PKU), galactosemia (GAL) and hypothyreosis (TSH). Screening for the early detection of biotinidase deficiency and of the adrenogenital syndrome (AGS) are recommended for all newborns but have up to now only been carried out by some screening laboratories and only in some European countries. The best possible time for taking blood is the time following the 36th hour of life or at least 24 hours after the first protein-based diet has been given. In the case of outpatient deliveries or after discharge from hospital within the first 24 hours of life, TSH determination is in any case carried out since hypothyreosis can already be reliably discovered at this point in time. A problem at this early point in time is however the screening for GAL and PKU due to the frequent occurrence of false negative results. Therefore an additional second screening for GAL and PKU is recommended. Thanks to the Guthrie-test it has been possible to considerably reduce the severity of the examined diseases in most European countries through early diagnoses and targeted treatment and thus to enable many newborns to live an almost normal life.

Nevertheless the following assessment tendency or the following socio-ethical step model seem to be appropriate:

- if a screening programme fulfils the criteria of validity and reliability,
- if it is possible to achieve with limited resources a high level of individual benefit in terms of avoiding serious diseases and promoting individual potentials of development as well as a high level of social benefit in the form of avoiding high costs which would be incurred through delayed diagnoses, inadequate therapies and false diagnoses and
- if the person concerned will probably not be stigmatized by society, there is a high degree of socio-ethical obligation. This obligation covers two aspects. If the above-mentioned criteria apply, the public health services are obliged to provide and thus simultaneously to assure newborn screening – not least also to counteract any form of desolidarization. On the other hand, due to the rather little damage that will be done to the family (violation of formal self-determination; minimal tendency of discriminization) but the high economic costs that will arise in case of non-participation, there is a high moral obligation for the parents as well to participate in newborn screening programmes. Although under the conditions mentioned, participation is imperative from the moral and ethical point of view, this does not necessarily mean to transform it into legal compulsion. Given the fact that a legal culture which is based on "negative freedom" and informed consent has proved its worth, one might consider the proposal of maintaining the principle of voluntariness at the legal level and thereby not restricting oneself to standardized non-directive counselling only. The fact that in this context ethical deductions cannot simply be applied but that the corresponding attitudes of society must be considered has to be seen in connection with the circumstance that in the ethical and political discourse moral issues cannot simply be treated in a deductive way but have to be compared with cultural standards. Only in this way can in addition to the moral-theoretical validity the equally important acceptance and reproductibility of ethical judgements be maintained. Turning this meta rule upside down, the following can however also be concluded: If the described framework conditions are getting weaker, parents are less obliged to participate in newborn screening and the counselling should be carried out in a more non-directive way. In other words: The individual is less obliged to justify his refusal of participation.

The not simply non-directive counselling model described here under the mentioned maximal framework conditions can be reproached with transporting a health paternalism which cannot be accepted in a pluralistic society. But the opposite is true: It is only through ensuring elementary conditions (so-called conditional goods) that different possible forms of a successful life can at all be realized (3). Without paying respect to these basic goods freedom will remain an unsubstantiated principle and can be interpreted to the disadvantage of those who are deprived if under a purely formal ideology of freedom but due to lacking equality of chances these are not able to translate their concept of freedom into reality.

The capabilities approach selects this kind of real freedom to serve as a justice-theoretical guideline. It not only tries to make sure that through social compensation deficits are offset but it also deals with the question as to how the capabilities of each individual (also of those who by social convention are regarded as handicapped) can be promoted as effectively as possible. Here it is however not the individual wellbeing which is most important but the objective of providing sound conditions for being able to participate in interpersonal communication. The objective is thus to enable the individual to lead an integral and self responsible life under the given physical and age-specific conditions (4).

A number of congenital metabolic disorders and endocrinopathies which are not discovered under the traditional newborn screening system but which could in principle be treated today, are presently discovered too late and with unnecessary diagnostic efforts and by causing considerable financial costs both in the outpatient and inpatient sector. So some of the children concerned start to display health problems through the manifestation of clinical symptoms and signs. These can be revealed by critical metabolic disorders which quite often lead to death or irreversible damage. In other cases the diagnosis is made when the children display subacute health problems through retarded development or isolated organ manifestation. For a hardly estimated number of patients the diagnosis is not recognized as long as they live since the symptoms and signs of congenital metabolic diseases and endocrinopathies are too little known, judged wrongly or an inadequate diagnosis is made. Moreover, an increased number of antibiotic therapies particularly in the perinatal centres and the fact that through a reduced number of hospital days following uncomplicated delivery as a result of the introduction of case-based flat rates the test is carried out at an earlier point in time have led to increasing inaccuracies of the Guthrie-test. Another problem is the sample splitting in some countries : e.g., in Germany the hypothyreosis-screening is financed by the statutory health insurance companies (GKV) and all other screening parameters are tax paid. This makes it impossible to bring the screening results together.

All this shows that the present aggravation of the problem calls for new strategies such as for example the employment of new technologies.

The methodology of the future for screening newborns for congenital metabolic disorders and endocrinopathies will probably be Tandem Mass Spectrometry (Tandem MS). Using a dry blood sample this fully automated technology allows to analyse simultaneously and probably in a more efficient way up to 34 different congenital metabolic disorders as early as on the first day of life. The screening for hypothyreosis and galactosemia however has to be carried out with traditional means. A market for newborn screenings with corresponding competition is presently developing among private laboratories. Here it will be decisive how many analyses will be offered and demanded at which price – irrespective

of whether the statutory health insurance companies will take over some of the costs or not. Now already private laboratories try to conquer huge market sectors through price dumping without considering regional cooperation structures between screening and treatment centres. In this way, a reasonable screening management of congenital metabolic disorders and endocrinopathies and an evaluation of the effectivity and efficiency of newborn screening becomes almost impossible. Lacking quality standards in the traditional system particularly also comprising the extension of a tracking system for the follow-up of positive screening results have meanwhile resulted in an increasing number of screening failures (i.e. false negative cases which are recognized too late).

It will therefore become all the more important to use the recommendations of the medical expert societies for a systematic review (Health Technology Assessment) to find out under which conditions, according to which criteria and for which selected disorders a screening for the 34 metabolic disorders and endocrinopathies which can at present be technologically tested should reasonably be offered and carried out (5, 6). So for example an extension of the present newborn screening should cover only those defined treatable diseases which can validly and efficiently be detected with this technology. Moreover certain framework conditions have to be observed such as for example the existence of an established follow-up structure, a defined period of time for taking blood, information and consent of the parents and/or persons involved, a comprehensive and valid documentation and availability of the data and good laboratory practice.

Policy Development

At the national level, in several European countriesthe working committees have meanwhile dealt with the question of including newborn screenings extended by Tandem-MS into the range of services provided by the health insurances and has opted for this step.

Looking back on the question of implementing a newborn screening programme expanded by Tandem-MS, in most European countries except the UK (5, 6) no systematic evaluation such as Health Technology Assessment (HTA) has up to now been initiated. Even after almost 30 years of introduction of the Guthrie test, uniform newborn screening standards within most European countries are still lacking. So for example ensuring high coverage rates as well as quick information of the parents concerned in case of positive test results vary within a country. These organisational conditions make it more difficult to coordinate and analyse the data at the national level for the purpose of an improved quality management.

In connection with the newborn screening programme it has only marginally been discussed if through the present development in most European countries

a biobank which includes the data of almost all newborns and which presently – irrespective of the financing through the health insurances – "is slipping" from public or government institutions into private hands might bear potential for abuse (1). It is imaginable that a few private big laboratories will get the DNA and thus germ plasm of complete population groups through the test cards which are used for taking blood samples and might perhaps use them for commercial purposes (see example of Iceland) (7). Here we are confronted with the specific question as to whether with regard to this development for example the argument of medical confidentiality which also applies to private laboratories in most European countries will be sufficient for minimizing the potential of abuse of a population-related DNA database in private hands.

Another problem in terms of social law concerns the danger of being stigmatized in case of being tested for non-treatable metabolic disorders. Could this have consequences for the dealing with insurance companies and employers?

The newborn screening programme is an illustration of a prevention measure for which the question of inclusion into the range of services provided by the health insurances (unfortunately without HTA) has finally been clarified in most European countries. However, consequences with regard to social legislation and social ethics have been completely disregarded or ignored. Thus, now the most important question concerns the way as to how privately run biobanks will be dealt with by social and health policy (policy development). At present, the "right" prevention measure in this field (extended newborn screening by Tandem MS) is carried out "wrongly" in most European countries since there is urgent need for regulations, a fact which does not necessarily imply the requirement of a law. Now it is (unfortunately) too late for HTA (i.e. for a systematic assessment and evaluation) in most European countries. In addition to the already existing problem of a biobank in private ownership, a new problem is already now coming to a head. It is foreseeable that the present newborn screening by Tandem MS will before long be replaced by genetic tests (e.g. by DNA-chip technology) which will then in particular also allow the testing for a number of other dispositions for a disease.

2. Folic Acid Fortification

Assessment

The water-soluble folic acid vitamin is present both in animal and plant-based foods. Folates and their derivatives are coenzymes and thus an important and necessary component of numerous metabolic processes. They are for example of primordial importance for DNA and RNA synthesis as well as for cell division and the new building of cells (8, 9).

In case of inadequate administration of folates and/or of the vitamins B6 and B12, the homocysteine metabolism is disturbed so that the blood homocysteine concentration may rise. This means that the folate and homocysteine metabolisms are very closely correlated and that the homocysteine concentration in the blood can be used as an indicator for the quality of folic acid supply. The following rule can be applied: the higher the blood concentration of homocysteine, the more inadequate the supply with folic acids. Genetic causes are also discussed in connection with increased homocysteine levels. Whereas severely increased homocysteine levels are the result of a defect of the cystathionin-beta-synthase, slightly increased homocysteine levels occur in persons who are homozygote for the thermolabile variant of the methylentetrahydrofolatreductase (MTH-FR) enzyme. This variant occurs in about 10% of the population worldwide, whereas about 40% of the population are heterozygote carriers and thus have normal homocysteine levels. This is of great importance for targeted measures in the field of preventive medicine.

Various national and international studies have shown that the supply of the population with folates is inadequate (10, 11). With their usual diet, the greatest part of the population fails to cover the required level of folic acids recommended for health prevention. What are the health consequences of this inadequate supply with folic acids in almost all groups of the population?

Folic acids, which have been under research for more than 40 years now (12), are well known for the importance they have for congenital malformations and/or during pregnancy. In a number of randomised controlled studies (13, 14, 15), evidence could be provided that periconceptional supplementation with vitamins (i.e. in addition to B6 and B12 above all the supplementation with folic acids before pregnancy onset) will both lead to an increase of the fertility rate and to a significant reduction of congenital malformations by a total of up to 17%. The reduction was most pronounced in neural tube defects (so-called spina bifida) (16, 17, 18). The mechanism of this effect has not yet been sufficiently clarified. An increasing number of indications however supports the thesis that in this context homocysteine plays a decisive role. This is also confirmed by the fact that the C 677 T gene polymorphism of the methylentetrahydrofolatreductase (MTH-FR) correlates with elevated homocysteine levels in the blood (9). With 10% this gene polymorphism is already widely spread in the normal population, but it could much more frequently be shown in mothers of children with neural tube defects (19).

For women of childbearing age, three approaches to primary prevention of congenital malformations can thus be mentioned (20):

1. a daily diet rich in folic acids
2. the supplementation (i.e. additional supply) of folic acids or
3. the enrichment of basic foods with folic acids.

These approaches however lead to a number of practical problems: First, the folic acid content in foods varies considerably and no longer adequately covers daily needs (11). Moreover, different nutrition habits, certain drugs, gastro-intestinal diseases, the consumption of alcohol and cigarettes interfere with the folic acid metabolism (9). To some extent these are even folic acid antagonists so that in Germany the daily folic acid supply recommended for pregnant women is achieved for less than 10% of these women. In Great Britain it could for example also be shown that before conception only 2.4% of all pregnant women increased their folic acid supply with their diet although a national recommendation on folic acid prohylaxis for women who wanted to have children had already been made some time before (21). Another important aspect is the fact that in industrialized countries 40 – 50% of all pregnancies are unintended and that only 20% of these women go to a doctor in the first four weeks of their pregnancy. Folic acid prescriptions at a point in time when the pregnancy has long since started thus only have a very limited success for the prevention of congenital malformations.

But folic acid is important not only for pregnancy. It also has a great impact on *cardiovascular diseases*. A meta analysis of the year 1995 (22) and further large prospective studies could meanwhile show that at least 10% of all atherosclerotic diseases in the general population can exclusively be attributed to elevated homocysteine concentrations in the blood. In a prospective study with 10,000 participants from the USA (23), a daily supply of 0.3 mg of folic acid already led to a significant reduction of elevated homocysteine levels and at the same time also to a 20% reduction of the apoplexy risk and to an at least 13% reduction of the cardiac infarction risk. In 1995, it was calculated for the USA that through folic acid supplementation up to 50,000 deaths in persons of 45 years of age and older due to cardio-vascular diseases could be prevented (22). For Germany e.g., corresponding figures are estimated at up to 15,000 (24).

Another and third important aspect of folic acid has to be seen in the fact that as a result of its DNA methylisation capacity folic acid is able to repair DNA strand breaks and thus to protect against *cancer diseases* (25). This protective effect could already be shown for cancer of the colon and rectum, breast cancer and cancer of the prostate (26). It was also observed that a low folate uptake is very risky in people who are both consuming alcohol and cigarettes (27). In cancerogenesis folic acid thus seems to be a necessary but no sufficient risk factor.

A fourth and last possible important aspect of folic acid concerns the prevention of cognitive impairments in the elderly such as *dementia* (28) as well as *depressive disorders* (29, 30). Even if intervention studies are still outstanding, epidemiological studies already show the correlation between folic acid supply and cognitive diseases.

Policy Development

Which prevention strategies are useful, particularly due to the integration of genomic knowledge? Which "*evidence-based public health policies*" should be developed, or rather, which health policy implementation strategies should be carried out? Looking at the so-called "policy-making process" (31) which is important for the development of health policy implementation strategies, it has to be realized that all steps of the "policy-making process" have actually long since been fulfilled: There is sufficient evidence of the problem and it is regarded as substantially important (issue definition). The objective of a prevention measure is not only clearly recognizable but several targeted prevention measures can indeed be taken such as an increased daily supply through foods, supplementation and the enrichment of basic foods with folic acid (setting objectives). Particularly with regard to a discrepancy between a best possible implementation strategy and practicability it is moreover possible to weigh up the consequences of the potentially possible implementation strategies and thereby setting priorities (priority setting). Should the target group for example be the total population or only a specific group within the total population? Should the strategy for example be implemented by a national institution or by the individual himself? Or couldn't alternative strategies be considered as well (defining options and options appraisal) and be implemented alongside each other (implementation)?

After in 1981 Ireland already enriched its basic foods with folic acids and was thus the first country to provide evidence for a significant reduction of neural tube defects, ten years later states which also had a high risk of neural tube defects recommended folic acid supplementation in the periconceptional period, or rather, the enrichment of foods with folic acid: so for example in 1991 in the USA through the Centers for Disease Control, 1992 in Great Britain through the UK Department of Health, in 1992 in the Netherlands through the Netherlands Food and Nutrition Council and 1993 through the Scientific Committee for Food in the EU.

In Australia, after at first controversial discussions, the recommendations of the National Health and Medical Research Council were taken up by the National Food Authority in 1995. Still in the same year, the voluntary food enrichment with up to 50% of the daily folic acid requirements were included in the nutrition guidelines. Three years later this recommendation was evaluated and the decision made to replace the voluntary food enrichment by the compulsory fortification of foods. In the USA, the US Department of Health and Human Services and the Food and Drug Administration (FDA) in 1996 also decided to enrich cereal products with folic acid.

In contrast to these countries, no national health policy strategy has up to now been formulated e.g. in Germany. Not only to make sure that in Germany all women of childbearing age equally profit from the findings and experienc-

es of other countries should the enrichment of food with folates be considered. Folate supplementation is inadequate here. Particularly also due to the fact that the majority of the German population does not follow the recommendations of the nutrition campaign "Five a day" (intake of 5 portions of fruit or vegetables a day) and that moreover the preparation and storage of foods lead to folate content losses of between 30 and 90% (9), measures should be taken to counteract this inadequate supply with folates in the normal population with the enrichment of food on a systematic and not only selective basis. According to information taken from the German 2000 nutrition report (11), the average daily folate supply in the population amounts to no more than 58%, i.e. only half of the recommended value. Another aspect to be considered are the genetic causes, i.e. the widely spread C 677 T gene polymorphism of the methylentetrahydrofolatreductase (MTH-FR) in about 10% of the population. All this in turn leads to elevated homocysteine levels in the normal population with the above-described health impacts. It is particularly this reason of inadequate supply of the total population which prompts other countries such as Canady (Ontario) (32), Rhaeto-Romanic Switzerland (33), Hungary or Chile (34) to enrich their basic food with folic acid (fortification) so that mortality from cardiac infarction and apoplexy could soon be reduced significantly.

Given the evident effectivity and efficiency at population level, the negligible side effects and easy realization of the intervention, the implementation of such a national health policy strategy for countries like Germany should now be discussed in all seriousness (e.g. 0.1 mg folic acid/100 g bread or per 1 g salt). So finally, e.g. in Germany, this issue is presently being dealt with as part of a risk assessment approach through the German Federal Institute for Risk Assessment (BfR).

Folic acid prophylaxis is one of the few examples of a prevention measure or task of public health genetics which clearly fall into the responsibility of the state or under the tasks of the federal government. It serves (almost) every citizen, is efficient and has hardly any side effects. At present in various European countries such as Germany neither the "right" prevention measure is being carried out in this area at the federal level nor has any national strategy been introduced. In this example, no further assessment or even Health Technology Assessment (HTA) is required. It should instead be urgently examined (policy development and assurance) where the country-specific barriers to implementation lie. E.g. in Germany, it has to be assumed that these are both cultural reasons (compulsory fortification) and legal reasons (drugs versus nutrition supplements).

EXERCISES

Students should search in the internet for "Newborn Screening" and "Folic Acid Prophylaxis" as well as for actual initiatives in these fields of public health genetics. Furthermore, students are encouraged to write a short paper (statement) describing the challenges and tasks of public health genetics regarding newborn screening and folic acid fortification in their country considering policy issues.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Case Study: Macedonian Human DNA Bank (hDNAMKD) as a Source for Public Health Genetics**
Module:1.3	**ECTS (suggested): 0.25**
Author(s), degrees, institution(s)	**Mirko Spiroski, MD, PhD** Professor, Institute of Immunobiology and Human Genetics, Faculty of Medicine, Skopje **Todor Arsov,** **Aleksandar Petlichkovski,** **Ana Strezova,** **Dejan Trajkov,** **Olivija Efinska-Mladenovska,** **Elena Zaharieva**
Address for correspondence	Mirko Spiroski, MD, PhD Institute of Immunobiology and Human Genetics (IIBHG), Faculty of Medicine, University "St. Kiril & Metodij", Ul. "50 Divizija" No. 6, P.O. Box 60, 1109 Skopje, Republic of Macedonia Phone: +389 2 3110 556; Fax: +389 2 3110 558 e-mail: mspiroski@yahoo.com
Keywords	Public health schools, genetics, human DNA bank, Republic of Macedonia
Learning objectives	After completing this module students and public health professionals should: • Recognise the need for creation of human dna banks as a source for public health genetics; • Increase knowledge of legal issues for consent requirements; • Understand the methods of dna isolation and banking; • Differentiate ownership of banked samples; and • Identified control of banked samples.

Abstract	Macedonian Human DNA Bank was created. Blood samples were collected with written consent from the donors, specific protections were provided for vulnerable populations (minors, persons suffering from mental disorders, and adults placed under limited guardianship). DNA was obtained from peripheral blood leukocytes by the phenol extraction method. The MKD-SPI is designated laboratory code for the DNA samples stored in hDNAMKD. The samples deposited in hDNAMKD were allocated in one of the three active projects (anthropology, unrelated patients, and related patients project). There are several projects with different clinical diagnosis selected by depositor according to predefined criteria. There are three projects that included family data (related patients project): Related bone marrow transplantation, related renal transplantation, and autism. Depositors are donor's physicians. The DNA bank will provide material for research into the molecular alterations associated with population diversity and genetic disorders. Thus, the response to the needs of individuals and families who are threatened by genetic disease will improve.
Teaching methods	After reading this module, students will work in small groups, with additional recommended readings and Internet resources in order to analyze biobanks in South Eastern European countries and will submit in a written form proposal for creation SEE-PH hDNA bank.
Specific recommendations for teachers	This module is organised within 0.25 ECTS. The work is consisting from the text of this module, seminar paper, small group discussions, as well as written recommendations for creation of SEE-PH hDNA bank.
Assessment of students	Seminar paper describing the content of biobank(s) in SEE, and written recommendations for creation of SEE-PH hDNA bank.

CASE STUDY: MACEDONIAN HUMAN DNA BANK (HDNAMKD) AS A SOURCE FOR PUBLIC HEALTH GENETICS

Mirko Spiroski, Todor Arsov, Aleksandar Petlichkovski, Ana Strezova, Dejan Trajkov, Olivija Efinska-Mladenovska, Elena Zaharieva

1. Introduction

Two areas of investigations in biomedicine that began early in this century have expanded rapidly in recent years. One is the search for genetic variation associated with disease; the other is the use of genetic variation to infer human origins and prehistory. Although anthropological and biomedical genetics have different objectives, there are similarities in the resources they seek and the problems to be faced in obtaining them (1-3).

DNA analysis differs from many other genetic tests in several ways. First, the rapid advance of DNA diagnostic capabilities places special responsibilities on the providers of these services to keep current. Second, the long-term stability of DNA may permit questions to be answered later that were not envisioned at the time of its procurement. Third, since the DNA analyses commonly involve linkage analysis, a concept that is unfamiliar to laypersons and too many health care professionals, there is a significant risk of misinterpretation of results by recipients (4-6).

The aim of this paper is to present the Macedonian Human DNA Bank (hDNAMKD) as a source for public health genetics, legal issues for consent requirements, methods of DNA isolation and banking, control of banked samples, ownership of banked samples, as well as service recharge rates.

2. Aims

The aims of the Macedonian Human DNA Bank are:

- To provide genetic material for human variations in Macedonian population inside and outside Republic of Macedonia, and minorities living in Republic of Macedonia (Molecular Anthropology);

- To provide material for research into the molecular alterations associated with population diversity and genetic disorders Public Health Genetics or Genetic Epidemiology);

- To respond to the needs of individuals and families who are threatened by genetic disease, particularly their wish to know whether or not they are at a risk of developing or transmitting a disorder with a genetic component (Medical Genetics).

3. Material and methods

Consent requirements for the banking and further use of samples

DNA samples are taken from the individuals with written consent and specific protections for vulnerable populations are provided (minors, persons suffering from mental disorders, and adults placed under limited guardianship). Testing of these persons for diagnostic purposes is permitted only when this is necessary for their own health or if the information is imperatively needed to diagnose the existence of a genetic disease in family members (7-8).

Individuals are informed with respect to the types of research that will or might be carried out, the arrangements for access to or sharing of stored samples, and the duration of storage (9). Consent is freely given, free from pressure, based on information provided by the trained staff of the Institute of Immunobiology and Human Genetics, Faculty of Medicine, Skopje, Republic of Macedonia. Individuals have the right to withdraw at any time from the research, including destruction of their samples (10). Individuals are asked to consent for broader use of the DNA samples without need to re-contact individuals (11).

Consent at the population level (group consent) is provided from all individuals participating in the research by signing the questionnaire with their own, their parents, their grand parents, and their grand grand parent's anthropological data for cultural, linguistic, religious, and geographic identification.

Chemicals and equipment

GeneQuant pro RNA/DNA calculator (Amersham Biosciences), GNA 100 electrophoresis (Amersham Biosciences), Electrophoresis Power Supply - EPS 600 (Amersham Biosciences), MacroVue UV-25 (Amersham Biosciences), Polaroid Gel Cam (Amersham Biosciences), Heraeus Sepatech deep freezer (-80oC), Sorval 12MC V centrifuge.

DNA isolation and deposition

DNA was isolated from peripheral blood leukocytes by the phenol-chlorophorm extraction method (12). The quantity and quality of the genomic DNA isolate is determined by 260/280 UV spectrophotometer with GeneQuant pro RNA/DNA calculator. At regular intervals, the integrity of isolated DNA is evaluated by agarose gel electrophoresis performed on randomly selected isolates. Following isolation and quality assessment, DNA is aliquoted into a normalized

concentration. The preparation of aliquots serves to allow ready distribution of DNA samples to both the client laboratory and their collaborators and to preclude excessive routine freezing and thawing of the primary DNA isolate, a practice which is well known to result in notable degradation of genomic DNA stocks. All samples are stored in alarmed Heraeus Sepatech ultra-low freezer at -80ºC.

Access to the DNA Bank facility is restricted to DNA Bank personnel; in addition, access to the DNA Bank's computer databases is still further limited to only selected Bank staff members. All DNA sample distributions require written authorization by both the principal investigator of the study underlying the samples in question (depositor) and the DNA Bank Manager (Director of the Institute).

Control of banked samples and quality issues

Sharing of all knowledge and distribution of materials are obligatory. Data and materials are free of charge and are available at a nominal cost or to cover distribution costs. Health professionals for their own medical research can use medical data. DNA samples are stored indefinitely. Stored samples may be destroyed at the specific request of the person. The destruction of samples is not possible for samples already provided to the researchers or if already entered into a research protocol or used for diagnostic purposes or used for immortalization of cell lines (7).

Ownership of banked samples

The owner of the anthropology data is Institute of Immunobiology and Human Genetics (IIHG), Faculty of Medicine, Skopje, Republic of Macedonia. Banked DNA from the patients is property of the depositors (IIHG and MD who sent the material for DNA banking).

Service recharge rates

In accordance with Macedonian Fund for Health Protection, all services will be charged according the Price List for Health Protection. Our recharge rate is based on estimated material and labour costs for one 10 cc tube of whole blood.

4. Results

We defined three project fields in Macedonian Human DNA Bank: anthropology (hDNAMKD1), unrelated patients (hDNAMKD2), and related patients (hDNAMKD3). Laboratory code for the DNA samples stored in Macedonian Human DNA Bank is MKDSPI. A total number of 2705 DNA samples are stored in Macedonian Human DNA Bank - 1526 in the anthropology, 722 in the unrelated patients, and 457 in the related patients project field. Depositor of the DNA samples of anthropology project field is Institute of Immunobiology and Human Genetics (Table 1).

Table 1. Definition of Project Fields, hDNA Bank Code, Laboratory code, and frequency of DNA samples stored in Macedonian Human DNA Bank (hDNAMKD) (December 31, 2004).

Project Field	hDNA Bank Code	DNA Stored Samples					
		2000	2001	2002	2003	2004	2000-2004
Anthropology	hDNAMKD1	46	281	653	401	145	1526
Unrelated patients	hDNAMKD2	111	249	75	210	77	722
Blood related patients	hDNAMKD3	19	159	103	115	61	457
TOTAL	**3**	**176**	**689**	**831**	**726**	**283**	**2705**

The structure and definition of populations in this project (ANTH) are defined according the personal national declaration, language, and religion (Table 2). Macedonians are defined as a nation with Macedonian origin, with Macedonian primary and secondary language, and with different religions (Orthodox, Catholic, Protestant, Muslims e.t.c.). National minorities (ethnicities) in the Republic of Macedonia are defined with MKD as a prefix added to the minority name. MKDAlbanians are Albanian minorities with Albanian as a primary language, Macedonian as a secondary language, and Muslim religion. MKDRoma are Roma minorities with heterogeneous primary language (Macedonian, Roma, and Turkish), with Macedonian secondary language, and with Muslim religion. MKDTurks are Turkish minorities with Turkish primary language, with Macedonian secondary language, and with Muslim religion. MKDSerbs are Serbs minorities with Serbian primary language, Macedonian secondary language, and orthodox religion. MKDVlachs are Vlachos minorities with Vlachos primary language, Macedonian secondary language, and orthodox religion. MKDAdmixed are the rest of minorities (Monte Negro, Jewish, and others) with admixed primary languages, and admixed religions. There are DNA samples from the Gora region, southwest Kosovo, Yugoslavia labelled as YUGGora with Goran as a primary language, Macedonian secondary language, and Muslim religion. YUGGorans are very close to MKDMuslims situated in the west part of Republic of Macedonia (Table 2).

Table 2. Definition of Macedonian population DNA samples stored in the Anthropology project field of Macedonian Human DNA Bank (hDNAMKD1).

Population Name (ethnicity)	Nation	Other Nation	Primary Language	Secondary (Home) Language	Religion
Macedonians	Macedonian	Macedonian	Macedonian	Macedonian	Orthodox Catholic Protestant Muslim
MKDAlbanians	Albanian	Macedonian	Albanian	Macedonian	Muslim Catholic
MKDRoma	Roma	Macedonian	Macedonian, Roma, Turkish	Macedonian	Muslim, Orthodox
MKDTurks	Turk	Macedonian	Turkish	Macedonian	Muslim
MKDSerbs	Serb	Macedonian	Serbian	Macedonian	Orthodox
MKDVlachs	Vlach	Macedonian	Vlachs	Macedonian	Orthodox
MKDAdmixed	Admixed	Macedonian	Admixed	Macedonian	Admixed
YUGGorans	Gora	Serbian	Macedonian	Serbian	Muslim

Project codes for blood unrelated patients are defined as five character codes. A total number of 722 DNA samples are stored from unrelated patients from different projects. Depositors of the clinical DNA samples are medical doctors working on different project in cooperation with the Institute of Immunobiology and Human Genetics. There are 10 projects with different clinical diagnosis selected by depositor according defined criteria. The number of clinical projects and DNA samples is continuously growing up.

We have three projects consisted with family data: related bone marrow transplantation (BMTR), related renal transplantation (RETR), and autism (AUTI) consisted of a total number of 457 persons (DNA samples). Depositors are medical doctors connected with particular project. The number of projects, families, and DNA samples from related samples is continuously in progress.

5. Discussion

There are several integrative activities in Europe and USA for legislation, creation, coordination and communication of biobanks. In the South Eastern Europe, there are present some human DNA, but they are not publicly available and not connected with public health genetics.

European resources. The European Commission's Biosociety website contains a compilation of information on European policy and legislation, EU-funded research, public consultation within Europe (including Eurobarometer), bioethics, and food quality and safety. "Bioforum" offers an opportunity for discussion of specific topics and there is also a database of experts.

- Life sciences and biotechnology - a strategy for Europe (European Commission, January 2002).
- DRAFT: Proposed statement on formal recognition of medical genetics as a medical specialty in Europe (European Society of Human Genetics, 2001).
- Provision of genetic services in Europe - current practices and issues (13).
- European Group on Ethics in Science and New Technologies.
- Data storage and DNA banking for biomedical research: technical, social and ethical issues Recommendations of the European Society of Human Genetics (14).
- Population genetic screening programmes: technical, social and ethical issues Recommendations of the European Society of Human Genetics (15).
- Genetic information and testing in insurance and employment: technical, social and ethical issues Recommendations of the European Society of Human Genetics (16).
- Directive 98/44/EC of the European Parliament and of the Council of 6 July 1998 on the legal protection of biotechnological inventions.
- European Convention for Human Rights and Biomedicine (April 1997). Article 11 of this Convention covers uses of genetic information. A useful Explanatory Report to the Convention (May 1997) is also available. An additional Protocol: Prohibition on Cloning Human Beings, was added in January 1998.
- Concerted action on genetics services in Europe (CAGSE). A report of an EU-funded project to produce an authoritative description of genetics services in Europe, 1997 (13). The report, which was published as a supplement to the European Journal of Human Genetics (17) contains tabulated information about:

  - statistical trends in European countries (population, GNP, life expectancy etc);

- the numbers of genetically-trained professionals per million of population;

- the current status of newborn screening programmes;

- the current status of screening for carriers of recessive diseases and late-onset genetic disorders;

- the current status of genetic family registers;

- current educational programmes at undergraduate and post-graduate level;

- factors limiting access to medical and genetics services.

Ethical, Legal and Social Aspects of Human Genetic Databases (ELSAGEN) - A European Comparison. The ELSAGEN project has two general objectives:

1. Ethical, legal and social studies of genetic databases: To anticipate and address questions raised by recent developments in genetics research by providing knowledge of ethical, legal and social aspects of population-based human genetic databases.

2. Consultation: To consult citizens by providing knowledge of public views of privacy and related moral values in the context of human genetic databases.

To meet the first objective a number of studies that fall into four categories are undertaken: Ethical, legal, social and what could be called "fundamental" issues.

Ethical issues. The objective of the studies on ethical issues is to provide knowledge about such ethical concerns as privacy, consent and genetic discrimination in the context of human genetic databases.

Legal issues. The objective of the studies on legal issues is to provide knowledge about the laws, policies and guidelines relating to genetic databases throughout Europe, and the essential legal problems which have to be addressed in relation to the collection and storage of genetic data; and to discern key common principles from this policy matrix and use them to construct a normative framework.

Social issues. The objective of the studies on social issues is to provide knowledge about the effects of human genetic databases and genomics on governance and democracy, about the relations of ethical standards, social norms and values as they are reflected in the debates about databases, and about the concepts and applications of social justice in the context of human genetic databases.

Fundamental issues. The objective of the studies in the fundamental issues is to investigate relations between knowledge, values and human rights. Three

studies are planned here, one on fundamental concepts in bioethics and the implications of genetic databases, the second on how ethical frameworks mutate and change in the light of new technologies and the third on the social, cultural, and philosophical context of the science and technology on which human genetic databases are based.

Consultation on public views of privacy. The second objective is to provide knowledge about public views of privacy in the context of human genetic databases, people's trust of public and commercial organisations with regard to collection and storage of personal data, and to what extent these views and attitudes vary between the four countries. A combined quantitative and qualitative sociological study will be conducted in the four countries and the results analysed by bioethicists.

Public Health Genetics Unit (PHGU). Together with the University of Cambridge Centre for Medical Genetics and Policy, the PHGU forms the nucleus of the Cambridge Genetics Knowledge Park, established in April 2002 with funding from the Department of Health and the Department of Trade and Industry. The PHGU is endorsed by the Faculty of Clinical Medicine of the University of Cambridge. It is located at the Strangeways Research Laboratory and is associated with the University of Cambridge Institute of Public Health. Aims of the PHGU are:

- To keep abreast of developments in molecular and clinical genetics, and in their ethical, legal, social and public health implications.
- To provide a link between academic research, clinical practice and the development of policy within the NHS for genetics and genetic services, including the implications for the funding, development, staffing, organisation and provision of those services.
- To establish mechanisms for dialogue within the NHS between geneticists, physicians, public health and primary care professionals on matters related to genetics, molecular medicine and genetic services.
- To provide an epidemiological and public health perspective on NHS policy development for genetic and related services, including criteria for evaluating genetic testing and genetic screening programmes.

National Health and Nutrition Examination Survey (NHANES) III DNA Bank: Gene Variants Important to Public Health. The National Health and Nutrition Examination Survey (NHANES) is a nationally representative survey of the United States population (18), conducted by the National Centre for Health Statistics (NCHS). Detailed interviews, clinical, laboratory and radiological examinations are conducted as part of the survey. NCHS has collected these data with an assurance of confidentiality (19). During the second phase of NHANES

III (1991-1994), white blood cells were frozen and cell lines were immortalized with Epstein-Barr virus, creating a DNA bank. The bank is maintained by the National Centre for Environmental Health, CDC, and contains specimens from more than 7000 participants (20, 21). In 2002, NCHS requested proposals for the use of these specimens. Collaborative CDC-Wide Project A CDC-wide working group of epidemiologists and laboratorians, representing most Centres and Institutes at CDC, was convened to develop a collaborative proposal for determining the prevalence of selected genotypes of public health importance using the NHANES III DNA Bank (22). The criteria used to select genes important to public health included:

- known or hypothesized association with diseases of public health importance,
- role in pathways affecting multiple diseases,
- identified functional variants,
- relatively common variants (prevalence >2%),
- previously described gene-environment or gene-gene interactions,
- relevant phenotypic data available in NHANES datasets, and
- no current use for clinical risk assessment or intervention.

The final proposal included 87 variants of 57 genes known to be important in at least six major pathways:

- nutrient metabolism (e.g., folate and homocysteine; lipids; glucose; alcohol; vitamin D),
- immune and inflammatory responses (e.g., cytokines, cytokine receptors),
- activation and detoxification pathways (e.g., drugs, carcinogens, environmental contaminants),
- DNA repair pathways (e.g., ionizing radiation, environmental toxins),
- hemostasis and renin/angiotension pathways, and
- developmental pathways.

Genotyping is performed in collaboration with the National Cancer Institute (NCI) at the NCI Core Genotyping Facility. Prevalence data from the NHANES database will be the basis for future analysis of gene-disease associations and gene-environment interactions. Gene-environment interactions are considered to be the fundamental biological processes that both maintain health and bring about disease. As our understanding of these interactions grows, establishing the prevalence of gene variants known to interact with specific environmental factors will be a key factor in assessing the potential impact of environ-

mental interventions. Genotypic information will add another dimension to the analysis of clinical, physical, and lifestyle information collected by NHANES. Additional analysis of genotype/phenotype relations will be proposed once the prevalence data have been evaluated (Table 3).

Table 3. NHANES CDC-Wide Working Group

ATSDR	Agency for Toxic Substances and Disease Registry
NCBDDD	National Centre on Birth Defects and Developmental Disabilities
NCHSTP	National Centre for HIV, STD, and TB Prevention
NCID	National Centre for Infectious Diseases
NCEH	National Centre for Environmental Health
NCCDPHP	National Centre for Chronic Disease Prevention and Health Promotion
NIOSH	National Institute for Occupational Safety and Health
NIP	National Immunization Program
NCHS	National Centre for Health Statistics
OGDP	Office of Genomics and Disease Prevention
PHPPO	Public Health Practice Program Office

(http://www.cdc.gov/genomics/NHANES.htm)

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EXERCISES: ***Biobanks in South Eastern Europe***

Task 1: Seminar paper. Students should use additional recommended readings and Internet resources in order to analyze biobanks in South Eastern European countries. As output, students should write a seminar paper describing the content of biobank(s), ethical issues, accessibility, and potential use of biobanks for public health genetics.

Task 2: After reading this case study under the supervision of lecturer, students are asked to split and work in small groups (4-6 students) in order to discuss and create South Eastern European Public Health Human DNA Bank (SEE-PH hDNA). Each group will discuss one of the following items (1 hour for reading the case study, 1 hour for group discussion and 2 hours to produce written recommendations to be presented to the whole group):

- legal background for creation SEE-PH hDNA;
- aims of SEE-PH hDNA;
- project fields of SEE-PH hDNA;
- participation in international projects;
- established working regulations;
- shares of SEE-PH hDNA;
- working transparency and international network.

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RECOMMENDED READINGS (INTERNET LINKS)

1. Macedonian Human DNA Bank [http://www.hdnamkd.org.mk]
2. National DNA Data Bank of Canada [http://www.nddb-bndg.org/main_e.htm]
3. UCSF DNA Bank, University of California, San Francisco [http://www.som.ucsf.edu/departments/dnabank/about.htm]
4. DNA Bank and Tissue Repository, Duke Centre for Human Genetics [http://www.chg.duke.edu/dnabank.html]
5. DNA Resources Core, Vanderbilt University Medical Centre [http://phg.mc.vanderbilt.edu/dnacore.shtml]
6. DNA Bank/Alzheimer's Disease, College of Georgia [http://www.mcg.edu/alzres/index.htm]
7. DNA Bank of Alzheimer's Families for Genetic Studies [http://www.ttuhsc.edu/SOM/Neuropsychiatry/ALZRES/DNAWeb/DNA_Bank_Home.htm]
8. DNA bank from patients with retinal diseases [http://www.research-projects.unizh.ch/med/unit40300/area382/pl419.htm]
9. DNA Bank, ICP - Centro per la malattia di Parkinson e i disturbi del movimento, Milano [http://www.parkinson.it/centro/eng/dnabank.html]
10. Iranian Human Mutation Gene Bank [http://www.ihmgb.com/]
11. DNA Copyright Institute [http://www.dnacopyright.com/]
12. DNA Bank, GeneLink, Inc. [http://www.bankdna.com/dnabanking.asp]

HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title:	**Socio-Economic Factors – Key Determinants Of Health**
Module: 2.1	**ECTS (suggested): 0.25**
Author(s), degrees, institution(s)	**Genc Burazeri, MD, MPH** Department of Public Health, Faculty of Medicine, Tirana, Albania **Nertila Tavanxhi, MD, Ms.C**. UNAIDS, Geneva, Switzerland **Lidia Georgieva, MD, Ph.D.** Assoc. professor, Department of Preventive Medicine and Epidemiology, Faculty of Public Health, Medical University - Sofia, Bulgaria **Ulrich Laaser, MD, DTM&H, MPH** Professor, Section of International Public Health, University of Health Sciences, Bielefeld, Germany
Address for Correspondence	Genc Burazeri, Faculty of Medicine Rr. "Dibres", No.371, Tirana, Albania Tel: +355 4 240401 Fax: +355 4 257420 E-mail: gburazeri@yahoo.com
Keywords	Education, income, inequalities, health, socio-economic.
Learning objectives	At the end of the module, students should be able to: • Critically appraise the differential toll of ill-health across populations and population sub-groups; • Understand the impact of socio-economic environment on health; and • Assess the main socio-economic determinants of health in their own populations: education, income, occupation, absolute (material) deprivation, and relative depravation.

Abstract	There is a considerable body of literature indicating a consistent relationship between socio-economic factors and health. The principal measures of socio-economic status have been *education, income, and occupation.* Education has been the most frequent measure as it does not usually change (as income or occupation might) after early adulthood. Information about education can be obtained easily and it is unlikely that poor health in adulthood influences level of education. Recent research undertaken in former communist countries has developed specific instruments for assessment of individual socio-economic circumstances or conditions. These include *"material deprivation" and "amenities at three levels"* (self-perceived deprivation, an important psycho-social pathway to ill-health). Assessment of socio-economic environment is important in order to understand ill-health differences across population sub-groups.
Teaching methods	• Introductory lectures; • Small-group seminars, during which students are assigned different tasks.
Specific recommendations for teachers	This module should be assigned 0.25 ECTS.
Assessment of Students	• *Group assignment* (5-7 students): development of instruments/tools to assess socio-economic factors. Students are expected to come up with consensual/group questionnaires, which will help them develop a "team spirit". This is an important issue to regulate the fragmentized learning and working dimension, which is rather problematic in SEE countries due to an inherited "Soviet" teaching style. From this point of view, group assignments are recommended to account for *40% of the overall grade of the module.* • *Individual assignment:* take home essay (up to 3000 words, references excluded). Students are expected to provide a comprehensive literature review about socio-economic determinants of health, and critically appraise the major socio-economic factors linked with ill-health on their own populations. Individual assignments are recommended to account for *60% of the overall grade of the module.*

SOCIO-ECONOMIC FACTORS – KEY DETERMINANTS OF HEALTH

Genc Burazeri, Nertila Tavanxhi, Lidia Georgieva, Ulrich Laaser

Introduction

What accounts for the health gap between and within countries?

It has been argued that differences in availability, accessibility and affordability of medical care services account for a considerable proportion of ill-health differences across different sub-groups of populations (1-2).

From this point of view, health inequalities arise from inequalities in health care.

However, medical care fails to address the social gradient in the onset of new cases of diseases, which are not issues of medical care *per se*, or inequalities in mortality from diseases which are not amenable to medical services (or at least, whose avoidance is questionable) (3). Moreover, the main contributor to the mortality gap observed between Eastern and Western countries (coronary heart disease), is believed not to be amenable to medical care (4-5). Furthermore, childhood circumstances, work environment, unemployment, patterns of social relationships, social exclusion, as well as engagement in unhealthy behaviour cannot be accounted for by lack of access to good-quality medical care.

In addition, although individual risk partly explains the variation in occurrence of diseases, it fails to explain marked differences in morbidity/mortality in line with differences in socio-economic status over short periods of time (where genetic predisposition to disease is assumed not to change substantially) (6-7). It is also worth making a distinction between individual risk factors and environmental causes of disease, since attempts to explain ill-health differences across populations based only on an individual risk-factor approach has been persuasively criticized (8). Besides the partial variation in occurrence of disease, it has proved difficult to modify individual risk factors by trying to persuade individuals to change their behaviour. Notwithstanding successes achieved with individuals in groups at high risk (e.g. drug treatment for hypertension and/or high cholesterol levels), it makes a limited contribution to reducing disease rates in the whole population (7-8). As Geoffrey Rose has suggested, the cause(s) of individual differences in disease may be different from the cause(s) of differences between populations (9). Therefore, social

determinants play a key role in explaining the ill-health gap between populations and within population sub-groups.

Socio-economic circumstances: absolute and relative depravation

In attempting to account for the health gap between and within countries, a considerable part of the research conducted in the last decades, has linked observed differences in ill-health between and within countries with a whole array of elements, which shape the socio-economic environment in different countries.

The following phenomena concerning the socio-economic circumstances are evident in different countries depending on the Gross National Product (GNP) structure:

There is a clear relationship between income and life expectancy (LE) between countries (10). In poor countries, even small increases in GNP (per capita) are associated with relatively large increases in LE, which is due mainly to malnutrition and/or infectious diseases. Hence, the absolute material deprivation is an important determinant, which explains the differential toll of morbidity and mortality between poor and rich countries. From this perspective, for the poor countries of the world, an increase in living standards that reduces malnutrition and infectious diseases will make a major contribution to improving health.

In counties with a GNP (per capita) of >$5000, the relationship between GNP and LE is weak (10). The implication of such relationship is that, above a certain level of income, even large differences in income between wealthy countries are associated with negligible differences in respective LE.

For countries with similar levels of income, there is a strong relation between income inequality and LE (10-11). This is termed "relative deprivation", which is arguably considered as a major determinant of ill-health in "rich" countries, as opposed to the absolute deprivation which accounts for a considerable proportion of morbidity/mortality in poor countries. Income inequality reflects the social environment and the way societies are organized. From this point of view, there is a developing research area that relates disease patterns to the organization of society and the way society invests in its human capital. In recent years, it is soundly being argued that many classical risk factors (such as hypertension, alcohol consumption, smoking, or lack of exercise) have clear social determinants (7,11). Therefore, the excess morbidity and mortality not explained by ~~the~~ absolute deprivation in rich countries has been linked to the psycho-social concept (referred to as relative deprivation). A striking example comes from the Whitehall study (British civil servants), which documented large differences in CHD mortality patterns associated with the perceived (relative) deprivation (12). Form this perspective, for the rich countries of the world, reduction in socio-economic inequalities will make a major contribution to improving health.

Social position and health status: selection or causation?

Plausibly, observed differences in disease rates relate more to characteristics of the social environment. The causal direction, therefore, is likely to be from social environment to illness, and not the other way (7). Nevertheless, it has been intriguingly argued that health status may determine both socio-economic position as well as social circumstances that affect health (13-14). From this point of view, health could be a major determinant of life chances/opportunities. This phenomenon has been termed "health selection". The implication of such a phenomenon is that health may "select" people into different social strata (layers) (13-14). Accordingly, sick individuals are more likely to lose their jobs and/or remain unemployed than healthy people. This might bear important implications as to the direction of causality of the relationship between social position and health. This would lead to the argument that poor health leads to lower position in the social hierarchy, social exclusion, increased risk of unemployment and job insecurity, less participation in social networks, unhealthy behaviour (diet, smoking, alcohol and drug addiction, as well as lack of physical activity) (13-14). However, such a question of "egg and chicken" can be convincingly addressed in longitudinal (cohort) studies only. So far, current evidence (albeit limited to few prospective studies) suggests the casual direction to be from social environment to illness and not vice-versa (15-16).

Assessment of socio-economic factors in countries of South East Europe

Education

Education is the most widely used measure of socio-economic status in most of research conducted anywhere in the world (17). The advantage of employing such a variable (education) as a measure of socio-economic position is related to the relatively simple/straightforward questions, which usually generate a high response rate (17-18). Furthermore, as educational attainment is usually stable after young adulthood, it is little affected by poor health developed later in life among adults of both sexes (17-18). However, engagement of education as a measure of socio-economic position has also some disadvantages, which should be taken into consideration, especially in countries of South Eastern Europe, or more broadly former communist countries. For example, in Albania there are huge birth cohort differences in levels of education, so as psychological and behavioural patterns of a given level of education are different for different cohorts. In addition, poor illness in childhood may affect the level of education attained in young adulthood. Nevertheless, due to its simplicity, comparability between countries and especially the difficult endeavour of measurement of income level, educational attainment is frequently used as the key measure of social ranking in most of societies.

Most of the research conducted in Eastern European and former Soviet countries has classified individual educational attainment into the following four categories: *primary or below, vocational (apprenticeship), secondary (or an equivalent level), and university degree* (19-22). Nonetheless, this classification is contingent on: a) specific educational systems in each country, and b) the relative value each society assigns to the development of its human resources.

Income

Income like education is another widely used measure of socio-economic position (17-18). However, beside difficulties in assessment of such a variable (e.g. high non-response rates), a low income level may reflect impaired health (13-14). From this perspective, contrary to education, income maybe directly affected by health status in adulthood, therefore pointing to differential life chances/opportunities in adulthood associated with state of health (13-14). Furthermore, measurement of income is rather complex in all societies; it encompasses not only individual wages, but also other sources of income such as real estate/property or non-cash benefits (food stamps, free access to medical care, etc.). Therefore, it may be more useful to measure the total assets of individuals, which commonly is termed *"wealth"* (17). However, such measurements are is a rather difficult job to pursue.

Things get even more complicated in former communist countries where transition towards a free market system in the last decade is associated with a high degree of distrust/hostility and negative feelings/affection by large segments of populations, which does not permit a reliable estimate of "real" individual income/wealth in these countries.

In attempting to measure income level among undergraduate university students in Tirana last fall, we employed the following instrument/question: *"How would you rate your monthly family income including wages, allowances, family businesses, and other sources of income, subtracting the rent your family might be paying for the apartment or house?"* (23-24). However, we got the lowest response rate for this question (80%), even though we asked for more confidential/sensitive information (sexual behaviour and practices, for which the overall response rate was 87%). Therefore, other proxy measures should be engaged in parallel with the self-reported income in order to capture the array of socio-economic position of individuals in Eastern European countries.

Occupation

Occupation is another variable commonly employed for assessment of socio-economic ranking of individuals in all societies (17-18). However, the use of such a measure (occupation) usually involves some categorization. Two famous examples to mention with this regard are the Registrar General of Great Britain (used since 1911) (25) and the US Bureau of Census (used since 1897) (26), which are roughly comparable. Occupation is an important characteristic in modern societies linked with prestige and social status. However, use of occupation as a measure of socio-economic position bears several disadvantages. As for income, current occupation for certain individuals may reflect the impact of disease/poor health (13-14). Furthermore, modern research has focused on the decision latitude, time pressure and social support in the work place rather than the classical categorization of occupations/professions. Thus, the Whitehall study (conducted among British civil servants) (12) in addition to Karasek's pioneering evidence (27-28), has arguably linked a higher risk of coronary events and its related mortality with work environment/characteristics.

In former communist countries, the employment of current occupation/profession for assessment of social position is even more difficult. The orientation towards a free-market system in the last decade has been associated with tremendous changes in employment rates and occupational/professional shifting. Besides the exceptionally high unemployment rates, it has not been uncommon for physicians or other conventional "white-collar" professionals to have moved into manual occupations and/or questionable businesses. On the other hand, former "blue-collars" (with no university degree) employed currently in the most prestigious positions are even less uncommon. Furthermore, the overwhelming rapid socio-economic transition is driving large segments of populations into a multi-occupational fashion (part-time jobs rather than a permanent full-time position). Therefore, assessment of occupation/profession in countries of South Eastern Europe must clearly address the following issue: *assessment of current or "habitual" occupation?* From this perspective, use of current occupation/profession is rather questionable in these countries. Nonetheless, authoritative research conducted in former communist countries has, to a certain extent, matched successfully current occupation as a measure of socio-economic position. Occupation in these studies was classified into three broad categories: *managerial/supervisor, other employment and self-employment (19-22).*

Assessment of absolute and relative deprivation in former communist countries

Recent research undertaken in former communist countries has developed specific instruments for assessment of individual socio-economic circumstances. Thereof, a concept of "material deprivation" (19, 21-22, 29) and a concept of "relative deprivation" (30) were developed.

Material depravation

Material depravation was used as an index of absolute depravation in former communist countries. It is assessed by 3 questions about how often the individuals' household has difficulties to buy enough food or clothes and to pay bills for housing, heating and electricity (19,21-22). Possible answers to these questions (never/almost never, sometimes, often, always) are coded and a depravation score is derived as the sum, based on which individuals are classified into two categories: low material depravation and high material deprivation. This rather simple instrument has resulted valid in prediction of poor health in vulnerable sub-groups (i.e. individuals with low socio-economic status) (19, 21-22, 29).

Relative depravation: amenities at three levels

In attempting to assess the relative (self-perceived) depravation as an important psycho-social pathway to ill-health, individuals in Hungary were asked to report on household items that they possessed (30). According to this approach, household items are classified as follows:

Basic items: washing machine, refrigerator, microwave, telephone.

Socially oriented items: colour television, radio cassette recorder, car, motorcycle.

Luxury items: cable television, air conditioner, dishwasher, personal computer, summer house, garden.

Nevertheless, application of this classification should be regarded with caution, as different items might fall into different categories depending on the specific socio-economic environment of each country. For example, in Albania microwave and car ownership would be better placed into the 3rd category (i.e. luxury items). However, such a practical classification of amenities may be useful and worth adopting by all SEE countries in order to assess the health impact of both, absolute and relative depravation.

Therefore, postgraduate public health students are encouraged to adapt and validate these instruments *(material depravation and amenities at 3 levels)* for their specific settings/environments.

EXERCISES

Task 1: Students are required to develop tools for assessing socio-economic position based on three main components engaged in research studies worldwide *(education, income and occupation/profession)*. Students should design a simple, but comprehensive questionnaire in order to capture the array of social position (social ranking) of individuals in their own settings. In different countries/cultures, *education, profession and income* bear different socio-economic connotations. Therefore, students are expected to design such a tool which would best capture the array of social standing for individuals pertinent to their societies.

Task 2: Students are required to develop a tool for assessing *material deprivation* based on the questionnaire designed by Bobak M et al (19,21-22). This questionnaire, however, should be adapted/amended in line with specific socio-economic environments of students' own societies.

Task 3: Students are required to provide the means for assessing *relative deprivation* based on measurement of *amenities at three levels*, as described by Marmot M et al (30). Same consideration as above (i.e. questionnaires should be designed in a "setting-specific" fashion).

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Inequalities and Ill Health**
Module: 2.2	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Barbara Artnik, DMD, MSc** Teaching Assistant Department of Public Health, Faculty of Medicine, University of Ljubljana, Ljubljana, Slovenia
Address for correspondence	Barbara Artnik, DMD, MSc Department of Public Health, Faculty of Medicine Zaloska 4 SI-1000 Ljubljana Slovenia Tel: + 386 1 543 7540, Fax: + 386 1 543 7541 E-mail: barbara.artnik@mf.uni-lj.si
Keywords	Socioeconomic factors; mortality; life expectancy; health policy; policy making; national health programs
Learning objectives	The first two educational objectives (domain of intellectual skills) of this module are: • To increase the awareness of health professionals about the negative effects of persisting inequalities in health within and between countries; • To sensitise health professionals for developing an attitude about reducing inequalities in health as a very important task of their work. Health professionals represent a bridge to policy-makers in the sense of thought-transference and implementation of research achievements into practice. After completing this module (domain of intellectual, practical and also communication skills) participants should be capable to: • Assess the data currently available; • Collect additional data; • Analyse, interpret and present the data; and • Formulate a policy response to the results.

Abstract	Socio-economic inequalities in health are a major challenge for health policy, not only because most of these inequalities can be considered unfair, but also because reducing the burden of health problems in disadvantaged groups offers a great potential for improving the average health status of the population as a whole. However, it seems that public health professionals are not enough aware of inequalities in health, or they are not trained enough to handle them. It can be partially explained by the fact that there is insufficient postgraduate education and continuous training in the field of socio-economic inequalities for public health personnel. This module consists of four activities (tasks), one activity for every learning objective (Task 1 - Assessment process of the availability of data, Task 2 - Existing data resources, Task 3 - Methodological guidelines, Task 4 -Formulating a public health policy.
Teaching methods	For the purposes of this training programme a workshop should be performed (Four weekends of training course on Friday afternoon and on Saturday) within four months. The whole programme should be carried out as a discussion led by a moderator. After every activity, specific learning objectives should be determined for every participant and until the next workshop their professional tasks should be performed. Their achievements should be reported (within 10 minutes) and discussed with other participants at the next meeting. The formulated document should be submitted to policy-makers. Resources: A computer room for 20 participants needs to be assured. Statistical package SPSS for Windows should be installed on every computer and if necessary, the software should be also installed to the personal computers of the participants. Equipment: data projector for PowerPoint presentations, overhead projectors, paper, pencils.
Specific recommendations for teachers	Suggested ETCS: 0.50, of which, 2/3 should be supervised work and 1/3 individual work. It is recommended for participants (a group of 15 to 20 students) to be familiar with the statistical package SPSS for Windows. A computer room should be provided.
Assessment of participants	An attitude test should assess the changes in the attitudes of participants. Two questionnaires should be administered to all course participants, one at the beginning of the first meeting and the other one at the end of the training course. **Module evaluation:** Questionnaires should be distributed during the course to assess the level of satisfaction of participants with the programme. However, the most important evaluation of the module should be the final outcome – health policy formulation.

INEQUALITIES AND ILL HEALTH

Barbara Artnik

Introduction

Differentials in health and longevity by socioeconomic status (SES) and by the nature of social relationships have been identified in a myriad of studies, some dating as far back as the 1800s. More so than most research areas, this field has actively engaged researchers from many disciplines, including sociology, psychology, economics, demography, epidemiology, biology, and medicine. They have found that, with few exceptions, persons of higher socioeconomic status and persons, who are more socially integrated, experience lower rates of morbidity and mortality than their respective counterparts (1-4).

The international evidence points to an uneven distribution of health and disease, favouring those in socially advantaged positions, whether position is measured by income, education, occupation or other indicator or socioeconomic status. These associations have been identified across time, place, gender, and age. Moreover, these inequalities in health are apparent for a broad set of outcome variables, such as self-perceived health, most illnesses, disability, mortality, and psychological well-being, and for alternative measures of social position, such as income, other measures of wealth, education, occupation, level of social integration, and marital status. The magnitude of the differentials is substantial, not trivial. For example, mortality rates are commonly two-to three-fold greater for people at the bottom than at the top of the social scale; life expectancy is five years less for unskilled workers than for professionals; there is a gap of between nine to twelve years in disability-free life expectancy between poor and rich people (5).

Terminology

The term “inequality” is used for stating differences in health status determined by social variables like educational grade, professional category and income level sometimes added up to one integrated index of social status. By some, this is called “vertical” inequality, whereas “horizontal” inequality may refer to various dimensions of disparities connected with gender and age or different ways of looking at a person’s position in the society, e.g. marital and family status, ethnic group, whether one is a migrant or a native resident etc. Others prefer not to make such a distinction but to think instead in terms of disadvantaged or

vulnerable groups such as migrating labourers, the unemployed, socially isolated elderly, and one parent families.

The differences or variations in the health profiles can be measured from standard health statistics. However, not all of these differences can be described as inequalities.

Inequality in health is a term commonly used in some countries to indicate systemic, avoidable and important differences. However, there is some ambiguity about the term, as some use it to convey a sense of unfairness while others use it to mean unequal in a purely mathematical sense. Added to this is the problem of translation in some languages, where there is only one word available to cover both "inequality" and "inequity". To avoid confusion, the terms "equity" and "inequity" have been chosen by World Health Organisation (WHO) for the European Health for All strategy.

The term "inequity" as used in WHO documents has a moral and ethical dimension. It refers to differences in health which are not only unnecessary and avoidable, but in addition, are also considered unfair and unjust. In order to describe a certain situation as inequitable, the cause has to be examined and judged to be unfair in the context of what is going on in the rest of society. The issue of equity in health is not only equity in health outcomes, but also equity in the various determinants of health. The concept of fairness obviously involves a moral judgement and is, therefore, intrinsically difficult. As is the case with health outcomes, the inequities in health determinants are those that should not exist. Every person should, in terms of equity, have the opportunity to access those sanitary and social measures necessary to protect, promote, and maintain or recover health (6).

Explanations for inequalities in health

Three categories of explanations for the observed patterns have been proposed. One set of hypotheses relates to a set of causal mechanisms through which socioeconomic status and social relationships potentially affect health status and the risk of dying. A second type of explanation, sometimes referred to as "selection" or "reverse causation", refers to a set of pathways whereby unhealthy individuals may reduce their social position or become socially more isolated as a consequence of their inferior health status. A third, less frequently invoked explanation encompasses artefactual mechanisms, such as measurement error.

The consensus among researchers from different disciplines is that the observed disparities in health are driven largely (although not entirely) by a complex set of causal processes, rather than by selection or artefactual mechanisms. In terms of SES and health, the claim has been that, although there is some evidence of

downward social mobility among individuals in poor health, this selection process makes only a minor contribution to the overall association between SES and a wide range of health indicators (7-13).

Similarly, scientists have argued that selection processes have a negligible impact on the observed health differentials in social support, social integration, and marital status (14, 15).

Artefactual mechanisms (e.g., errors of measurement, such as undercounts in the census, numerator-denominator problems, such as inconsistencies in reports between registration and census data, or inappropriate measures of mortality or SES) are also not considered to be a powerful explanation of the observed associations (16, 17).

A review on inequalities in health

The relation of poverty to ill health has been known for centuries, and the classic work of medical historians such as Sigerist (18) outlines the evolution of that relationship. He describes the major lines of thought of the eighteenth century when activists like Johann Peter Frank recognized poverty as a major cause of disease and advocated for a police function in public health. The industrial revolution accentuated the appalling health living conditions of the poor and led to the utilitarian approaches of reformers like Chadwick towards improving the health of the poor in the nineteenth century.

It is appropriate here to point out the role of one of the medical heroes, Rudolf Virchow (19), whose leadership of the health reform movement in this country has left a remarkable legacy in terms of social security that includes health benefits. He investigated an outbreak of relapsing fever in Silesia and came to the conclusion that the causes were essentially social. According to Sigerist, he recommended prosperity, education, and liberty, which can develop only on the basis of complete and unrestricted democracy.

Almost every country in the world has data showing the differences in health outcomes. In spite of that researchers refer frequently to the United Kingdom where there is a tradition of more than 150 years of collecting and analysing health data. The politically most effective description of socio-economic gradients and mortality after the Second World War was so-called Black Report (2) published first 1978 in the United Kingdom. The results demonstrate the constant social gradient for almost all causes of mortality. It was a seminal work on the inequalities in health and the policies necessary to promote and restore health. Even though the report caused little positive domestic reaction at the time, it was and continues to be the stimulus for debate and research in the international arena on the inequalities of health outcome and the means to address them.

More recently another study on inequalities in health in the UK has been conducted, and the findings have been published in what is known as the Acheson Report (20), after Sir Donald Acheson. The report documents the persisting inequalities in health and states that for many measures of health, inequalities have either remained the same or have widened in recent decades. The report "adopts the socioeconomic model of health and its inequalities" and posits that the capacity of the personal behaviour and lifestyles of individuals to affect health is significantly modulated by the social and community influences in which a given individual operates. In addition, there is a wide range of living and working conditions that can positively or negatively affect the health outcomes.

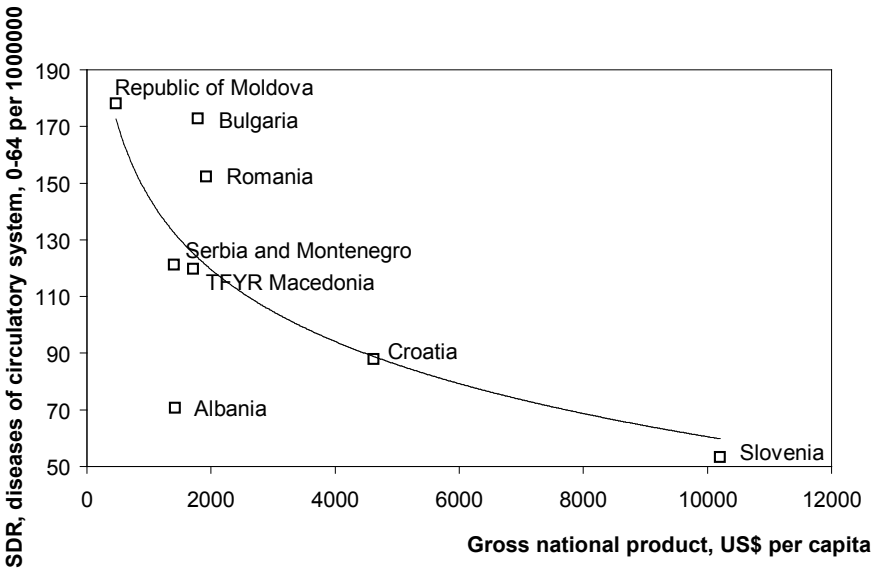
The data clearly show the impact of social class on health. In spite of criticisms of the formulation of the social classes, there is now overwhelming evidence of the influence of social hierarchy on health. In the classic work Why Some People Are Healthy and Others Not (21), Renaud makes a most definitive statement: The lower one is situated in the social hierarchy as defined by work, lodging, education, income or whatever; the lower one's probability of staying in good health and the lower one's life expectancy. This is the most frequent and most pervasive of all the observations made in the history of public health.

The fact that health outcomes are to a large measure socially determined gives hope that these social conditions, if altered, can lead to improved health. The Acheson Report (20) notes that in order to reduce health inequalities, "further steps should be taken to reduce income inequalities and improve the living standards of poor households." This recommendation is remarkably accurate when it addresses both the aspect of difference in income and the absolute level of income that is associated with poverty. There has often been debate as to whether it is income distribution or poverty that has the major impact on health. The answer is that the predominance of one or other depends very much on the economic status of the population examined.

There is a clear potential link between social ties and social capital as reviewed by Kawachi (22). Kawachi and his colleagues (23) describe lucidly the two approaches to the economic situations associated with ill health. There is the focus on absolute poverty, with the need that is expressed so often today to eliminate or to eradicate poverty. These expressions borrowed from the image of disease control and eradication but, although attractive as slogans, are not usually useful in operational terms. The other focus is on relative deprivation, where it is the difference in income between groups perhaps at any level of wealth that is a major determinant of health outcome. It is important to make this differential. Poverty affects the individual's capacity to maintain or recover his or her health and in addition impacts on the societal environment that itself will affect health. Relative deprivation or, in its commonly assessed expression, misdistribution of income is not an individual characteristic, but is very much a structural aspect of the society or group in which the individual has to function.

As already indicated, it is not only absolute deprivation that is important. As Wilkinson's seminal work (24) has proven, income inequality has an equally and sometimes more powerful influence on such health outcomes as infant mortality rate and life expectancy. Particularly in the developed and richer countries, it is income distribution rather than individual measures of wealth such as per capita gross national product (GNP) that are important. However, a decreasing exponential trend of standardised mortality from cardiovascular diseases at increasing GNP can be observed in the countries of South Eastern Europe (Figure 1).

Figure 1. Gross national product (GNP) and standardised mortality from diseases of circulatory system by South Eastern European countries, 2002



Source: Health for All Data Basis

Income misdistribution is associated not only with health outcome but with a whole range of social pathologies. In societies that have more income inequality, there is increased criminal activity, for example.

Constant (although not necessarily linear) relationships between SES (measured by occupational class, income, or education level) and health status have been established for other outcomes, including the infant mortality rate and the prevalence of major chronic diseases (7). A well established relationship between educational level and health status is mediated in part by the obvious connections between higher educational achievement, a better job, improved standard of living and more resources to devote healthcare and treatment.

People in many of the lower income countries – and, indeed, poor, disadvantaged and marginalised people everywhere in the world –have benefited less from the products of health research and continue to suffer high – and often growing – levels of ill health and premature death. Many of the reasons for this can be traced to failures to use knowledge which can be linked to issues such as inadequate finances, lack of political will, weak infrastructures and missing human resources.

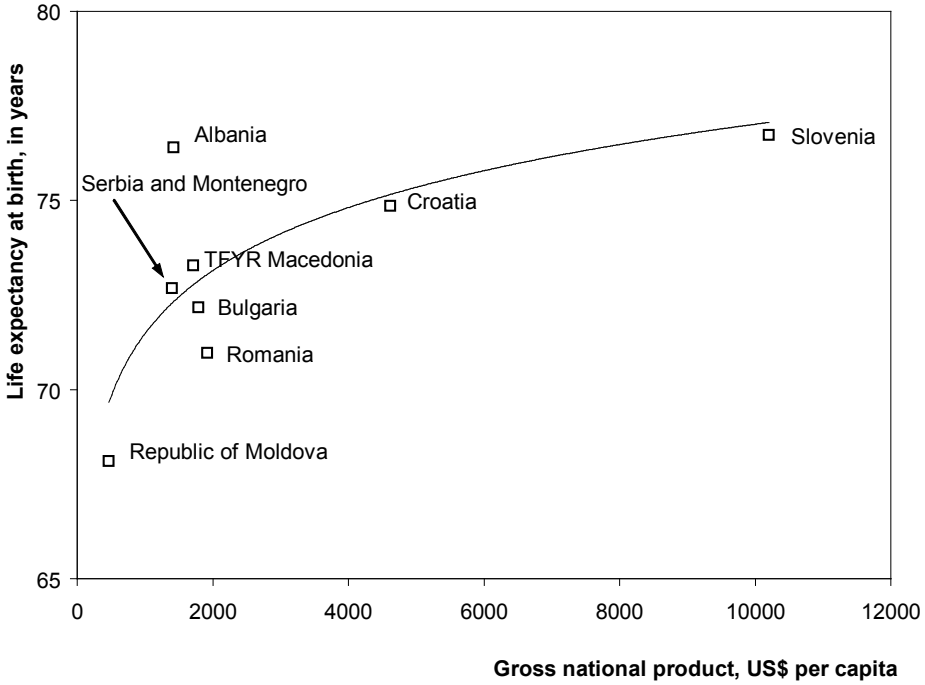
There is a vicious circle linking poverty and ill health. As a consequence poor people are subject to higher rates of maternal mortality, HIV/AIDS and a host of other burdens that can have devastating consequences for themselves and their families.

It also has been proposed that when material deprivation is such that the expectations of the individual cannot be fulfilled, a situation develops similar to the anomie described by Durkheim (25). As he first conceived it, anomie refers to a state in which the usual norms are no longer clear or observed, and later he used the concept to describe anomic suicide. The competition between individuals and the incongruence between aspirations and possible satisfaction favoured the impulse towards suicide. It is not farfetched to relate the increase in criminal activity and social stress attendant upon income inequality to the anomie of Durkheim.

The relationship between income and measures of health such as life expectancy is curvilinear. The poorer the group, the sharper and clearer the relationship, but above a certain level of income the curve flattens and the effect of income on health is progressively muted. In terms of country level comparisons, we can note that the effect of income on life expectancy, for example, is stronger in the developing than in the more developed countries. Figure 2 shows the connection between life expectancy at birth and GNP in South Eastern Europe. A logarithmic trend from the given data of South Eastern Europe shows a strong positive gradient for the low GNP, whereas a moderate increasing slope for the countries with the higher GNP is observed. The life expectancy trend confirms the observations from other countries.

In a classic series of data produced 25 years ago, Preston (26) developed a family of curves for the relationship between income and life expectancy for different decades of this century. The curves remain qualitatively the same, but over time—as countries prosper—the curves shift, and there is a higher life expectancy for the same income level. This is a most important observation, in that it leads to the view that there are exogenous factors such as technology, both hard and soft, that have contributed to this increase in life expectancy at similar income levels. It is the advent of this technology that has been implicated in the finding of the relatively more rapid improvements in health in many of the developing countries.

Figure 2. Life expectancy at birth and gross national product (GNP) by South Eastern European countries, 2002.



Source: Health for All Data Basis

It has been suggested that it is not only difference in outcomes, such as mortality rates, that can be affected by misdistribution of income. Income differentials result in or are derived from different work opportunities, and these employment differentials are said to create a situation in which the self-worth and autonomy of the lower paid worker are so affected as to lead to varying degrees of psychosocial stress. The spread of information that shows what can be achieved elsewhere makes the appreciation of the gap between aspirations and reality so great that there can be outcomes measured in terms of physiological abnormality. The television images of the rich and famous are seen in the most remote parts of the world, and miracles of modern technology appear to be there simply for the asking. Blood pressure, for example, increases when there is incongruity between what the individual perceives to be an acceptable or conventional lifestyle and that to which he or she is subjected or relegated because of material deprivation.

Results are less clear cut in studies that employ multiple measures of social position. For example, Fuchs (27) argues that when health is modelled as a function of both income and schooling, the latter variable dominates, sometimes leading to a negative association between health and income.

Findings from many studies have challenged the notion that the association SES and health is due largely to the adversities associated with poverty. Instead of revealing a threshold effect, these associations have emerged at every level of the social hierarchy (e.g., the highest social class was shown to be healthier and have lower risks of dying than the next highest group), generating what researchers now refer to as a social gradient in health. For example, the widely cited Whitehall study from the 25-year follow-up of British civil servants (28-30) shows the social gradient in all-cause mortality. The mortality gradient was present even within a relatively homogeneous group: civil servants in one type of occupation (stable office jobs) and one geographical location (London), but in different grades of employment (8). These men were all in stable employment and none were in poverty in any absolute sense of that word, yet there is a gradient in mortality. Each grade in the civil service has higher mortality rates than the grade above it in the hierarchy.

Lisa Berkman and Thomas Glass (31) have reviewed the evidence for the strong and consistent protective effect of participation in social networks and of social support. Evidence from the Whitehall II study shows that the lower is the position in the hierarchy, the less is the participation in social networks outside the family, and the more negative the degree of social support is (32).

The impact of poverty on health is still evident today, and in every country it will be the poor who are the most disadvantaged, both in terms of health outcomes and in access to the factors that make for good health. Poverty is associated with mental as well as physical illness, and there are good data to show that low socioeconomic status is associated with higher rates of psychopathology. But as the Report on World Mental Health (33) points out, "although poverty is linked to mental ill health, economic prosperity does not translate directly into either personal or social well-being."

There is a gradient in health outcome running from the most to the least advantaged members of society; these health outcomes are not specific to any particular cause; a medical response will not solve the problem; nor will a response that emphasises individual choices over lifestyle. Inequalities in health are a manifestation of the social determinants of health. While it does not follow automatically that if the causes are social in origin, the solutions need necessarily to be social; it is likely that an understanding of causes of inequality has the possibility to lead to policies that can make a fundamental contribution to improving health in society (34).

WHO: Health for all in the 21st century

The policy of the World Health Organisation (35) is based on the fact that the world is one and indivisible. As stated in the 1998 World Health Declaration, the enjoyment of health is one of the fundamental rights of every human being. Health is a precondition for well-being and the quality of life. It is a benchmark for measuring progress towards the reduction of poverty, the promotion of social cohesion and the elimination of discrimination. Health status is differing significantly between the Member States of European Region (51 countries) and within them is representing the major obstacle to development. The regional policy for health for all is a response to the World Health Declaration (35). To achieve health for all in the 21st century, the European Region of WHO has set 21 targets (36), which Member States are supposed to achieve between the years 2005 and 2020 (depending on individual target) by the means of the national policy and regional development's orientations. For equity in health, the first two targets are of the main importance. Equity in health is supposed to be attained by the means of solidarity at country level and in the European Region as a whole.

Target 1: Solidarity for health in the European Region

Poverty is the major cause of ill health and lack of social cohesion. One third of population of the eastern part of the European Region, 120 million people, live in extreme poverty. Health has suffered most where social systems have collapsed, and where natural resources have been poorly managed. This is clearly demonstrated by the wide health gap between the western and eastern parts of the Region. The differences in infant mortality rates are the most significant (from 3 to 43 per 1000 live births) as well as in life expectancy at birth (from 79 to 64 years). According to the plans of the WHO (36), the present gap in health status between Member States of the European Region should be reduced by at least 30 %. In order to reduce these inequities and to maintain the security and cohesion of the European Region, a much stronger collective effort needs to be made by international institutions, funding agencies and donor countries. Furthermore, external support should be much better integrated through joint inputs into government health development programmes that are given high priority and are firmly based on a national health for all policy in the receiving country.

Target 2: Equity in health

Second target of the WHO aims to ensure the differences between socioeconomic groups to be decreased, since even in the richest countries in the European Region, the better off live several years longer and have fewer illnesses and disabilities than the poor. The health gap between socioeconomic groups within countries are supposed to be reduced by at least one fourth in all Member

States, by substantially improving the level of health of disadvantaged groups of inhabitants.

Poverty is the biggest risk factor for health, and income-related differences in health – which stretch in a gradient across all levels of the social hierarchy – are a serious injustice and reflect some of the most powerful influences on health. Financial deprivation also leads to prejudice and social exclusion, with increased level of violence and crime.

There are also great differences in health status between women and men in the European Region. Other health-risk factors, which are determining association with a certain socio-economic group, are educational level, nationality, etc.

Advisable Guidelines for Reducing Inequalities in Health

Socio-economic inequalities in health are a major challenge for health policy, not only because most of these inequalities can be considered unfair (6), but also because reducing the burden of health problems in disadvantaged groups offers a great potential for improving the average health status of the population as a whole (37). The international community and national governments are turning to the scientific community for advice on how to reduce inequalities in health. Governments are looking, in the worlds of WHO's strategy for Europe, for »a scientific framework for decision makers« and »a science-based guide to better health development« (36). As recommended by the WHO for European Region (36), policy-makers should develop a systematic strategy for monitoring socio-economic inequalities in health. Action should be taken on different levels. Inequalities should be reduced by the means of the state strategy, city and community policies, using intersectional co-operation. Extend of the health and social activities should be planned, co-ordinated and enlarged in a professional and a precise manner, with the special emphasis laid on children, invalids, pregnant women and elder persons. People as individuals should be aware and ensured better information on growth and development of children, life-style and health, endangerment at work, etc. Taking the measures stated here above is conditioned by structural and etiological familiarity with inequality between individual groups of population in a certain place and time. Research programmes for studying the condition and for reducing health inequalities have already been introduced by the Netherlands, Finland, New Zealand (38-41). These countries were recently joint by the UK Government with its programme (42).

However, in other countries it was too little done to solve the problem of inequalities in health. It seems that public health professionals are not enough aware of inequalities in health or they are not trained enough to handle them. It can be partially explained by the fact, that there is neither postgraduate education nor training in the field of socio-economic inequalities for public health personnel.

Several principles for action stem from the concepts of equity outlined by Margaret Whitehead (6). These are listed here as general points to be borne in mind when designing or implementing policies, so that greater equity in health and health care is promoted:

1. Equity policies should be concerned with improving living and working conditions;

2. Equity policies should be directed towards enabling people to adopt healthier lifestyles;

3. Equity policies require a genuine commitment to decentralizing power and decision-making, encouraging people to participate in every stage of the policy-making process;

4. Health impact assessment together with intersectional action;

5. Mutual concern and control at the international level,

6. Equity in health care is based on the principle of making high quality health care accessible to all,

7. Equity policies should be based on appropriate research, monitoring and evaluation.

Above all, it should be stressed that solving problems of inequity cannot be achieved by one level of organisation or one sector but has to take place at all levels and involve everyone as partners in health to meet the challenges of the future.

Conclusions

There is consistent evidence throughout the world that people at a socio-economical disadvantage suffer a heavier burden of illness and have higher mortality rates than better off counterparts (1-4).

Science has brought dramatic improvements in human well-being world-wide, as witnessed by the contributions it has made to extending lifespan and quality of life for people in many countries in the last century but the benefits of modern health research have not been evenly shared. Half of the world's premature deaths could be prevented with simple and cost-effective interventions. But it is not enough known how to make these more widely available to the people who need them.

The risks that lead to chronic diseases contribute to health inequalities by social class in developed countries, and increasingly in developing countries (43-45). There is a need for researchers focusing on inequalities in health to identify which interventions and policies will have the most pronounced impact on reducing social class inequalities and engage in the development of health promotion approaches that explicitly target reduction in inequalities.

The targets of WHO in the European Region (36) are clearly very ambitious, that may not be realistic everywhere. Nevertheless, it gives a clear focus to health policy and promotes the monitoring of quantitative changes over time in socio-economic inequalities in health, which is essential to assess the effects of health policy interventions. This will only work, however, if ways can be found of quantifying the "size" of socio-economic inequalities in health (46).

However, although we should not formulate policies in the absence of evidence to support them, we must not be paralysed into inaction while we wait for the evidence to be absolutely unimpeachable (34). The evidence in this Chapter provides basis for formulating policies to address the social determinants of health.

EXERCISES: ADVISABLE GUIDELINES FOR REDUCING INEQUALITIES IN HEALTH

For the purposes of this training programme four tasks will be executed (one task for every learning objective). The whole programme will be carried out as a discussion led by moderator. After every task specific learning objectives will be determined for every participant and until the next meeting their professional tasks should be performed. Their achievements will be reported (within 10 minutes) and discussed with other participants at the next meeting.

Task 1. Stimulating introduction at the first meeting will be led by moderator: key words will be used as a target to sensitise the participants that the inequalities in health exist. Discussion: The assessment process of the availability of data. Task 1 they have to achieve until the Meeting 2:

- To inventory the data that are already being collected and that can be used to measure the magnitude of socio-economic inequalities in health (from socio-economic registries, mortality registries, health interview surveys, etc.);
- To assess the informative value of these data;
- To make provisions for generating new data.

Task 2. At the second meeting the reports should be presented by every participant. Discussion: Existing data sources. The results of the first workshop will determine whether additional data need to be collected or just data from different registries or surveys should be linked. Task 2 they have to achieve until the Meeting 3 (if necessary):

- To add variables to existing data sources;
- To link data from different registries.

Task 3. At the third meeting the reports should be presented by every participant. Methodological guidelines should be discussed and refined. It has to be decided:

- Which morbidity and mortality indicators will be used and how the socio-economic status of subject will be measured and classified;
- Are absolute or relative differences (or both) to be measured;
- Should the analysis be limited to measuring the effect of lower socio-economic status on health of people of lower socio-economic status, or should it also aim at measuring the total impact these inequalities have on the health of the population;
- The choice of an adequate level of analysis and the application of multilevel analysis.
- Task 3 they have to achieve until the Meeting 4:
- To analyse socio-economic inequalities in health;
- To interpreted the results carefully;
- To prepare the results for clear and understandable presentation.

Task 4. At the fourth meeting he results have to be presented clearly and understandably (e.g. to use graphical displays) by every participant. The discussion: Formulating a public health policy response to the results:

- To what extend has the state identified inequalities in health as an important health and social problem until now;
- What are the objectives for any interventions?
- Who are the main groups with a concern for inequalities in health?
- What are their interests, priorities, and commitments?
- What is the context within which interventions need to be considered?
- etc.

The formulated document should assure that public health policy satisfies identified needs and finally it should be submitted to policy-makers.

Follow up workshops on health policy development should be performed every six months.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Poverty**
Module: 2.3	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Carmen Ungurean, MD, MPH** Department of Strategies and Forecasts in Public Health **Irma Eva Csiki, MPH** Senior researcher, associate lecturer University of Pharmacy, Bucharest, Romania Department of Monitoring and Planning the Professional Activity, Institute of Public Health Bucharest
Address for correspondence	**Carmen Ungurean, MD, MPH** Institute of Public Health Bucharest 1-3 Dr Leonte Str., 050463 Bucharest, Romania Tel. : +40 21 224 9229 Mobile: +40 788 36 37 85 Fax: + 40 21 312 3426 E-mail: carmen@ispb.ro
Keywords	Health determinants, poverty, social determinants.
Learning objectives	After completing this module students and public health professionals should: • Be aware of the multiple facets of poverty; • Be able to list indicators of poverty; and • Recognize the relationship between poverty and health
Abstract	The concept of poverty is a multifaceted one and does not refer solely to economic issues. There are also a number of related notions, which are directly linked to poverty, such as: equity, vulnerability, social exclusion and development. Equally, there is a strong bi-directional relation between poverty and health, resulting in the fact that one cannot be achieved without attaining the other. Starting from the multiple concepts of poverty and its relations, a number of indicators for measurement can be defined, each of them having its advantages and limitations. This paper provides a brief overview of the poverty facts and figures for some European countries and briefly describes the strategies for poverty reduction.
Teaching methods	Teaching methods include lectures, interactive group discussions, seminars.
Specific recommendations for teachers	This module should be assigned 0.50 ECTS, of which two thirds should be lectures and guided discussions and one third individual/group work: searching for literature and trying to define and identify strategies for poverty reduction in a region/country and the use of indicators to support these strategies.
Assessment of students	Quality of seminar paper and oral discussion.

POVERTY

Carmen Ungurean, Irma Eva Csiki

Concepts of poverty

Based on intuition and experience one can think poverty is easy to recognize: hunger, threadbare clothes, homelessness, begging, ignorance, ill-health and the list can go on. This apparent standardized representation of poverty is illusory, as poverty represents a complex, multidimensional and dynamic phenomenon. The way poverty is looked at depends a great deal on the values, ideals and preferences of individuals, organizations and societies.

The way poverty is defined determines the methods of measuring it, which at their turn yield results upon which policies and strategies to address this issue are built. The term was dedicated a richness of definitions throughout the literature overtime. According to Oxford Concise Dictionary, poor means "lacking adequate money or means to live comfortably" and poverty is "the state of being poor" and "want of the necessities of life". Poverty has been traditionally understood as the lack of access to resources, productive assets and income resulting in state of material deprivation (1).

Although widely used, poverty is not merely an economic definition, measured exclusively with monetary units, rather is a term behind which stand a multitude of concepts. The line of thinking has moved from considering poverty strictly in material terms of deficiency in individual consumption, to adding new dimensions of common properties and state provision of commodities, as well as qualitative ones such as autonomy, dignity, and empowerment. Figure 1 presents the scheme of the range of poverty concepts, proposed by Bauluch in 1996, where PC is "private consumption", CPR is common property resources, and SPC is state-provided commodities. The top of the pyramid is the narrowest definition of poverty and the bottom represents the broadest (2).

Figure 1. Scheme of poverty concepts

1	PC
2	PC+CPR
3	PC+CPR+SPC
4	PC+CPR+SPC + assets
5	PC+CPR+SPC + assets + dignity
6	PC+CPR+SPC + assets + dignity + autonomy

Source: Bauluch, 1996

Poverty represents a deprivation of essential assets and opportunities to which every human being is entitled (3). Poverty is a pronounced deprivation in well being where well being represents individual possession of income, health, nutrition, education, assets, housing, and a number of rights in the society (4).

Poverty can be viewed in absolute and relative terms (5).

Absolute poverty refers to subsistence below minimum socially acceptable living conditions usually established based on nutritional requirements and other essential goods. Within the notion of absolute poverty, often another distinction is made between *primary poverty* – or indigence, and *secondary poverty* – or extreme or overall poverty. Indigence is usually used to address those who lack the access to the basic necessities of survival. People living in conditions above this threshold experience other forms of poverty (5).

Relative poverty refers to lowest segments of a population compared against its upper segments.

Poverty can be looked at from an *objective or a subjective perspective* (5). The objective approach uses a normative judgment of what is the socially prevailing conception on what are the minimum necessities of life. The subjective approach is based on people's preferences and desires on how much they value goods and services.

Based on the types of deprivation - physiological or sociological a number of concepts of poverty derive (4). Lack of material goods and assets, such as income, food, housing, clothes are the parameters of income and basic needs poverty. Lack of access to assets like land, common properties, health services, participation, credit, are the dimensions of *sociological poverty.*

The human capability poverty represents a concept emerged from these two types of deprivation – physiological and sociological. Thus, poverty is not "merely the impoverished stated in which a person actually lives, but also the lack of real opportunity – due to social constrains as well as personal circumstances – to lead valuable and valued lives "(5).

Poverty is not a static condition. Poverty is a status that can or cannot change over time. From this perspective the concept recognizes two main categories (6):

Chronic poverty which includes the always poor – those who are placed below a threshold in each period and the usually poor – those who on average of all periods score below the threshold, but there are periods when they are not poor.

Transitory poverty which includes the fluctuating poor – those who at some stages are poor and at others are not, but their mean score is around the threshold and the occasionally poor – those who have experienced at least at one period poverty, and their mean score is above the threshold.

Related notions

Poverty – inequality – inequity

The terms equality and equity are not synonyms, nor are poverty, inequality and inequity. Therefore a clarification between notions is necessary. While inequality signals a difference between individuals, or groups, without making any implications and without ranking them, inequity focuses on distribution of resources or processes that drive a particular inequality between social groups. There is a highly ethical dimension in inequity concept and thus, inherently the concept is normative. Equity in general terms means social justice or fairness. Summarizing, inequity is a systematic inequality that is unjust or unfair (7).

Inequality is broader concept than poverty that is defined over an entire population, not only a certain poverty threshold (8).

Poverty – vulnerability

These two notions are often related and connected, but they are not synonymous. Poverty refers to different forms of deprivation, while vulnerability is a matter of external risks and internal defencelessness (9). Some particular groups

may be at risk of falling into poverty or deeper poverty because of ethnic, religious, gender or class discrimination, areas of residence, illnesses or disabilities, or a combination of any of these factors.

Poverty – social exclusion

There is an ongoing debate over defining social exclusion within the concept of poverty, with emphasis on aspects of social deprivation, or as a much broader range of issues in which poverty is included. Thus, the defining social exclusion greatly depends on how poverty is approached. If poverty is viewed in a narrow perspective of material deprivation, than social exclusion will incorporate broader terms, including material deprivation. If the definition of poverty is a multidimensional one, then one could expect that social exclusion will be defined in specific terms, such as participation or social rights (5).

Poverty – development

Poverty is often viewed as underdevelopment. Human Development Report 1997 (10) makes a distinction between the two terms by relating poverty to individuals and development to groups. The distinction between these concepts depends greatly on the degree of equity within a society and the prevalence of poverty (5).

All the notions presented above are the key elements of well-fare and well being, closely linked to the concept of poverty, and usually measured and analyzed together with it.

Measures and analysis of poverty

Measuring poverty provides essential information for policy making to address the issue. A credible measure of poverty can be a powerful instrument for focusing the attention of policy makers on the living conditions of the poor (11). Measure of poverty provides information on the dimension of the problem, identifies the groups affected, identifies the main determinants of poverty and assesses the policy implications. Poverty measures are important evaluation tools of policy and programmes and allow in the same time comparison between countries.

Measuring poverty implies three necessary steps:

- choosing the relevant indicators of well-being;
- selection of poverty line; and
- generating summary statistics to aggregate information.

Indicators of poverty

The choice of the indicator used to measure poverty is determined by the adopted concept of poverty, the purpose of the study and the availability of data to feed into the indicator. Poverty indicators can be grouped in two main categories: means/ends and quantitative/qualitative indicators (5).

Means/ends indicators. Means indicators refers to the inputs intended to achieve an end, as for example economic welfare based on the household consumption, expenditure or income to achieve a certain weight-for-height, height-for-age, nutritional status etc. Poverty is traditionally measured with means indicators, which are usually monetary indicators. The advantage of these types of indicators is that there are many to choose from (5).

Ends indicators, although are gaining terrain and support in the recent studies, change relatively slow over time and are not suitable for short or medium term monitoring, and some of them are expensive to collect. However, they have the advantage of better correlation with the phenomenon being measured (5).

Both types of indicators can be used in simple forms or as composite indicators. Authors recommend the use of both types of indicators in a combination as the most pragmatic approach.

Qualitative/quantitative indicators. One should not fall into the drawback of confounding the quantitative indicators as a measure of objective poverty, and the qualitative one for subjective poverty. In fact, both concepts of poverty can be measured with qualitative, as well as quantitative indicators (5). The income and basic needs concepts of poverty are usually, measured with quantitative indicators, while, poverty from a human capabilities perspective is measured with qualitative indicators. This is how sometimes qualitative indicator can yield a more subtle picture of the situation than quantitative ones.

Given the multifaceted character of poverty, a broad approach to the phenomenon will draw on the necessity of using a combination of indicators from the two sets.

Monetary indicators are income, expenditure and consumption indicators. These types of indicators emphasize the material aspect of the household well being, and represent means indicators. The value is than assigned to each resident of the household, and the share of the total amount is *per capita income/expenditure/consumption*.

Consumption appears to be a better indicator, as income is only one element that allows consumption; others include aspects of availability and accessibility (8). Also, consumption may be better measured than income, as in many agri-

cultural countries, income, may fluctuate seasonally, as well as in urban settings, where due to the large number of informal sectors income flows may be also uneven. Lastly, consumption expenditures may reflect better the actual standard of living in the household and its access to credit markets. Measuring income has the advantage that can differentiate between sources of income, and where data on wages are collected they can be compared against these and checked for quality (8). Income poverty can be measured sometimes in *per capita GNP*. This is a very crude measure, does not reflect changes in the individual income (Table 1) (5). Table 1 presents the three categories of European countries, grouped according to their wealth (GNP per capita) in low income countries with an annual GNP less than 3,000 US$ per capita, middle income and high income countries and where available, the proportion of people living on less than 1 US$ a day.

The monetary indicators are relatively simple to compute, data needed are relatively widely available, they are easy to explain and easy to understand, and they make sense to an uninformed audience.

Table 1. GNP per capita of countries of Europe and proportion of people living on less than 1 US$ a day

<3,000 US$	**3,000 – 10,000 US$**	**>10,000 US$**
Bosnia and Herzegovina (?)	Croatia (?)	Andorra
Albania (?)	Czech Republic (3.1)	Spain
Macedonia, FYR (?)	Hungary (0.7)	Ireland
Moldavia (6.8)	Slovenia	UK
Bulgaria (2.6)	Malta	Italy
Romania (17.7)	Greece	Finland
Ukraine (?)	Cyprus	Sweden
Yugoslavia (?)	Portugal	Netherlands
Lithuania (2.1)		Iceland
Belarus (?)		Belgium
Russian Federation (1.1)		France
Latvia (?)		Austria
Turkey (?)		Germany
Poland (6.8)		Denmark
Estonia (6.0)		Norway
Slovak Republic (12.8)		Switzerland
		Luxembourg

Source: World Development Report 1997, The World Bank

Nonmonetary indicators. These types of indicators measure the non-material dimension of poverty, such as health, nutrition, literacy, participation (capability indicators). These indicators are measuring outcomes in terms of the "ends" (5, 8).

- *Health and nutrition indicators* can be life expectancy, nutritional status of children, and incidence for specific diseases. Some input proxies can be used, such as number of visits to the hospital or medical facilities, access to specific health services, number of vaccinations received by children (5).

- *Education indicators* can be level of literacy, specific scores in schools, number of completed years in school (5).

- The advantages of c*apability indicators* are various. They measure the well being in terms of final outcomes. They are relatively easy to collect, as they are generic indicators in most national statistics. Their limitations are that some of them are difficult to quantify, such as the case of participation. Being qualitative indicator, it may shed more light on the reality, but it exists in small samples, which makes rather difficult to use it in a broad policy (5). Also, capability indicators change slowly over time and cannot be used in short and medium term policy monitoring.

- *Basic needs indicators* distinguish between private income, public provided services and some "non-monetary" income. The basic needs indicators measure access to food, shelter, schooling, health services, sanitation, drinking water, employment opportunities, etc. Sometimes they are classified in "means" category, sometimes are considered to be closer to outcomes and they are placed into a separate category – "indirect ends". They have the advantage of measuring the goods and services directly, whereas their limitations are that they cannot be aggregated meaningfully, and they are not so easy to understand (5).

Other indicators

Composite indexes of wealth represent an alternative to using simple, uni-dimensional indicators, by combining information on different aspects of poverty. Box 1 presents a selection of the composite indicators used by UNDP. Composite indicators can be used for inter-countries comparability, and they are good tools to employ in advocacy, but they are not relevant for cross-country analysis (5).

Box 1. UNDP composite indicators of poverty

Human development index	Life expectancy at birth, adult literacy, education enrolment, GDP per capita.
Human Poverty index HPI - 1 (Developing countries)	People not expected to survive beyond the age of 40 years, illiteracy, access to safe water, and access to health services, underweight children.
Human Poverty index HPI - 2 (Developed countries)	People not expected to survive beyond the age of 60 years, population below mean income, long term unemployment
Gender related development index	As HDI, adjusted for gender differences

Source: Human Development Report, 1998

Indicators of inequality are difficult to develop as they basically summarize one dimension of a two-dimensional variable. The most used indicator is Gini coefficient, which varies between the "0" value, meaning absolute equality, to "1" value, meaning complete inequality. Graphically Gini coefficient is represented by the area between Lorenz curve and the line of equality (8). Some of the limitations are that it is not additive across groups.

Indicators of inequity are highly relevant to poverty measure, by allowing to identify who are the poor. Inequity can be measured by desegregation of other indicators by sub-groups and time-use studies (5).

Indicators of vulnerability are difficult to develop, as measuring the probability of becoming poor in the future is impossible to measure. Analysis of income and consumption over time and their viability can be used as proxies for vulnerability (8).

Indicators of access to assets measure the access of the poor to productive assets (land, capital), social and physical infrastructure, to housing and other durable goods and access to common property (natural environment). These indicators do not fall into any of the already presented groups, but are highly relevant for poverty measurements (5).

Another type of indicators of importance when exploring the various aspects of poverty are the *governance indicators* which are not traditionally associated to poverty, but correspond to opportunities of empowerment of general population. These indicators are information circulation (number of news publications/1,000 inhabitants), institutional regulations (number of registered civil society agen-

cies, advocacy groups) and decentralization (percentage of national revenue allocated to local governments) (5).

Poverty lines

Poverty in most cases involves comparison between the condition of an individual, family, household or group against what it is believed to be standard condition (12). Poverty lines are cut-off points separating the poor from non-poor (8). The poverty line is conceptualized as a minimum standard needed by any individual to fulfil his/her basic needs (3). Poverty lines can be measured in monetary units – certain level of consumption or non-monetary - a certain level of literacy, certain level of nutritional status. The poverty lines can be set in relative and absolute ways.

The *absolute poverty lines* are anchored in some absolute standard of what households should be able to count on in order to meet their basic needs. For monetary measures, the absolute poverty lines are based on estimates of the costs of a nutritional basket, considered minimal for the health of a typical family (3). Currently the most used absolute poverty lines are set by the World Development Report 1990 and they are of 1 US $/day or a minimum consumption basket of 2,15 US $/day (13). This requires conversion of domestic currency values of consumption in a common currency. The conversion is done with the purchasing power parity values – exchange rates where the same basket of food costs the same dollar amount in different countries (6). The nutritional absolute poverty lines are usually set at 2100-2300 kcals per person, per day. The absolute poverty lines allow cross-country comparisons.

The *relative poverty lines* are defined in relation to the overall distribution of income or consumption in a country, as for example poverty line can be set at 50% of the country's mean income or consumption, or 60% of the median. The choice of poverty line depends of the purposes of the analysis, and the use of multiple lines can help distinguish among different levels and aspects of poverty. The absolute and relative poverty lines can be combined in order to allow considering inequality and the relative position of the household, but still recognizing that below a minimum survival is not possible (3).

Once a poverty line or a combination of lines is set, the comparison of the indicator against the line(s) can be measured so that the entire population or a sub-group condition can be measured and described. The most commonly used measures are listed below:

Incidence of poverty (headcount index) is the share of population whose income or consumption is below the poverty line. For non-monetary indicators,

that is the share of population that does not reach the defined threshold (level of literacy, nutritional status etc.) (3).

Poverty gap index (depth of poverty) provides information on how far below the poverty lines households are (3). This measure captures the degree to which the mean income or other indicator differs from the established poverty line. The poverty gap index can be used to estimate the minimum amount of resources necessary to eradicate poverty (3).

Poverty severity (squared poverty gap) considers both the distance separating the poor from the poverty line, but also the inequality among the poor (3).

The poverty depth and severity both complement the incidence of poverty. It might happen that some populations would have a high incidence of poverty but low poverty gap, and other groups would have a low incidence of poverty with a high poverty gap. Depth and severity can be used for evaluation of programmes and policies (3).

Data sources for poverty indicators

Administrative data. Administrative data can be provided by national authorities (ministries, statistical institutions, etc) provide information on various areas: health status (malnutrition, diseases prevalence, hospital expenses), education (school enrolment), infrastructure (roads network), decentralization. These data are used to assess the public and private inputs and outcomes and their distribution across the country.

Population census. Population census contains basic information on the total population and provides information on its demographic structure, some information on access to facilities such as electricity, sanitation, drinking water, housing ownership, information on employment and possible education.

Household surveys. Household surveys are of essential importance for assessing the distribution of wellbeing into a population. Examples of households' surveys:

- Living standard measurement (LSMS);
- Expenditure and income surveys;
- Employment surveys;
- Demographic and health surveys;
- Rapid monitoring and satisfaction surveys.

Poverty analysis

Poverty analysis provides the poverty profile, which gives the characteristics of the different socio-economic groups and the differences between groups. The profile depends on the data available. The profiles can be presented in three ways (3):

- Poverty measures by group;
- Contribution of different groups to poverty measures, or the contribution of each group to the overall poverty; and
- Relative risks.

A well-presented profile can be extremely relevant and can indicate if economic changes at different levels are influencing the poverty indicators. Poverty can be compared over time to allow monitoring the changes in certain groups and also, in order to identify the main determinants, correlation of poverty are measured.

Determinants of poverty

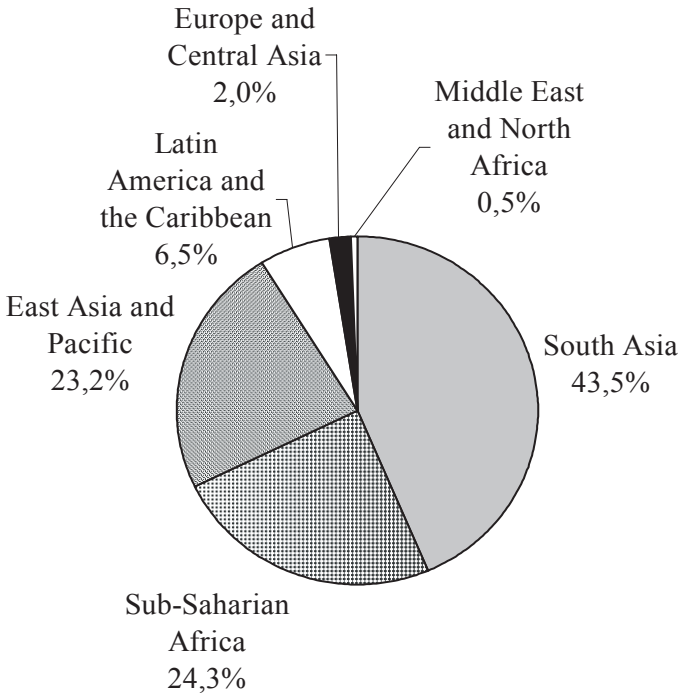
The determinants of poverty can be grouped under three main categories (3):

- *Regional* – geographical residence (isolation), adverse climatic conditions, poor governance, unsecured policy environment, unstable political and markets, poor/low participation, global and regional insecurity, ineffective juridical system;
- *Community* – poor infrastructure (bad roads, no access to electricity, remote from schools, medical centres, markets), low human resources development, lack of social mobility and representation, poor social capital;
- *Household and individual* – demographic characteristics (size and structure, dependency ratio, gender of the household head), economic (employment, income, consumption expenditures, property), social (health, education, shelter).

Poverty facts and figures

It is estimated that about 20% of the world's population live in absolute poverty, and about 50% live on less than 2 US dollars per day. Of the worlds population of 6 billion people nearly 44% live in South Asia (Figure 2) (14).

Figure 2. Where the developing world's poor live



Source: World Bank, 2000s.

In 1998 some 2% of the total population of the European Region (approx. 24 million) were estimated to live in absolute poverty, while relative poverty can affect up to 50% of the population in some countries in the east part (13). 200 – 250 million citizens of Europe live under the level of poverty (about 15% in EU and 40% to 80% in Central and Eastern Europe). In addition some estimations consider that another 50 to 100 millions people live just above the level of poverty (16).

Before 1990's countries from Central and Eastern Europe were characterized by a high degree of basic security, because the state was notable providing for the citizens. The security in terms of civil and political rights, participation and freedoms was lacking, but basic economic and social rights were secured. The wages although low were nevertheless secure, so was the employment. The

basic services were largely subsidized and supplied on regular basis. The access to education and health services was free and guaranteed. The transition period, which started after the fall of the iron curtain, is still ongoing in many of the CEE countries and has altered severely the situation. Despite the fact that individuals are entitled to more freedoms which they enjoy and exert actively, the institutional and structural framework in which the transition takes place results in very slow progress in achieving human basic rights. In most of these countries, the economic situation has deteriorated, impoverishment has intensified and income and wealth inequalities have widened. Employment has decreased; millions of people are unemployed, or underemployed. Of those who are working, many of them have been driven into the informal, low-paying, sectors. Moreover payment of their wages is unsecured, in terms of being delayed or never paid; the subsidies for most of the services have been discontinued or diminished. Many basic services require fees, such as health services, education.

The seven costs of transition in Central and Eastern European Countries, as identified by the UNDP in Human Development Report 1999 (17) are:

- Decline of life expectancy, especially among young and middle-aged men;
- High level of morbidity, especially higher incidence of common illnesses, and spread of TB, STDs, HIV/AIDS;
- Income and human poverty affecting especially children, elderly, disabled, migrants and refugees;
- Income and wealth inequality;
- Rising in gender inequalities;
- Educational declines; and
- Employment losses.

Table 2 shows human development index ranking among some European countries, in 1994 and 1995 (10).

Table 3 shows human development index ranking among some European countries, in 2002

Table 2. HDI ranking in selected European countries

	1994				1995			
Country	HDI value	HDI rank	Real GDP per capita (PPS$)	Real GDP per capita (PPS$) rank minus HDI rank	HDI value	HDI rank	Real GDP per capita (PPS$)	Real GDP per capita (PPS$) rank minus HDI rank
Canada	0,96	1	21,459	7	0,96	1	21,916	10
Finland	0,937	8	17,417	15	0,942	6	18,547	17
Albania	0,655	102	2,788	4	0,656	105	2,853	3
Bulgaria	0,78	69	4,533	9	0,789	67	4,604	8
Macedonia	0,748	80	3,965	5	0,749	80	4,058	3
Moldova	0,612	110	1,576	28	0,61	113	1,547	23
Romania	0,748	79	4,073	3	0,767	74	4,431	4
Slovenia	0,886	35	10,404	3	0,887	37	10,594	1

Source: UNDP, Human Development Report 1997-1998

Table 3. HDI 2002 in selected countries

HDI Rank	Country	Human Development Index (HDI) value, 2002
1	Norway	0.956
2	Sweden	0.946
4	Canada	0.943
5	Netherlands	0.942
19	Germany	0.925
24	Greece	0.902
27	Slovenia	0.895
48	Croatia	0.830
56	Bulgaria	0.796
57	Russian Federation	0.795
60	Macedonia, TFYR	0.793
65	Albania	0.781
66	Bosnia and Herzegovina	0.781
69	Romania	0.778

Source: Human Development Report, 2004

Poverty and health

Poverty and ill-health are intertwined. Poor countries tend to have worse health outcomes than developed countries. The association between poverty is a two way one: illness or high fertility have a substantial impact on the household income, and can cause falling below the poverty line (18). Ill-health is often associated with increased health care costs. The other side of the coin shows that poverty also cause ill-health. Poor people are thus caught in a vicious circle: poverty breeds ill-health and ill-health maintains poverty (15, 18).

Those living in extreme poverty typically lack access to safe drinking water, decent housing, adequate sanitation, food, education, professional health care, transportation, safe and secure employment, and health information. Table 4 presents some of the basic socio-economic and health indicators in South-eastern European countries. Greece, Austria and Denmark were included in the table for comparison reasons.

The people living in absolute poverty are five times more likely to die before reaching the age of five, and two times more likely to die between ages 15 and 59, than non-poor. Differences in maternal mortality are dramatic: the lifetime risk of dying in pregnancy in parts of sub-Saharian Africa where 50% of the population lives in absolute poverty, is one in 12, compared to one in 400 in Europe (14). A relatively small number of diseases and conditions are responsible for the most of the world's health deficit: HIV/AIDS, malaria, TB, maternal and childhood diseases, tobacco-related illnesses, all aggravated by malnutrition. These diseases and conditions account for 14 million deaths per year in population under 60 years of age and for 16 million deaths per year among all age groups (19). HIV/AIDS, malaria, and TB epidemics are worsening and represent one major cause of erosion for the socio-economic gains from over 20 past years in developing countries. In some areas high malaria incidence is associated with reduced economic growth of 1% per year (19).

Table 4. Basic socioeconomic and health indicators for selected European countries

Country	Mid-year estimated population	GDP per person (PPS US$)	Income inequality	Unemployment rate	Income poverty line (50% of the median income (1987-1997)	Income poverty line (% of population <4US $/day) (1993-1995)	School life expectancy	Probability of dying before 5 years
Albania	3,145,000	3,189		18.4				20.77
Austria	8,075,000	26,072	23.1	6.7	10.6		14.5	5.73
Bosnia Herzegovina	4,067,000			11.9				16.8
Bulgaria	7,866,000	5,071	26.4	16		15	12.2	15.94
Denmark	5,332,000	28,354	24.7	5.4	7.2		14.8	5.73
Greece	10,624,000	16,058	32.7	11.1			13.7	7.85
Moldova	4,285,000	2,037	40.6	2.1		66		22.43
Romania	22,388,000	6,041	28.2	10.5		59	11.6	22.2
Slovenia	1,986,000	15,977	28.4	7.6		0.7		5.63
FYR Macedonia	2,044,000	4,651		3.2			11.4	13.65
Serbia and Montenegro	10,538,000			26.1				

Source: European Health Report 2002

Strategies to reduce poverty

Currently an unprecedented interest is taken to address poverty, both at national and international level.

Millennium Development Goals (MDGs)

MDGs were set by world leaders in 2000 at the Millennium Summit, when UN reaffirmed its commitment to work toward a world in which sustaining development and eliminating, poverty would have highest priority. The Millennium Declaration committed 189 governments to work towards poverty eradication. The MDGs represent the commitment of governments from around the world to create an enabling environment for poverty reduction.

At international level the Millennium Development Goals provide global targets against which governments and aid donors can measure the progress towards the ultimate goal of poverty eradication.

All 8 MDGs comprise health related targets. Box 2 presents the health-related targets comprised in each of the goals.

Box 2. Health Related Millennium Development Goals

Goal 1: Eradicate extreme poverty and hunger - Target 1: reduce the proportion of people living on less than US$ 1 a day to half the 1990 level by 2015. *Target 2:* reduce the proportion of people who suffer from hunger by half the 1990 level by 2015.

Goal 2: Achieve universal primary education - Target 3: ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling.

Goal 3: Promote gender equality and empower women - Target 4: eliminate gender disparity in primary and secondary education, preferably by 2005, and to all levels of education no later than 2015.

Goal 4: Reduce child mortality - Target 5: reduce by two-thirds, between 1990 and 2015, the under-five mortality rate.

Goal 5: Improve maternal health - Target 6: reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio.

Goal 6: Combat HIV/AIDS, malaria and other diseases - Target 7: have halted by 2015 and begun to reverse the spread of HIV/AIDS. Target 8: have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.

Goal 7: Ensure environmental sustainability - Target 9: integrate the principles of sustainable development into country policies and programmes and reverse the losses of environmental resources.

Goal 8. Build a global partnership for development: to help poor countries eradicate poverty, hunger, and premature death will require a new global partnership for development based on stronger policies and good governance.

World Bank strategy

The World Development Report 2000/2001 proposes a strategy in three directions (4):

Promoting opportunity. Lack of material opportunities such as jobs, credits, roads, electricity, markets, schools, sanitation, drinking water, and health services are direct causes of poverty. Overall economic growth is crucial for generating opportunity, so is its quality. Market reforms may be of essential importance, but reforms need to reflect local institutional and structural conditions. Enhancing equity is a prerequisite for reducing poverty.

Facilitating empowerment. Public actions responsible for the needs of poor people depend on interaction of political, social and other institutional processes. Access to market opportunities and to public sector services is often strongly influenced by state and social institutions, which must be accountable to poor people.

Enhancing security. Reducing vulnerability to economic shocks, natural disasters, ill-health, disability, and personal violence is an intrinsic part of enhancing well-being and encourages investment in human capital and in higher-risk, higher-return activities.

Any comprehensive strategy to reduce poverty has to be based on a comprehensive poverty analysis that identifies the nature and the evolution of poverty, the profile of poor people and all contributing factors of poverty. A realistic prioritization of the goals has to consider complementary and compatible policies tools. Participation of the affected populations is essential, since they are the main beneficiaries of these activities.

EXERCISES

This exercise aims to enable students to use the various concepts of poverty, to use different approaches to analyse poverty and to identify poor populations at national/regional level.

Task 1. Define mean/end indicators of poverty and provide monetary and non-monetary examples.

Task 2. Choose an approach to poverty concepts and outline a plan of analysis accordingly.

Task 3. Design a questionnaire for a household survey according to the type of poverty you choose to investigate.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Unemployment as a Determinant of Health**
Module:2.4	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Elkeles, Thomas, MD, DiplSoc** Professor University of Applied Sciences Neubrandenburg, Germany **Kirschner, Wolf, PhD**
Address for correspondence	Prof. Dr. Elkeles, Thomas University of Applied Sciences Neubrandenburg Department of Health and Nursing Brodaer Street 2 D-17033 Neubrandenburg, Germany Tel: ++49 395 5693-417/403 Fax: ++49 395 5693-497 E-mail: elkeles@fh-nb.de
Keywords	Health, unemployment, Germany, South East Europe
Learning objectives	After completing this module students and public health professionals should: • Increase knowledge about social determinants of health; • Differentiate factors influencing unemployment in European countries; • Identify indicators of (poorer) health of the unemployed; • Differentiate moderating variables of health of the unemployed; • Differentiate descriptive and analytical evidence of the health of unemployed; • Understand the causation hypothesis and the selection hypothesis; and • Know the state of the art of health promotion measures for the unemployed.

Abstract	Health is determined not only by physical and mental factors, but to a large extent by social conditions too. In socio-epidemiological and psychological research there is overwhelming evidence indicating that unemployment and long-term unemployment are severe risk factors for health. In Germany - as in many other countries - in the last decades unemployment turned out to be a resistant phenomenon which doesn't seem to decrease significantly by a relevant growth of the economy. Generally, the dynamics of unemployment in industrial societies depend on several main reasons: seasonal, demographic, conjunctional, technological and structural factors. In post-industrial societies there seem to emerge new public health problems with flexible work, which means that employment and unemployment are no longer dichotomic variables. The situation in South-Eastern European countries since 2000 is shown. Dynamics of the underlying development cannot be considered based only on official rates at some given moments. The descriptive and analytical knowledge about the associations between unemployment and health is shown. Available studies show that unemployed persons suffer from a poorer state of health by means of several indicators. Due to methodological reasons, however, questions concerning the causes of this phenomenon, and in particular concerning the direction of effects between health and unemployment, can hardly be answered up to now. Therefore, the knowledge about consequences for intervention programs is also limited. There are missing or inappropriate evaluations as well as altogether limited experience in health promotion of the unemployed. Many persons for a long time out of work are not only in need of health promotion but also in need of effective health management strategies combining targeted therapy, rehabilitation and health promotion measures. Actually, in the whole field of public health, interventions and conceptual work for the unemployed has still to be done.
Teaching methods	Lectures, seminars, individual, exercises
Specific recommendations for teachers	All methods applicable
Assessment of students	All methods applicable

UNEMPLOYMENT AS A DETERMINANT OF HEALTH

Thomas Elkeles, Wolf Kirschner

1. Social, ecological and behavioural determinants of health

According to the definition of WHO (1946) "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". (1) With this political and programmatic definition we however scientifically do not exactly know what health really and definitely is. Much more we know of the panorama of diseases at least with respect to descriptive evidence revealed by health statistics and epidemiology. Excluding many infectious diseases and the most common chronic non-communicable diseases - as e.g. cardiovascular diseases - we have only poor evidence on the causes and genesis of many diseases. This stands for an example for the second most prevailing disease in industrialised countries - cancer - where analytical epidemiological evidence is limited to some specific cancer sites as e.g. lung cancer and cancer of the cervix.

Modern (Social) Epidemiology is assuming that health and disease have to be understood as a continuum and that both - health and disease - are determined or at least affected by three main factors:

- ecological factors;
- social factors;
- behavioural factors (see figure 1) (2).

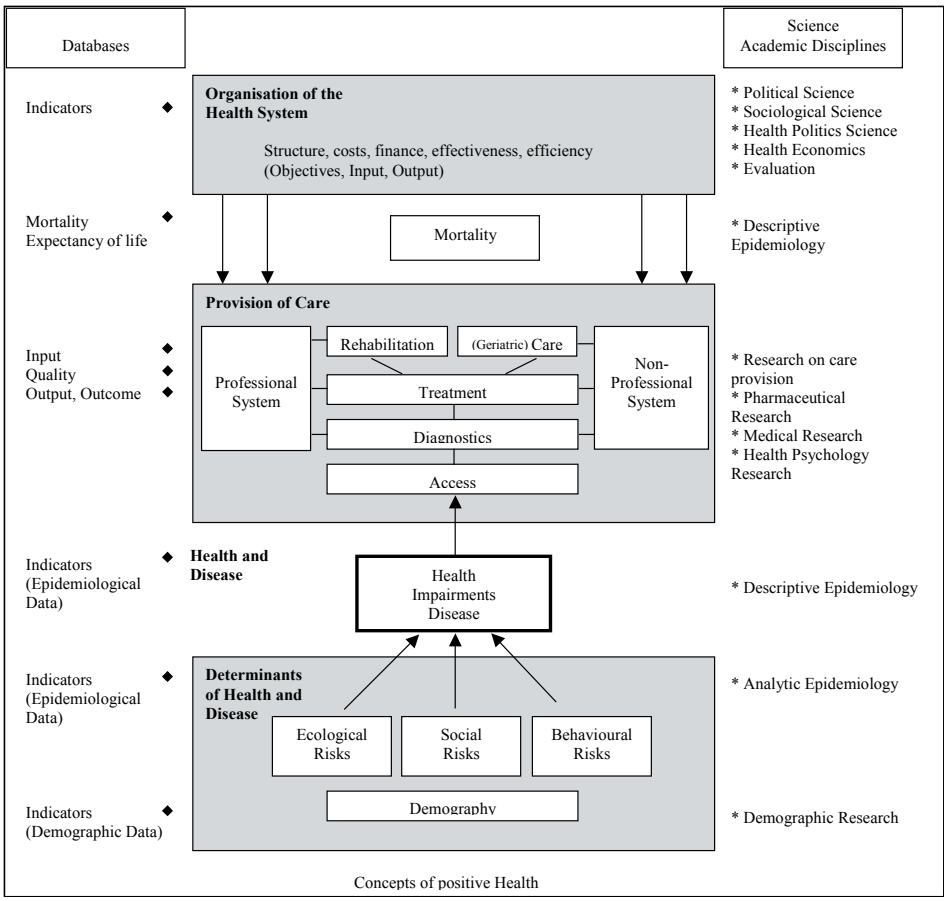
Analytical epidemiological research aims to investigate the associations of these factors with specific diseases with the calculation of statistical rates in terms of relative risks or ODDS Ratios if successful. Respective epidemiological research is basically dependent on the existence and quality of adequate data where severe differences have to be observed already in industrialised countries. But even when affluent epidemiological data are available analytical epidemiological research is often complicated by the fact that the indicators used for measuring the three main factors are often correlating or interacting in an often unknown manner.

Except two diseases - skin diseases and breast cancer - in all other cases a social gradient can be observed showing a higher incidence and prevalence of

diseases in lower social class compared to middle or upper social class. This also stands when other indicators are used e.g. education and qualification levels. Persons of lower social class have not only a higher burden of disease; they are falling ill earlier in life and are dying earlier.

There are some theories on the causes and potential mechanisms of this phenomenon of "social inequalities in health" which are neither theoretically nor empirically sufficiently understood nor developed.

Figure 1. The health system: an outline



Source: Kirschner (1997)

A basic theoretical approach is stating that in lower social class population's - compared to middle or high social class - there are excess risks of diseases due to combined and simultaneous risk expositions in all three fields. And indeed when investigating the role of behavioural risks (smoking, alcohol consumption,

physical activity) we will find that persons of low social class have significantly more behavioural risks as well as they are more frequently living in habitations where noise, pollution or crime will expose them to additional ecological and social risks. In the field of social risk factors unemployment has to be regarded to be a relevant and severe risk factor for health.

As will be shown in the following, internationally and nationally there is overwhelming evidence that unemployment has adverse effects on health in terms of increasing risk behaviour, decreasing resources, thus increasing the risk of incident morbidity and/or progressing of already prevalent diseases. Even increased mortality rates have been demonstrated. With respect to the duration of unemployment a dose response relationship can be shown. Though descriptive epidemiological evidence of these associations is high, there are several intervening factors aggravating or diluting negative health effects.

To summarize - unemployment and long term unemployment are affecting health dramatically. With this descriptive epidemiological evidence we however do neither theoretically nor empirically completely understand up to now which mechanisms are involved hereby. This means that we have only limited analytical knowledge on risk or protective factors in this process, which is caused by insufficient analytic research nationally and internationally e.g. with large scaled and long-time cohort studies which would be necessary to control for some twenty moderating or confounding factors. So the potential health effects of unemployment may differ in populations groups according to:

- no or only modest fortune;
- the role occupation plays in the orientation of the unemployed;
- Age and gender;
- Length of unemployment;
- Education and qualification level;
- Reasons of unemployment (self inflicted);
- Skills to find a new and adequate job;
- Social support;
- Support from the job offices;
- overall rate of unemployment and the given probability to find a new job.

So when the majority of moderating factors turn out to be negative we can expect that unemployment will have severe effects on health. On the other side, when the factors are positive in majority the effects will be smaller if emerging at all.

As also will be shown in the following, with these findings interventions in the field of health promotion for the unemployed (as will be shown in the following chapter 4.3) cannot be based on confirmed analytic epidemiological data in terms of relative risks. The majority of interventions - if not all of them - in this field are so to speak logically based in the sense that effective intervention strategies should stop this process of worsening health. So in terms of intervention theories interventions can only have the character of open experiments.

2. Size and structure of unemployment in European countries

In market economies unemployment expresses a disproportion between supply and demand of the workforce. The size of unemployment in a specific country first of all depends upon the economic structure given, furthermore on demography, the patterns of men and women participating in employment, migration, international and national policies of economics. In addition seasonal, technical and structural factors etc. are influencing employment and unemployment. With respect to the official unemployment rates published we have to keep in mind last but not least several "statistical tricks" in the calculation of the official rates, regularly tending to underestimate the number or rates of persons out of work.

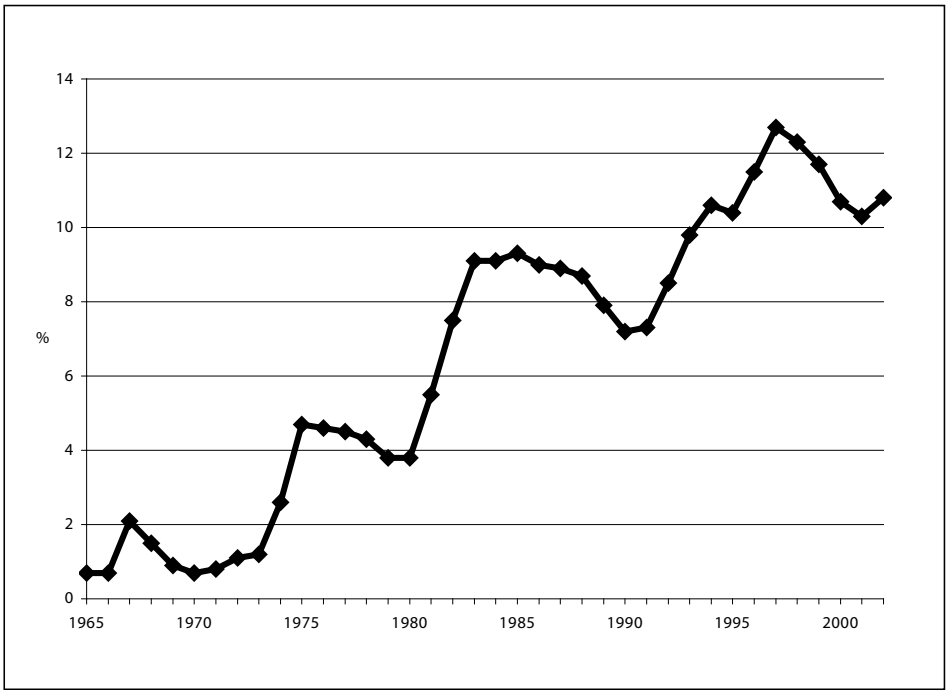
Especially in countries in transition from controlled to market economies we often have to register high unemployment rates due to the adjustment and integration of the national economy in the global economy.

In market economies unemployment is potentially always persistent and increasing whenever economic growth is too low. It is an accompaniment of the industrialised capitalist economy and no exceptional case. In fact low unemployment rates and situations of full employment are rare in the history of modern capitalist societies (see below).

In post-industrial societies there seem to emerge new and additional risks with flexible work, insecure employment conditions, invalidation of qualifications and unstable job careers. Employment and unemployment therefore seem to be no longer dichotomic (3,4,5,6). This process will lead to increasing problems also in the field of public health.

In Germany (see Figure 2) (7) in the last forty years unemployment was steadily increasing with the characteristic that the levels of unemployment were getting regularly higher and higher, indicating that cyclical economic developments were and still are superposed by structural problems in the economy and in the labour markets in Germany. Leading German economists do not expect a relevant reduction of unemployment with the predictable only moderate growth of the economy.

Figure 2. Development of the unemployment rate in Germany, 1965-2003



Source: Federal Agency for Labour (2003)

Within Germany unemployment rates differ strongly between men and women, north and east and – since the unification in 1989 and the following political and economic transition process in the former German Democratic Republic – between West and East.

In South-East-European countries since 2000 there are countries with increasing, decreasing and rather stable rates (Table 1) (8,9). Some countries in these years have stable differences in the level of the unemployment rates. Not always women have higher official unemployment rates than men, as it is known from Western European countries. But the dynamics of the underlying development can not be seen regarding only official rates at some given moments.

Table 1a. Unemployment rates in South-East-Europe, All, 2000-2003 (in %)

Country	2000	2001	2002	2003
Albania [a]	-	-	-	15,2
Bulgaria [a]	16,9	19,8	17,8	13,7
Croatia [a]	16,1	15,8	14,8	14,3
Greece [a]	11,1	10,5	10,0	9,3
Hungary [a]	6,4	5,7	5,8**	5,9
Macedonia [a]	-	30,5	31,9	36,7
Moldova [a]	8,5	7,3	6,8	7,9
Romania [a]	7,1	6,6	8,4***	7,0
Russian Federation [a]	10,7	9,1	8,0	8,3
Serbia and Montenegro [a]	12,6	12,8	13,8	15,2
Slovenia [a]	7,0	6,4	6,3	6,7
Turkey [a]	6,6	8,4*	10,3	10,5
Ukraine [a]	11,7	11,1	10,2	9,1
OECD Total [b]	6,4	6,5	7,0	7,1
Major seven [b]	5,7	5,9	6,5	6,7
OECD Europe [b]	8,7	8,3	8,6	8,9
EU 15 [b]	8,2	7,4	7,7	8,1

*Notes: * Estimates based on the 2000 Population Census results*
*** Estimates based on the 2001 Population Census results*
**** Estimates based on the 2002 Population Census results*
Sources: a Labour force survey of every state, put into tables by International Labour Organisation (ILO 2004/2005)
b Statistical Office of the European Communities, put into tables by Organisation for Economic Cooperation and Development (OECD 2004)

Table 1b. Unemployment rates in South-East-Europe, Men, 2000-2003 (in %)

	2000	2001	2002	2003
Albania	-	-	-	13,2
Bulgaria	17,1	20,6	18,6	14,1
Croatia	15,0	14,2	13,4	13,1
Greece	7,2	7,0	6,6	6,0
Hungary	7,0	6,3	6,1**	6,1
Macedonia	-	29,5	31,7	37,0
Moldova	9,7	8,7	8,1	9,6
Romania	7,7	7,1	8,9***	7,5
Russian Federation	-	-	-	-
Serbia and Montenegro [a]	10,6	11,1	12,4	14,4
Slovenia	-	-	-	-
Turkey	6,6	8,7*	10,7	10,7
Ukraine	11,7	11,2	10,3	-

*Notes: * Estimates based on the 2000 Population Census results*
*** Estimates based on the 2001 Population Census results*
**** Estimates based on the 2002 Population Census results*
Source: Labour force survey of every state, put into tables by International Labour Organisation (ILO 2004/2005)

In Germany e.g. in 2001 the annual absolute number of officially unemployed persons was 3.851636, but in the same year there were more than seven millions of entries in unemployment and almost seven millions of exits from unemployment. This means that behind official numbers in a given time at the aggregate level there are massive movements at the individual level. So it is obvious that already today wide fractions of the population have experienced unemployment or they know persons who are or were unemployed or are threatening unemployment in their existent occupation.

The proportion of persons who are unemployed longer than twelve months in Germany is 33%, increasing in eastern Germany to 40% in 2003. While actually about 10% of the population are officially out of work we have to bear in mind that the complete number and proportion of unemployed are much higher due to legal regulations in the unemployment statistics.

Table 1c. Unemployment rates in South-East-Europe, Women, 2000-2003 (in %)

	2000	2001	2002	2003
Albania	-	-	-	18,3
Bulgaria	16,6	18,9	16,9	13,3
Croatia	17,3	17,9	16,6	15,7
Greece	16,8	15,7	15,1	14,2
Hungary	5,6	5,0	5,4**	5,6
Macedonia	.	32,0	32,3	36,3
Moldova	7,2	5,9	5,5	6,4
Romania	6,4	6,0	7,7***	6,4
Russian Federation	-	-	-	-
Serbia and Montenegro [a]	15,2	15,0	15,8	16,4
Slovenia	-	-	-	-
Turkey	6,5	7,5*	9,5	10,1
Ukraine	11,7	11,0	10,0	-

*Notes: * Estimates based on the 2000 Population Census results*
*** Estimates based on the 2001 Population Census results*
**** Estimates based on the 2002 Population Census results*
Source: Labour force survey of every state, put into tables by International Labour Organisation (ILO 2004/2005)

In Germany as in many other countries persons without school- or vocational education are in particular affected by unemployment regardless of age. The much known risk groups in the labour market are: low qualified, young people, older people, women, migrants and the disabled.

3. Associations between unemployment and health

Numerous studies about the relationship between health and unemployment used an aggregate data approach. Aggregate data analyses, also called macro-analytical approaches, in general use aggregate economic data from official sources (e.g. unemployment rates) as indicators for economic change and instability of a country as well as aggregate indicators of the state of health of the respective population (especially mortality rates). Econometric time-series models are commonly used to test for relations between the variables.

Aggregate analyses are especially connected with the name of M. Harvey Brenner (10,11,12) who in numerous studies examined the hypothesis that in industrialised countries a rise in unemployment leads to a lagged rise or a slower decline of mortality rates. Statistically significant positive relations are observed between unemployment and mortality in general, mortality from cardiac diseases, suicide, infant mortality, and mortality due to traffic accidents. The aggregate approach, which is also used by other authors (for an overview: see 13, 14), claims to be able to avoid the selection problems that occur in samples with individual level data. However, a number of criticisms have been raised concerning the black-box character of the underlying theoretical assumptions (13), the indicator problems (14) methodological problems of modelling (13), as well as the general problem of the 'ecological fallacy' (15), that is, the question to what extent an association on the aggregate level gives an indication of the health of unemployed persons. A number of the other macro-level studies found only weak, or no evidence for the hypothesis of a relationship between unemployment and mortality (for an overview: see 14 for findings which differ from Brenner's: see 16 for Germany and 17 for Denmark). Furthermore, the relation between the development of unemployment and suicide rates differed from country to country within Europe (18,19).

Studies with individual data analyse psychosocial or health outcomes of specific individuals in relation to their employment status by means of cross-sectional, or longitudinal comparisons. They differ with respect to their research design (e.g. case studies, follow-up-studies, intervention studies, cf. 20), sample selection, and the health indicators employed.

Descriptive evidence

There is a large body of data and studies that all show a poorer health situation of unemployed if compared with employed persons. Internationally and nationally there is overwhelming evidence that unemployment has adverse effects on health in terms of increasing risk behaviour, decreasing resources, thus increasing the risk of incident morbidity and/or progressing already prevalent diseases (21,22,23,24,25,26). Even increased mortality rates have been demonstrated also with individual data (27,28).

The survey data of the German Cardiovascular Prevention Study provide a type of representative information, on the base of individual data, concerning the health of unemployed persons in Germany. This survey, which contains employment status characteristics (c.f. 29,30), was based on a representative sample of West German and West Berlin residents between the ages of 25 and 69. Analyses of the first wave (to) 1984-1986 (31,32) showed a poorer state of health of the unemployed "with respect to morbidity, psychosomatic symptoms, risky behaviour like smoking and alcohol consumption as well as to confinement to bed and subjective evaluation of the state of health".

These results are confirmed by recent studies with the data of the German National Health Survey 1998 (28,33,34). As compared to employed persons, unemployed have more psychosomatic and psychic constrains, less contacts because of the constrains, more contacts with medical doctors and more hospital days.

In Germany persons getting out of work have to visit their local job centres initially and regularly to receive unemployment support and/or to be counselled for further employment possibilities. In these visits the employees of the job centres are officially and unofficially documenting the health status and the overall appearance of the unemployed, focusing in the documentation of any "health restrictions" which can reduce the possibilities of reemployment. The overall rate of these documented health restrictions is 23% in Germany in 2003. Considering for example Saxony we see this rate steadily increasing with the duration of unemployment from 14% to 25 % in persons who are out of work for longer than two years. In several model projects in the context of the ongoing reorganisation of the job centres (called MOZART) (35) this "health restriction rate" was rising up to 60% in persons with low education, higher age and long term unemployment. This indicates, that long term and older unemployed persons are to a high degree not only suffering from several complaints but are severely and often chronically ill (36,37).

The scope of the medical problems in unemployed can be demonstrated by hospital discharge data of one health insurance company (Table 2) (38). This data suggest that with increasing time of unemployment addictive behaviour is increasing. resulting in severe addiction and emerging psychotic diseases. But also wide spread chronic diseases as diabetes mellitus and heart disease are somewhat higher in the unemployed. These data may however show only the tip of the iceberg as members of the health insurance company GEK (Gmünder Ersatzkasse) are biased towards better education and middle and higher social class.

Table 2. Hospitals days by underlining diagnosis of employed and unemployed

ICD 9	Days in hospitals	Unemployed Days in 1000	Employed sDays in 1000	Ratio
303	Alcohol addiction	229	25	9,2
295	Psychoses	183	18	10,2
300	Neuroses	105	23	4,6
304	Medical drug addiction	66	3	22,0
291	Alcohol psychoses	43	4	10,8
414	Ischemic Heart Disease	41	27	1,5
296	Affective Psychoses	36	12	3,0
722	Intervertebral disc degeneration	34	31	1,1
309	Psychogenic reaction	31	7	4,4
250	Diabetes mellitus	31	12	2,6
571	Chronic liver disease	30	3	10,0
301	Psychopathy	28	3	9,3

Data source: Sammet (1999)

Welfare recipients - if male most of them long term unemployed - are one population group, which have one of the worst health statuses in the German society. A survey conducted in the city of Berlin in 1990 revealed, that welfare recipients in the age from 25 to 34 years are rating their health status to 22% as not good or bad. This frequency of worse health status is common in the overall population in Berlin in the age 50 to 59 years. With 55% the majority of the older welfare recipients are rating their health status as not good or bad.

Table 3 (39) shows several health effects of (long term) unemployment: While employed persons are rating their overall health status only by 11% as not good or bad, this proportion rises to 16% in short term unemployed and to 33% in long term unemployed.

Table 3. Self reported health status of employed and unemployed persons in Germany

	Unemployed >12 months <12 months	Employed	
	%		a/b
n	122	131	35.392	
Reported health status				
Very good/good	33,2	43,5	50,5	
Satisfactorily	32,8	40,5	38,9	
Not good/bad	32,8	16,0	10,7	***/*
Handicaps by health status in dealing with daily targets				
Not at all	50,0	54,2	68,1	
Moderate	22,1	32,1	25,9	
Severe	27,9	13,7	6,0	
At least one day in the last 4 weeks				
Bed-ridden	12,4	15,3	7,8	***/n.s.
Hospital stay last 12 months	11,5	10,8	8,3	***/n.s.
Average satisfaction with c				
Health	4,5	4,9	5,1	***/*
Life situation	4,8	5,2	5,6	***/*
Average age	44,5	40,4	42,2	

*Note. *p < 0,05; ** p < 0,01; *** p < 0,001 (Chi-Square-Test)*
a: column 1 + 2 vs. column 3
b: column 1 vs. column 2
c: Average of a 7-point scale
Data source: Cumulative data of the National Health Survey (West) 1984 to 1991, German Cardiovascular Prevention Study (GCP) (N=55.308)
Source: Elkeles (1999)

There are similar effects demonstrating that (long-term) unemployment increases stress and affects especially mental health (40).

To summarise - unemployment and long term unemployment are affecting health dramatically. With this descriptive epidemiological evidence we however do neither theoretically nor empirically completely understand up to now which mechanisms are involved hereby.

Analytical evidence

There have been conducted some longitudinal studies in several European countries, beginning with follow-up studies after plant closures, which followed the classic termination study (41): the Elsinore Shipyard study (42), the Swedish Blue-Collar-Worker Study (43) and the Askøy Study (44). In addition to confirming the poorer health outcomes of the unemployed, such studies can provide indications about stress reactions in the long term and the influence of change in employment status. Findings from such type of follow-up studies, however, can not readily be generalised, since the specific cases surveyed are not necessarily representative of all unemployed persons neither in the same country nor in another countries.

Earlier findings, according to which a stabilisation of mental health could be expected to occur after approximately six months of unemployment, were modified by longitudinal studies with representative data (45,46,47), which showed that especially with respect to indicators of mental health, the state of health of unemployed persons is poorer but improves accordingly after re-employment. But country-specific conditions along the general climate of economic uncertainty, which affects employed as well as unemployed persons, have to be taken in account.

In an own longitudinal study we looked for effects for German (48) and for foreign unemployed in Germany (49). We used the representative data of the German Socio-economic Panel (1984-1988 resp. 1984-1992). All health indicators (health satisfaction, chronic illness, handicaps in fulfilling daily life tasks, disability) showed poorer outcomes for the unemployed persons, even after controlling for the possible confounding effects of socio-demographic variables. Unemployed persons also consulted a physician more frequently and were hospitalised more often. But longitudinal analyses (of becoming unemployed and of re-employment) did not lend much support of causal effects from entry in unemployment and re-entry in employment. In a later study, Gallo et al. (50) found quite similar results examining the new variable general health state in the German Socio-economic Panel.

German and migrant worker's (49) did not differ with respect to their health-satisfaction but unemployed foreign workers were quite less satisfied with their health than unemployed Germans. This corresponded with a high percentage of foreign unemployed (30-50%) that felt chronically ill. The longitudinal results were interpreted in the way that the unemployed migrant's poorer health could be explained with (health) selection processes in the labour market. Immigrants are still concentrated in branches and jobs, which are characterised by a high intensity of work in a stressful environment.

In sum, it can be noted that available studies on the relationship between health and unemployment by means of several indicators show that unemployed

persons suffer from a poorer state of health. Due to methodological reasons, however, questions concerning the causes of this phenomenon, and in particular concerning the direction of effects between health and unemployment, can hardly be answered up to now.

Recently Paul/Moser (40) analysed meta-analytic work including cross-sectional and longitudinal studies and the strength of effects. According to their results there is evidence for both possible hypotheses:

1. the causation hypothesis (that means that the health and psychic impairments of the unemployed are caused by unemployment itself)

2. the selection hypothesis (that means that persons in poorer health are more likely to lose their jobs and persons in better health are more likely to be re-employed);

Theoretical Background

As pointed out above, health is determined not only by physical and mental factors, but to a large extent also by social conditions. Whatever indicators are being used in order to measure health, subjective well being, specific diseases or total morbidity causes of death or duration of lifetime a close connection between health impairments and socio-structural disparities can be observed. Irrespective of which theoretical approach is used to explain this inequality in health and its persistence, it can and must be assumed that health is a sensitive indicator of the unequal distribution of resources, power, and status.

All sociological theories that describe and explain disparities in the structure of the society can be used as base for more specific theories about the causation of poorer health by the unemployment process. In this direction of explanations it seems obvious that the health impairments of unemployed are related to the material, mental, and social hardships which may result from unemployment (51,52).

Jahoda et al. (53) as well as Zawadski/Lazarsfeld (54) analysed mechanisms of such causation in the thirties and in the eighties there was made an "adaptation" of the underlying psychosocial process.

"It should be recalled that five aspects of the experience of unemployment in the thirties have been singled out: the experience of time, the reduction of social contacts, the lack of participation in collective purposes, the absence of an acceptable status and its consequences for the personal identity, and the absence of regular activity. In all these aspects the unemployed felt psychologically deprived." (55, p.39)

Because the five categories of experience "follow necessarily from the struc-

tural forms of modern employment (55, p. 59), „current psychological responses to unemployment can with somewhat greater confidence than in the past be attributed to the absence of a job not just to restricted finances." (55, p. 58)

This means that the loss of non-material, latent functions of work, which also are potentially health promoting, can be attributed as reasons for the causation of health impairments by unemployment. Indeed these are no mechanistic processes since there are a lot of moderating variables known as already stated above: type and length of unemployment, national and cultural experiences with (un)employment, age, gender, job orientation, qualification, personal activity level, social support, control conviction, help-seeking behaviour and many others.

On the other hand selection processes in the labour market can be explained by social structural mechanisms in the society generally, by labour market policies particularly.

As we have seen, with the existing socio-epidemiological findings interventions in the field of health promotion for the unemployed can hardly be based on confirmed analytic epidemiological data in terms of relative risks. The majority of interventions - if not all of them - in this field is so to speak logically based in the sense that effective intervention strategies should stop this process of worsening health. So in terms of intervention theories interventions at the moment can only have the character of open experiments.

Further on we have seen, that long term and older unemployed persons are to a high degree not only suffering from several complaints but are severely and often chronically ill. This to point out, that many persons long time out of work are not only in need of health promotion but of effective health management strategies combining targeted therapy, rehabilitation and health promotion measures. This means that actually, in the whole field of public health, interventions and conceptional work for the unemployed has still to be done.

4. Political based interventions towards unemployment and the negative health effects of unemployment

Though unemployment must be regarded as an integral part of the industrialised capitalistic economy - because of the given cyclical economic development - high and even increasing unemployment rates can endanger the political cohesion of a society potentially leading to political disavowals. So in Germany in the Twenties and Thirties of the last century the rise of the national socialist party can be attributed at least in part to the prevailing mass unemployment affecting not only lower social class but even middle-class populations. And also historically reducing the risk of unemployment was one of the first actions for socialist or social democratic movements leading often to an insurance system

for unemployment. This system secures a basic financial subsistence for the unemployed for a defined period of time. Actually in Germany the legal regulations concerning the unemployed are modified leading to a shortening in the amount as well as duration of payments to approximately 60% of the former net income up to 12 months than reduced on the level of social welfare subsistence.

Internationally there are remarkable differences in the social protection of the unemployed with respect to time and amount of subsistence. This also stands for health care of the unemployed. In the United States of America many persons getting unemployed loose their normal health insurance and must contract a new one, if they are able to do so. In Germany unemployment does not affect the given health insurance. Being out of work does not affect the scope and form of medical attendance.

Besides these precautions of social policy in providing minimal subsistence to avoid people from falling immediately through the cracks there are however additional political interventions dealing with unemployment and the risk of unemployment:

- Economic and labour market interventions;
- Education and qualification;
- Health promotion for the unemployed.

While economic and labour market policies as well as interventions concerning education and qualification have a long tradition in many European countries health interventions must be characterised to be a new tool, which is still in a phase of development and testing.

Economic and labour market interventions

Rational economic policy tries to realise four macroeconomic objectives simultaneously: growth of the economy, monetary stability, a balanced export/import relationship and sufficient employment. There are several possibilities to achieve these objectives by monetary or fiscal policy measures but in times of excessive national debts in many European countries and with an intensive control of national budgets by the European Central Bank monetary since 1999 stability has become a superior objective. In contrary to Keynesian positions that deficit spending would increase the demand of goods and services, thus increasing economic growth and lowering unemployment the majority of economists today believe that this will not work. Instead they are focussing mainly on tax reduction and a liberalisation of markets (the labour market included) with the tendency to reduce the level of wages. This is exactly what is actually happening in Germany and has happened e.g. in the United Kingdom, Denmark and Sweden some years before.

This policy is supplemented by an intensified control of persons out of work forcing them to search successfully for new jobs even under poor wage conditions. This policy of "demanding and encouraging" (Fordern und Fördern) is based on profiling instruments. Whether this policy is successful and which effects it will involve must however be waited for.

Education and Qualification

Since the first relevant rise of the unemployment rates in Federal Germany in the sixties, qualification of persons out of work was a predominant instrument of active labour market policy. The rationale of this policy was the fact that persons without vocational education were and are still affected by unemployment primarily. Thus basic and additional educational or qualificational measures were offered to the unemployed. For over twenty years a huge and prospering consulting field was established at the periphery of the German federal agency of labour and the local job centres. Thus for years costly interventions in qualification processes were carried out by the job centres, but they were downsized dramatically since 2002 with the objective to lower expenses. This decision was facilitated by the fact, that these interventions were not sufficiently – if at all ever – evaluated, thus not demonstrating any evidence on their effectiveness and efficiency. It seems very unlikely that health promotion for the unemployed (see below) will be a relevant intervention strategy in the job centres in the near future.

Health Interventions (Health Promotion)

In Germany "Unemployment and Health" is still a rather scientific topic, which has up to now only marginally reached the political debate. In the process of the still ongoing reorganisation of the job centres Germany has adopted from other countries counselling- and profiling strategies with the overall objective to better match skills and qualifications of the unemployed to the needs of the enterprises. In these profiling processes health status and health restrictions are not yet completely and thoroughly addressed. In reviewing the MOZART projects (projects to test the new profiling instruments) we found in only 3 from over 30 projects that health was part of the profiling process and only in one case there were regulations and recommendations, what should be done, if certain health problems or health restrictions would be detected. This exception was additionally concentrated mainly on the problem of alcohol addiction. In no case we found something like targeted health promotion and prevention. Therefore we can conclude that health is up to now not regarded as an interventive tool in the counselling and profiling system. Additionally there are some data privacy problems in a broader "screening" of health questions, as the job centres - like employers - are legally only allowed to ask questions on health, which are relevant for a concrete workplace. In general job counselling - e.g. in contrast to employ pilots or bus-

drivers - there is however any lack of concrete job requirements where the health status could or has to be addressed.

Health Promotion has its roots in respective WHO activities in the seventies and eighties leading to the Ottawa Charta (56) of 1986. "Health promotion is the process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical mental and social wellbeing, an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector, but goes beyond healthy lifestyles to wellbeing.

Health Promotion – besides ethical considerations – is also regarded to be a tool in lowering costs in the health system by preventing disease. So in many countries respective health promotion interventions and trials were established, which often attracted high public and political attention. With respect to the financial budget this form of health intervention was however provided only marginally. The majority of respective projects were also addressed mainly on individual health promotion measures in form of training courses. And in fact they were attended especially by members of middle and higher social classes.

Health promotion for the unemployed is in fact a development which is part of activities to match health promotion measures better to the social needs of the population or certain population groups thus narrowing social inequalities in health. Target groups thus may be e.g.: poor children and adolescents, welfare recipients, single female parents and persons out of work.

In Germany primary prevention and health promotion is a service of the health insurance agencies for their members and also the complete population. The respective § 20 of the code of social law read as follows: "The health insurance company should provide services of primary prevention in their articles of association, which are in concordance with the requirements stated in sentences 2 and 3. Services of primary prevention should improve the health status and should especially contribute to narrowing social inequalities in health chances. The national associations of the health insurance companies with involvement of independent analytic expertise resolve mutually and consistently upon prior operational fields and criterions for services according to sentence 1, especially with respect to needs, target populations, accessibility, contents and methods." (57)

Giving health insurance companies the responsibility for health promotion is internationally not very frequent. Besides Germany only in Switzerland this field of action is financed by the health insurance agencies.

5. The state of the art of health promotion interventions targeted to the unemployed

The following results are part of a six-month expertise for the Federal Association of Company Health Insurance Funds (Bundesverband der Betriebskrankenkassen) to evaluate the state of the art of these interventions with unemployed carried out in 2003. In addition to theoretical considerations on the necessity and possible performance of respective health promotion measures we did an empirical search of published projects on health promotion and primary prevention addressing persons out of work especially in Germany. Such a search can never be complete but nevertheless it should yield reliable evidence on the given structure of interventions. In our search we found totally 51 interventions. From these 14 were only marginally documented or described. From the remaining 36 projects two were only in a conceptual phase. The remaining 34 projects will now be described according to:

1. Prevailing interventive objectives (health and/or employment);
2. Target populations;
3. Objectives and methods;
4. Institutional and financial framework;
5. Documentation and evaluation;
6. Number of participants/selection/access and accessibility;
7. Effectiveness and efficiency.

Prevailing interventive objectives (health and/or employment)

Health promotion projects for the unemployed can have uni- or bivariate objectives in promoting health or promoting re-employment or both. When we classify the projects according to the objectives described we find that with 18% only a minority of projects are focussing only on health, while with 47% nearly half of the projects are oriented on re-employment while the rest aim at both objectives. So the total majority of projects (82%) are intending to improve re-employment chances.

Target populations

Thirty percent of projects are dealing with long term unemployed and 12% are directed explicitly on persons out of work with existing health problems (Table 4) (34). The projects are covering all age-groups, men and women and some few projects are also oriented on short term unemployed with definite objective to improve re-employment.

Table 4. Target populations in %

Long time unemployed	7	21
Unemployed	5	15
Social welfare recipients	5	15
Long time unemployed with health restrictions	3	9
Unemployed women	2	6
Persons threatened by unemployment	2	6
Short term unemployed	2	6
Unemployed adolescents	1	3
Unemployed of older age	1	3
Social welfare recipients with health problems	1	3
Members of health insurance companies unemployed	1	3
Unemployed men	1	3
Not clearly stated	3	9
Total	**34**	**100**

Source: Elkeles & Kirschner (2004), p. 211

Objectives and methods

When looking at the objectives stated (Table 5) (34) we find with 41% improvements in the psychosocial situation to be the most frequent objective, while 26% are addressing health improvements as primary objective and 33% will primarily improve the labour market chances.

Table 5. Objectives in %

Improving employment chances		
Improving re-employment chances	12	22
Improving job seeking skills	2	4
Improving competences	4	7
Total		33
Psychological improvements		
Reducing stress and psychosocial complaints	8	15
Psychosocial stabilisation	8	15
Networking	3	6
Motivation for self-helping activities	2	4
Coping strategies	1	2
Total		41
Health		
Health promotion (undefined)	7	13
Improving health	4	7
Additional health services	1	2
Improving health consciousness	1	2
Health counselling	1	2
Total		26
Total (multiple nominations)	**54**	**100**

Source: Elkeles & Kirschner (2004), p. 212

When looking at the methods (Table 6) (34) applied we find that with 79% the traditional concepts and fields of individual health promotion are in focus, while the rest used additional psychotherapeutic techniques. Altogether we find a brought range of objectives and methods with a strong emphasis on stress and the psychosocial situation supplemented by traditional forms of health promotion activities.

Table 6. Methods

Stress reduction	12	34
Physical activity	8	23
Reduce consumption of (any) drugs	4	11
Nutritional improvements	3	9
Traditional health promotion objectives		77
Constructive thinking	1	3
To enjoy	1	3
Self- and time-management	1	3
Personality development	1	3
Cognitive behavioural therapy	1	3
Social pedagogic measures	1	3
Not clearly stated	2	6
Therapeutic measures		23
Total	**35**	**100**

Source: Elkeles & Kirschner (2004), p. 212

Institutional and financial framework

Both are extremely heterogeneous ranging with respect to institutions from University departments to private companies, health promotion institutes, self-help groups, welfare offices, job centers and health insurance companies. The same stands for the financial framework with budgets ranging from some Euros up to millions of Euros.

Documentation and evaluation

With respect to the heterogeneous institutional and financial framework the standards of both important tools will also vary extremely. Based on 22 projects completed or in finalisation we found (Table 7) (34) just two reports on evaluation and further 4 indications that an evaluation is planned or in the works. Naturally these results may not be overestimated but by the experience made by us in gathering respective information we have to conclude that the standards of documentation and evaluation are (very) low.

Table 7. Standards of documentation and evaluation

No documentation available [a]	8
Evaluation report	2
External evaluation	1
Internal evaluation	3
Preliminary analyses	1
Publications available	7
Total	**22**

[a] *in the framework of the expertise (6 months)*
Source: Elkeles & Kirschner (2004), p. 214

Number of participants/selection/access and accessibility

Altogether the number of participants is – with some exceptions – low or very low. This raises questions with respect to the acceptance of these interventions by the unemployed. With respect to the overall stipulated proof of evidence of health promotion interventions by sufficient evaluation methods it is astonishing that when participants of the projects are described, there is no reasoning if and to what extent the given participants are biased compared to social, motivational or health variables. And only in few studies we found information that many persons out of work had to be contacted to create the final study group, which is at least a simple possibility for a first estimation of probable bias.

Getting access to persons out of work is one of the most practical problems in these intervention strategies compared to institutionalised populations at schools, hospitals or companies. At job centres and social-welfare offices this population may be easily contactable with the disadvantage however that interventions in these settings are not very popular in the opinion of the clientele. There is additionally the danger that taking part in these interventions could be become obligate and refusing to take part could lead to a reduction in subsistence benefits, a well known instrument by the unemployed in Germany. In one German intervention study in the context of job centres the participants reported that they had been pushed for participation by the employees of the job centres. In fact the intervention turned out to be not successful which could indicate that health promotion under pressure will eventually fail a result obviously plausible.

Effectiveness and efficiency

Evidence on both outcome measures is low. When analysing six mental health projects with reported respective analysis at least on effectiveness we find 50% reporting positive results while the other half failed to reach the given objectives (Table 8) (33). Additionally evaluative designs are often weak which may indicate that the evaluative budgets were totally too small. Furthermore we find in majority the practise of self-evaluations implying often insufficient experience in evaluation methods.

Table 8. Results on effectiveness of projects aiming at mental health improvements

	Results on effectiveness	
	Positive	Negative
Aktiva Dresden (58)		X
EVA Siegen (59)		X
MPRC Michigan (60,61)	X	
Työhön (62)		X
Proudfoot et al. (63)	X	
Muller (64)	X	

Source: Elkeles & Kirschner (2004), p. 215

Summary

Eight years after a comparable study by Gepkens and Gunning-Schepers (65) - however oriented on interventions in social disadvantaged totally and not specifically on unemployed we have - unfortunately - to confirm some of their results and to conclude that:

- interventive experience in terms of the number of respective projects is still very limited;
- interventions are focused on improvement in health as well as re-employment with focus on the latter;
- objectives and methods mirror the common practises in health promotion interventions supplemented by some additional psychotherapeutic measures;
- institutional and financial framework is highly heterogeneous;
- standards of evaluation and even documentation are only poor;

- numbers of participants are – with some exceptions – only small;
- structure of participants with respect to health and social status or motivation to participate is often unknown;
- evidence with respect to effectiveness is limited, while efficiency was rarely under observation at all;
- the only few positive effects detected in mental health oriented interventions often suffer from methodological problems e.g. selection bias in the intervention group which was addressed upon only as an exception.

Altogether we have to conclude that the practise of health promotion interventions in the unemployed suffers from three important deficiencies:

- deficits in the theoretical foundation of interventions e.g. with respect to the question why a certain intervention should yield whatsoever effect;
- deficits in program implementation which are supplemented by;
- deficits in program evaluation.

Conclusions and recommendations for further project and accompanying research

When we once again throw a glance on the projects described and taking into account that we were always talking of interventions we can detect an additional problem. In fact most projects described are by intervention theory no interventions but mere offers or services. The main differences between these two strategies are that offers and services go without any assessment of needs because they will be demanded by self selective usage. On the contrary real interventions are based on a thorough assessment of needs, because participants without needs may already affect effectiveness and efficiency. Interventions must try to optimise and maximise the participation rates of persons with defined needs to realise a program-coverage which secures efficiency. If not the program can be effective but will not be efficient. All these questions are of no interest for offers or services. When we will plan and develop real interventions in the field of health management or health promotion we have first of all to study the social-epidemiological needs of our target group on adequate data. When transferring the intervention into practise we have to install need assessment strategies.

But even when we modestly confine ourselves on services and offers we have to clarify the structure, effects and consequences of self selective usage. Without this clarification any so called “evaluation” is useless, because it may at best show positive results from study groups which are not sufficiently characterised. In Germany - probably as well in other countries – we know a little on the usage of health promotion services (Table 9) but very little on the motivation to do so.

There are however some indications that users of respective services are in majority just those who are at least in need for them.

Table 9. Usage of health promotion services in Germany (in %)

	Total	Men	Women
Health insurance compulsory	12,7	7,3	16,7
High social class	12,6	8,2	18,0
Private health insurance	11,9	10,3	14,4
West Germany	11,5	7,7	15,1
Middle social class	11,2	7,1	15,1
Total	10,5	7,0	13,8
Health insurance compulsory (AOK)	7,2	5,3	8,8
Low social class	7,1	5,5	8,3
East Germany	6,4	4,0	8,6
Unemployed*	-	-	-

Source: Kahl et al. (1999)
*(*Data for the unemployed not shown in the article cited)*

Additionally we have to find out more about the acceptance of respective interventions or services by our target population because low acceptance and still lower potential usage is accompanied by inefficiency.

Finally we have to remember that many persons out of work – especially those of older age and long term unemployment – are often severely ill. For them mere health promotion is a drop in the ocean. They are in need of integrative health management strategies combining therapeutic, rehabilitative and preventive measures, which have to be developed.

The future respective programs should be developed more sophistically, implementation has to be better controlled and all phases of evaluation have to be improved, that requires additional funding. Also documentation and publication have to be improved.

If you think that nobody could contradict these proposals you're mistaken however at least with respect to the adequate data necessary or available for these analyses. In Germany there is a long tradition that social scientists and epidemiologist are debating controversially especially on the role of surveys in this context. There are opponents of surveys arguing that enough other data would be

already available for these purposes. We disagree because the question is not, do you have data but do you have the right data.

In our point of view many of the practical and research questions which have to be solved could be realised by carrying out a representative survey with unemployed, thus clarifying:

- needs;
- acceptance and potential usage of services, offers or interventions;
- and building up a data base for the further development of strategies.

Last but not least as an additional advantage this data base could be used as a control sample for all study- or project groups which would resolve the crucial problem of widely unknown participants and giving the possibility of controlling bias.

6. Summary

Many industrialised countries have to register since many years progressing unemployment rates, which are only marginally reduced in times of economic growth. In Europe we find high unemployment rates in some transition countries as well as in developed highly industrialised countries as e.g. Germany and France.

An international comparison of unemployment rates is difficult to undertake due to different legal or statistical definitions which person shall be deemed to be out of work. In general the actual total number of the unemployed will be much higher than the number officially stated.

The threat of unemployment and unemployment are severe risk factors for health unless a majority of moderating factors acts in the opposite direction thus potentially diluting negative health effects. Long time unemployment is a special risk factor for health in individuals, which will eventually also affect health and well being of other family members.

High and increasing unemployment may affect the social and political cohesion of a society. So minimal social protective measures were established in developed countries granting certain financial subsistence for a defined period of time. The scope of this social protective measures differs extremely between European and although other countries. In all developed countries there are job centres or other institutions counselling the unemployed in getting new jobs.

To combat unemployment there are principally also tools in economic policy as well as active labour market policy. Today however leading economists don't believe that deficit spending would work, if this policy could be carried out at all

with respect to the given excessive national debts.

Also the long time used education- and qualification measures were getting out of fashion especially in Germany, which has practised these interventions excessively for more than 20 years.

Since some ten years the traditional middle-class oriented health promotion measures (stress reduction, physical activity etc.) are increasingly discussed and also tested in social disadvantaged population groups and here also in persons out of work.

From an epidemiological and preventive point of view these interventions are making sense as they are trying to stop or reduce negative health developments. However these offers or interventions are complicated and also costly. An evaluation of respective interventions for the unemployed carried out by us in 2003 revealed that the evidence that such programmes will work effectively is still insufficient.

These findings should however not lead to a hastily rejection of these trials. They should be an imperative for additional targeted activities, which have to be planned, implemented and evaluated more thoroughly.

With a view to the millions of persons out of work e.g. in Germany and other countries it may be naïve to believe that with health promotion the problem of unemployment can be really solved. This will not be the case. But what can at best be done, is the prevention of negative health effects. And this can and has to be done by a rationale healthy policy, which has the task of minimising health risks in the population.

The experiences made in these trials to be continued and still extended will us finally help for a better management of the demographic transition already under way. In some 30 years in many countries today extremely affected by unemployment the work force of the population aged 20 to 65 years will diminish rapidly. In some segments of the labour market we have to expect labour deficit already even earlier. This gap can only be closed by targeted immigration and/or health promotion for the (older) workforce, to place them into a position to be able to work. To realise this, we cannot wait the next 20 years. To realise these preventive potentials we have to begin now.

EXERCISES

Task 1: Select two European countries and find out in which way "people out of work" are officially defined. Then compare the unemployment rates.

Task 2: Discuss possible causes and mechanisms of deteriorating health in the unemployed. Specify five moderating variables which can interfere or dilute the negative health outcomes.

Task 3: Explain the causation hypothesis and the selection hypothesis.

Task 4: Many studies show that women are mentally less affected by unemployment than men. Discuss these findings with respect to different occupational orientations of men and women.

Task 5: Give a summary of the state of the art of health promotion measures for the unemployed.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Child Labour**
Module: 2.5	**ECTS (suggested): 0.25**
Author(s), degrees, institution(s)	**Nurka Pranjić, MD, PhD** Associate Professor Department of Occupational Medicine, Tuzla School of Medicine, University of Tuzla, 75000 Tuzla, Bosnia and Herzegovina
Address for correspondence	Nurka Pranjić Tuzla School of Medicine, University of Tuzla, Univerzitetska 1 75 000 Tuzla Bosnia and Herzegovina Tel: +387 35 320 600 Fax: + 387 35 300 600 E-mail: pranicnurka@hotmail.com
Keywords	Adolescent worker, exploitative child labour, health risk, occupational risk, regulations, rights, unsafe work.
Learning objectives	At the end of the module, students should be able to: • Become aware of all forms of child labour and its magnitude; • Recognise the concept and the history of child labour; • Understand the contributing factors for child labour; • Differentiate appropriate and slave labour in children; • Identify hazardous and health risks, work-related diseases, and injures; and • Improve care for children in need.

Abstract	Child labour is a problem that has been occurring for a long time, even before the written history. Millions of children working on a variety of settings under exploitative conditions are being exposed to health hazards on a daily basis, which may be detrimental to their health. These exposures may cause irreversible damage to their growth, somatic and psychological development. Asia covers over 50% of the magnitude of child labourers. Africa has the highest percentage of children working (1 child out of 3). About 15-20% of children do work in Latin America. The highest percentages of child labourers are reported in family-based agriculture, service industries as restaurants or vendors, prostitution, and in small-scale manufacturing. Often, children work under unsafe conditions, usually not having adequate educational time. Thus, it is a priority to identify the most intolerable forms of child labour in a particular country and work for their eradication. Children should know their rights, the occupational risks involved in their work, and the best strategies to protect their health.
Teaching methods	Teaching methods could include lectures, exercises, individual work, and interactive methods such as small group discussions.
Specific recommendations for teachers	This Module should be organised within 0.25 ECTS credits.
Assessment of students	Assessment should be based on a multiple choice questionnaire (MCQ), case problem presentations, and an oral exam.

CHILD LABOUR

Nurka Pranjić

Introduction

Types of child labour consist of a spectrum which runs from activities wholly beneficial to a child health and development at one extreme, to a gross exploitation on the other. The idea of exploitative child labour as a "social evil" has deep roots in the European culture, as seen for example in the writings of Dostoevsky, Dickens, Hauptmann and Zola.

Children are not little adults. A child means every human being below the age of 18 years unless, under the law applicable to the child, majority is attained earlier (1). In the majority of countries, the minimum age for employment is 14 or 15 years, but there are about 30 countries where it is only 12 or 13 years (1-3). Higher minimum ages often apply to hazardous work.

In recent years, therefore, the emphasis has shifted from the abolition of all forms of child labour to the elimination of intolerable and hazardous child labour. The International Labour Organisation (ILO) estimates that 110 million children aged 5-14 years are engaged in labour that can be described as hazardous or intolerable (3). Most of this takes place in Asia and the Pacific, although the highest prevalence is in Africa, where children younger than 14 years make up a third of the total workforce.

Defining Child Labour

Not all child work is harmful to children's wellbeing; rather, child work involves a spectrum. At one end of the spectrum, some kinds of work are wholly beneficial to a child health and development, teaching skills, building self-esteem, building a sense of solidarity and loyalty within a family and providing a bridge to the adult world of work. Sport is a good example for this. At the other end of the spectrum stands the work that is wholly detrimental to a child, such as bonded labour, commercial sexual exploitation, sexual and physical abuse in the workplace, and hazardous industrial work. As it's difficult to establish a clear-cut in this continuum, there is not a universal definition for child work (4).

History of child labour

Child labour first started in Britain and, as the Industrial revolution was spreading out, it took with it the advantages to hire more children from poor families, who in exchange for some food worked for more than 12 hours a day for a bigger production. In 1830, the English Parliament set up a commission to investigate the problems of child labourers. One worker in a textile mill testified that, since the age of 8, he had worked from 6 a.m. to 8 p.m., with an hour off at noon. Another boy, whose parents had sold him to a mill owner, testified that the child labourers were locked up in the mill night and day. He ran away twice, and was caught and whipped by his overseer. Stories as horrible as these are common from child labourers in the coal mine (5).

The first significant British legislation was enacted in 1878, when the minimum age of employees was raised to 10 years and employers were required to restrict employment of children between the ages of 10 and 14, to alternate days or consecutive half-days. In addition to making every Saturday a half-holiday, this legislation also limited the workday of children between 14 and 18 years of age to 12 hours, with an intermission of 2 hours for meals and rest. But, these and other reforms were not strong enough to stop it (6-7).

How many children are involved in labour?

Today, 246 million children work (8). About 120 million work full-time, while the remainder combine work with schooling or other non-economic activities (1, 3). Usually, up to 20% of economically active children in rural areas and up to 5% in urban areas are under the age of 10 years. There are over 10, 8 million children age 5-14 involved in work. Further, there are as many as 20,4 million children aged 5-17 involved in the worst forms of child labour (forced-bonded labour, armed conflict, prostitution and pornography, and illicit activities), which is called slavery (10,11). In Cambodia, the prostitution of girls as young as 5 years old is prevalent, particularly with many tourists visiting Cambodia with the specific purpose of having sex with prepubescent girls (10). In the military sector, an estimated 250 000 children under 18 years of age, some as young as seven, are currently serving in government armed forces or armed opposition groups as soldiers, spies, messengers, and porters (12-13).

Where is child labour found?

The percentage of children working is 41% in Africa, 21% in Asia and 16% in Latin America and the Caribbean. Furthermore, about 700 000 children are to be found in domestic labour in Indonesia, 559 000 in Brazil, 250 000 in Haiti, 264 000 in Pakistan, 200 000 in Kenya and 100 000 in Sri Lanka (8).

In Asia, most of the children work in factories and small-scale agriculture, whereas in Africa most of the child labourers are in the "informal sector" of the economy. They are servants, vendors, and work on commercial plantations. Very few of the child labourers work in the export industries such as mining and making carpets. Latin American child labourers mostly work in the small mining operations where they have to dig and work in small tunnels that an adult cannot fit into.

Child slavery exists today in the cotton fields in India, fishing industry in Ghana, charcoal production in Brazil, gold mines in Peru, brick producing kilns in Nepal, stone quarries in south Asia. Children work as camel jockeys in the United Arab Emirates. Child slavery exists too in domestic servants and sex slaves all over the world, including the United States of America and other developed countries.

In European countries existing forms of intolerable child labour include commercial sexual exploitation, sexual and physical abuse of child workers, exploitation of domestic workers, child trafficking, employment of children in hazardous conditions, and problems of street children. Europe is home to around six million Gypsys, scattered throughout the continent. Gypsy children are particularly vulnerable to economic exploitation, as the Gypsy economy tends to be based around extended family businesses in the field of metal work, scrap dealing, horse dealing, entertainment, agriculture and begging. In all of these spheres children are commonly employed, often on a full-time basis, after the age of 12, after which school drop out rates are high and adult literacy is low. Italy is considered to have one of the highest populations of working children in Western Europe, estimated at 1,5 million children. Southern Italy has a higher prevalence of child labour, associated with the regional poverty and underdevelopment. In Spain, there are perhaps 1,5 million illegal child workers, with an estimated 200 000 children under 14 years working illegally in the informal sector, including family businesses and agriculture. Seasonal harvesting work in Spain, Portugal and in France frequently takes children out of school for months (4). Turkey is one of the few European countries where ILO has conducted a country study of child labour through the International Programme for the Elimination of Child Labour (IPEC). A study in 1994 reported almost 2 million children working as salaried family members, 800 000 of whom were under 16 years of age. Compulsory schooling in Turkey ends at 12 years; afterwards, many children begin work in family businesses and, in particular, in agriculture (4).

What are the contributing factors for child labour?

In general, poverty is the principal reason for children labour. However, the situation is more complex for the extent of child labour is not directly proportional to the level of poverty (3-5, 8).

Basic causes of child labour:

- Homelessness;
- Unfair and exploitative labour relations;
- Exploitative socio-economic and cultural relations;
- Conventional child development practice;
- Lack of political commitment for better change (lack of living laws, inefficacy of the implementation of laws, and lack of systematic monitoring and follow-ups);
- Children are a cheap source of labour supply.

Other immediate causes:

- Large family size;
- Lack of parental education;
- Lack of a good, meaningful education;
- Leaving school early: drop-outs, pull-outs;
- Domestic violence.

What are the major occupations held by child labourers?

The following types of occupations are frequently held by child labour:

- Agriculture and related activities (landscaper, gardener, fishing industry);
- Hotel and restaurant services (cook, waiter, dishwasher, counter or kitchen worker);
- Domestic service, servants;
- Transport;
- Construction (construction workers);
- Sales clerk, stock clerk, baggier, cashier, vendors;
- Janitor or cleaner (shining shoes, running errands and cleaning cars);

- Health care or nursing aide;
- Child care provider (day care, baby-sitting, camp);
- Delivery worker;
- Mining and quarrying;
- Sex trade;
- Stone cutters and slate workers;
- Making carpets, cotton fields.

More than two-thirds of working children are engaged in agriculture and related activities, the rest in manufacturing, hotels and restaurants, domestic service, transport, construction, mining and quarrying, and the sex trade. Only some 5% of working children are to be found in the formal sector, including export industries. Some surveys show the majority of children working for nine hours or more, every day of the week (8).

Hazardous child work:

- Work which exposes children to physical, emotional or sexual abuse;
- Work underground, underwater work, or work at dangerous heights;
- Work with dangerous machinery, equipment and tools, or which involves the manual transport of heavy loads;
- Work in an unhealthy environment which may, for example, involve exposure to hazardous substances, agents or processes, or to extreme temperatures, noise levels, or vibrations;
- Work under particularly difficult conditions such as for long hours, during the night, or without the possibility of returning home every day (3-5, 8).

What are the adverse effects on health?

Most biological systems in the human body do not mature until about the age of 18. Although adolescents are more like adults than children, their bodies are still growing and maturing. Many differences in anatomy, physiology, and psychology distinguish them from adults. These differences may translate into unique risk factors for occupational injuries and illnesses. They are often physically weaker, mentally more vulnerable and children immaturity may leave them incapable of assessing occupational risks or the need for protective measures (14).

Among military recruits in Israel, data demonstrated a decreased risk for stress fractures with each year of age above 17 years (15). These results suggest

that adolescent bones may not have reached full structural maturity. Adolescence is characterised by a rapid growth rate, which is exceeded only by the growth rates during infancy and early childhood. Diminished co-ordination during periods of rapid growth could increase the risk of work injury.

Body weight, surface area, and fat composition vary between children and older adolescents. These physiological differences may result in different degrees of susceptibility to occupational exposures during different periods of adolescence. Growth and maturation are not constant across organ systems. The thymus grows most rapidly, exceeding adult size during most of the childhood and decreasing to adult size begins at about age of 13. The brain approaches full adult size at about the age of 4, though behavioural development occurs through adolescence. The kidneys, spleen, and ovaries all grow steadily from about 40% of adult organ weight at age of 8 to 100% at age of 17. The testes and uterus increase dramatically from about 10% of adult weight at age of 8 to 100% at age of 17. Damage to an immature organ or organ system may permanently prevent normal physical maturation, and organ systems may be more susceptible during rapid periods of growth (15).

In addition to the physical and physiological changes noted above, children experience profound psychological changes as they mature. This psychological transition is often less visible than the physical one, requires more time to complete, and typically lags behind physical maturation. Thus, psychological immaturity may be obscured by a relatively mature physical appearance in an adolescent. As a result, a child worker may be assigned to a task for which he or she is emotionally or cognitively unprepared. In addition, a child worker will not have adequate experience to judge his or her ability to complete an assignment safely. However, the consequences of risky behaviours during adolescence are generally severe (14-15). Lack of work experience coupled with normal adolescent psychological development and stress at work places adolescents at a high risk of injury on the job, depression and other psychological disorders.

Children may also be exposed to agricultural chemicals, pesticides and fertilisers, noise, respiratory irritants, and toxic gases (16, 17). Exposed children to pesticides may be more likely to show adverse neuro-behavioural effects. They may be exposed to benzene during work at gasoline stations, to lead during autobody repair, to asbestos and silica during construction and maintenance work and to loud noise during manufacturing, or construction (18-22). Exposures to hazardous materials and working conditions may result in immediate illnesses, or illnesses that are not detected for months or years after exposure. Exposure to harmful chemicals may also occur in restaurants. Chemicals commonly used for cleaning may cause chlorine or ammonia gas release when mixed improperly. Depending on the amount of gas inhaled, irritation of the eyes and respiratory tract, dizziness, cough, and chest pain may occur. Severe exposure may lead to

pulmonary oedema, serious lung injury, or pneumonia. Chlorine gas inhalation has also been shown to cause longer-term, asthma-like symptom (23). The association with work exposures may not be recognised.

The growth and development of children in industry and agriculture are severely compromised. Working children loose considerable ground and suffer significant growth deficits. These children risk a wide range of diseases and injuries. Musculoskeletal injuries, particularly back injuries, may cause permanent impairment, and traumatic injuries can have serious physical and emotional sequel. Some of the reasons cited are inadequate food intake and excessive energy expenditure (24).

Extreme psychological and emotional trauma, severe battle wounds, loss of hearing, loss of limbs, blindness, rejection by family and community, diseases (including HIV/AIDS), violence/abuse, drug addiction, rape and unwanted pregnancy, malnutrition and death, are some of the consequences for child labourers (21-28).

Summary of negative manifestations of child labour on children health status include (14-28):

- Delayed or stunted growth;
- Hearing and/or sight loss;
- Malnutrition and eating disorders;
- Sexual abuse/harassment;
- Abortion/teenage child birth;
- Inappropriate risk behaviour;
- Skin infections and allergies;
- Bone malformation;
- Musculoskeletal disorders;
- Sleeping disorders;
- Respiratory infections, chemical poisoning;
- Sexually-transmitted diseases, e.g. AIDS;
- Drug dependence;
- Difficulty creating social relationships;
- Depression.

Children and unsafe labour

Like their adult co-workers, teenagers face exposure to a variety of health and safety hazards that can lead to injury and illness. Often, children are forced to work in the worst conditions. Every 30 seconds, a child worker is injured on the job. One child dies due to workplace injury every five days (29).

Agriculture is the most dangerous industry for child workers, accounting for 42% of all work-related fatalities of child workers. Unlike other industries, half of the young victims in agriculture are under the age of 15 years (30). For child agricultural workers aged 15–17, the risk of fatal injury is four times the risk of child workers in other workplaces. Agricultural work exposes child workers to hazards such as machinery, confined spaces, work at elevations, and work around livestock (29-30).

Construction is a dangerous occupation for all workers and construction sites are full of hazards. The predominant fatal events are falls, contact with electric power, transportation incidents, and being struck by objects. Many of the non-operator fatalities involve working around the machine: being run over, struck by, or pinned by a forklift, being struck by a load that fell from a forklift (29- 34).

The risk of injury has been assessed for industry groups. It has not been assessed for various types of work or machines. Such data could inform decisions about what is an appropriate work for children.

Are current occupational standards adequate to protect child labourers?

Occupational Safety Health Agency (OSHA) strives to make the workplace safe for everyone, regardless of age. The agency uses a 45-year working life (occurring between ages 21 and 65) as standard and, with one exception, does not differentiate on the basis of age. The only age specific OSHA regulation concerns exposure to ionising radiation (35). Unfortunately, most occupational health standards are more helpful for adult workers' settings than the child labourers.

A European consensus on child labour is also found in international legislation. The Convention on the rights of the children has been ratified by all European countries and includes a specific article on economic exploitation, namely Article 32 (4):

"States' Parties recognise the right of the child to be protected from economic exploitation and from performing any work that is likely to be hazardous or to interfere with the child education, or to be harmful to the child health or physical, mental, spiritual, moral or social development".

"States' Parties shall take legislative, administrative, social and educational

measures to ensure the implementation of the present article. To this end, and having regard to the relevant provisions of international instruments, States' Parties shall in particular:

- Provide for a minimum age or minimum ages for admission to employment;
- Provide for appropriate regulation of hours of employment;
- Provide for appropriate penalties or other sanctions to ensure the enforcement of the present article."

The ILO Convention No. 138 on Minimum age for employment (1973) states that the minimum age for work should not be less than the age for compulsory schooling and, in any case, should not be less than 15 years (1, 35).

The ILO Convention No.182 on "Elimination of worst forms of child labour" was unanimously approved in June 1999. The worst forms of child work are slavery, forced labour, use of children in illegal activities, and children working in hazardous activities. Countries that ratified the Convention No. 182 need to agree in tripartite discussion upon the hazardous works they have in their countries. It is also possible to improve the working conditions as the first immediate action on the way to eliminating the worst forms of child labour (4, 9).

The Federal Labour Standards Act of US (FLSA) child labour provisions are designed to protect children by restricting the types of jobs they may hold, for safety reasons, the number of hours they may work, as well as for educational reasons (36).

According to the FLSA:

No worker aged 14 or 15 years may:

- Bake or cook (except at a serving counter);
- Operate power-driven machines, except those that pose little hazard (e.g., office machines);
- Work on a ladder or scaffold;
- Work in warehouses;
- Work in construction, building or manufacturing.

No worker younger than 18 years may:

- Drive a motor vehicle as a regular part of the job, or operate a forklift;
- Operate many types of powered equipment (e.g., circular saw, box crusher, meat slicker, bakery machine);

- Work in wrecking, demolition, excavation or roofing;
- Work in mining, logging or sawmills;
- Work in meatpacking or slaughtering;
- Work where there is exposure to radiation;
- Work where explosives are manufactured or stored;
- Load or unload a truck, railroad car or conveyor.

Individual countries also have their own child labour laws.

Maximum work hours for 14 and 15 year child labourer:

- Up to 3 hours on a school day;
- Up to 18 hours in a school week;
- Up to 8 hours on a non-school day;
- Up to 40 hours in a non-school week.

Legal right for child labour:

- A safe workplace;
- Compensation for medical and rehabilitation expenses and lost wages if injured on the job;
- Minimum wage and overtime pay;
- Freedom from workplace discrimination and sexual harassment.

Such research should identify, for each country those categories of child labour which are the most unacceptable and which represent a priority for control (1, 3-4). The limited data reviewed above suggest that these categories might include (35):

- Forced labour and child trafficking;
- Commercial sexual exploitation;
- Unacceptable working conditions in manufacturing industries (long hours, dangerous conditions, sexual and physical abuse);
- Conditions of employment in domestic service;
- Children working on street;
- Conditions of labour in agriculture.

Conclusion

As stated above, the problem with child labour is not that it is a "bad idea", but that the exploitation of children, so that they are not able to grow and get educated, is wrong and punishable.

The most important efforts to eliminate child labour abuses throughout the world come from the ILO, and a special agency of the United Nations. The organisation has introduced several child labour conventions among its members, including a minimum age of 16 years for admission to all kinds of work, a higher minimum age for specific types of employment, compulsory medical examinations, and regulation of night work. In the late 20th Century, the ILO added to this list the worst forms of child labour, including slavery, prostitution, debt bondage and forced military service. The ILO, however, does not have the power to enforce these conventions. It depends on voluntary compliance of member nations. Fortunately, the task of designating children at high risk usually turns out to be easier in practice than in theory.

Employment of young workers can have many benefits for businesses and for young workers. However, the potential for serious injury and death must be recognised and addressed by everyone involved. Employers, educators, parents, and young workers may not be aware of safety and health laws designed to protect young workers on the job. Safety and health regulations alone cannot control or eliminate all the factors that may contribute to the risk of injury for young workers.

The relative risks of different jobs and information about outcomes need to be clarified. Although the risk of injury has been assessed for industry groups, it has not been assessed for various types of work or machines. Such data could inform decisions about what is an appropriate work for children.

Education has an important role in either the promotion or prevention of child labour. Inaccessible or inappropriate education may push children earlier into the workplace. The physician who learns that the patient's job duties or hours violate wage or hour rules should be alerted to the additional possibility of health and safety violations. At a minimum, the physician should advise the patient that the work is illegal and may be dangerous, understanding that the child worker may nevertheless need the job and that other options may be scarce. With the children consent, the physician should include parents in this discussion. The physician should explain them the most essential occupational health and safety rights relevant to children and should provide parents with information resources.

Protective gear such as gloves, hard hats, safety shoes, goggles or respiratory protection may be necessary for some jobs. This necessity usually signals exposure to hazardous substances. This type of exposure is prohibited for children, except in supervised educational environments such as vocational-technical programs. Even then, these exposures remain a health and safety hazard.

EXERCISES

Child labour risks and its effects on health

Case Studies

Children are working in jobs all over the world. In this exercise, you will be learning about occupational risk and its effects to health of children who work.

Case Studies Questions (Mine part)

- How old are you?
- What exactly do you do at work?
- Describe your work-place tasks?
- Do you work with any chemicals, dusts or fumes?
- Do you have any problems at work?
- What tools, equipment and machinery do you use at work?
- Do you work alone?
- Is there an (adult) supervisor present in your working area?
- Have you received any training on how to perform your job safely, including training related to emergency situations (e.g., escaping from fire, handling potentially violent customers, seeking help if injured)?
- Has your employer given you any protective equipment (e.g., gloves, safety shoes, hard hat, or mask) to wear on the job? Are you using this equipment? (If not, why?)
- What hours do you work?
- Do you have time to eat?
- How much time do you spend each day on homework? Are you also involved in family, social, religious and community activities?
- How many hours of sleep do you get at night?
- Have your grades changed since you started working? Have you chosen easier courses since you started working?
- Do you have any difficulty doing your work?

I Introduction to Task

You have a good understanding of the UN Declaration of the Rights of the Child, recommendations of occupational and safety standards of NIOSH, OSHA and FALS. You know what health risks are in correlation with different types of child labour. You have been assigned to investigate and examine a particular child (case-study) to determine what right of the child is/are being violated, or what risks affect child health. Based on the information provided in the case, your group is responsible for determine an appropriate course of action to help the child and improve its labour conditions. Your group will then present a plan to the rest of the class. The group consists of 5 students.

II Roles of the students:

1. Reader - reads the case study to his/her group - later to the rest of the class.

2. Geographer - finds the mentioned country for the case study.

3. Definer - is responsible for finding the definition for words the group members are unsure of. These words should be used in the crossword that all members contribute to.

4. Recorder - records all the information onto the response worksheets, once everyone agrees on the appropriate response.

5. Organiser - puts all supplies back in their proper place when they leave the station.

III Process of Case Studies

1. After the teacher has assigned your team a case study title, the organiser can log onto the case studies and print it out for the reader to read it to the group. The geographer is to label the country of origin of the child on a world map.

2. The organiser can print out the Case Study Questions for your child and the reader can read the questions.

3. As a group, answer the questions for your case study (excluding the independent response assignment). The recorder will record the answers for the group. The organiser can hand this to the studies' bin - after everyone has recorded the independent response assignment. This section is to be completed at home and handed to the studies' bin by each student.

4. Open up and print out the UN Declaration on the Rights of the Child, and recommendations of NIOSH, and/or OSHA and/or FALS, and the graphic organiser for the general assembly presentation. Have the reader read aloud these pages.

5. Reread your child case study. As a group, discuss the case study while the recorder records the appropriate information onto the rest of the class form. What kind of things does your group think the UN organisations can do to help your case study child? Decide on your best plausible solution to correct the UN Right(s) and recommendations of NIOSH, OSHA and FALS of the Child that is/are being violated. Record it on the graphic organiser. Be prepared to make a recommendation to protect rights and health of the child who works. When considering your recommendation(s), look at the circumstances that surround the violation. Why is your child working? What is his/her job? What are the occupational risks? If he/she were not working, how would that affect him/her as an individual? Would labour be harmful to child health? Would it affect his family or his community? (If a child did not work in a sewing factory, would the family be able to feed itself?) Is the violation less important than the possible consequences of not having the work?

The rest of the class evaluation sheet will be used to evaluate your groups' thinking.

6. Decide on how your group will present your findings to the rest of the class. The geographer must indicate where the country of origin is for the child and colour it on the world map transparency (the organiser can collect this from the teacher). The definer may create a crossword on the Puzzle Maker if time allows it. Everyone must take a role in the presentation.

7. After your presentations to the rest of the class, each person is to evaluate themselves and their group members using the Performance Assessment form.

Resource parts and Forms:

- United Nations Declaration of the Rights of the Child, recommendation of NIOSH, OSHA and FALS
- Puzzle Maker
- Case Studies
- Case Studies Questions
- General Assembly Presentation
- General Assembly Evaluation Sheet
- Performance assessment
- Health risks assessment

IV Evaluation:

1. Group mark and individual mark,
2. 20% of independent response activity, marked by the teacher;
3. 20% of the rest of the class, presentation sheet, identifying the child rights and occupational and safety standards; being violated - marked by the teacher,
4. 20% of the rest of the class sheet - class evaluation and 20% individual student and group evaluation.

V Conclusion:

As a follow-up to this simulation, the whole group should conduct a U-debate on the question "Is child labour appropriate?" on a scale of 1-10. At the end, your ideas should be synthesised enough to respond to the following points:

- Child labour is appropriate when...
- Child labour is inappropriate when...

RECOMMENDED WEB PAGES FOR EXERCISES:

1. http://www.cdc.gov/niosh/images/childpie.gif

2. http://www.ilo.org/public/english/standards/ipec/simpoc/index.htm

3. http://www.ilo.org/public/english/standards/ipec/simpoc/jensen/tables/table3.htm

4. http://encarta.msn.com/find/Concise.asp?z=1&pg=2&ti=761552027 (Definition and history of Child labor, MSN Encarta)

5. http://www.childlaborphotoproject.org/childlabor.html (Images of Child Labor, Child Labor and the global village: Photography for social change, a project of the Tides Center and Julia Dean & Associates)

6. http://www.casa-alianza.org/EN/human-rights/labor-exploit/overview.shtml#labor3 (Child Labor Exploitation, Casa Alianza)

7. http://www.worldbank.org

8. http://www.ncpa.org/~ncpa/pd/pdint27.html

(Child Labor in Asia, National Center for Policy Analysis)

9. http://www.unicef.com (Child Labor, Several issues about Child Labor)

10.http://www.cnn.com/2000/ASIANOW/east/09/05/mcdonalds.child.labor/

working in hazardous job:

11. http://www.history.ohio-state.edu/projects/childlabor/mrcoalsstory/

12. http://www.history.ohio-state.edu/projects/childlabor/cottondress/

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Psychological Determinants Of Health**
Module: 3.1	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Sashka Popova, M.D., Ph. D.** Professor Faculty of Public Health Medical University - Sofia
Address for correspondence	Prof. Sashka Popova, M.D., Ph. D. Deputy-Dean, Faculty of Public Health, Medical University Belo More 8, Sofia 1527, Bulgaria Tel: +359 2 946 1976 E-mail: popov@intech.bg
Keywords	health psychology, risk behaviours, stress, stressful events, coping strategies, health communication
Learning objectives	After completing this module students and public health professionals should: • Identify psychological factors of health and illness; • Understand and apply basic concepts in health psychology; • Understand and apply basic models of health behaviour; • Understand stress and coping with stressful events; • Explain and apply communication skills in health care delivery.
Abstract	Recent developments in theories and models in the field of health psychology are discussed. The application of the basic psychological concepts to health, illness, and health care is analyzed. The issues addressed concern the psychological factors in the development of illness, stress and coping, interventions to improve coping with stressful events, and models to promote communication skills in health care delivery.
Teaching methods	Lectures and discussions in small groups.
Specific recommendations for teachers	Active participation of students in discussions.
Assessment of Students	Short written answer examination

PSYCHOLOGICAL DETERMINANTS OF HEALTH

Sashka Popova

Recent development in the field

In the twentieth century theoretical and practical advances in psychology helped lay the foundation for contemporary important and interesting areas in personality, social, clinical, and health psychology. As a microcosm of both the psychology and the interdisciplinary endeavour of behavioural medicine, these developments have taken the position that biological, psychological, and social factors are implicated in all stages of health and illness, and the bio-psycho-social model is a guiding framework for the application of both psychological theory and research to health, illness, and health care.

Much of the strongest work involved provides theoretical and conceptual frameworks that constitute a major contribution as they are often missing in traditional medicine and medical practice. In this context it becomes essential to consider such distinct theoretical ideas and models as:

Psychodynamic conceptions

Psychodynamic theories have gained widespread acceptance and are deeply entrenched in the public view of human behaviour. These conceptions of human nature commonly view human behaviour as motivated from within by various needs, drives, impulses, and instincts; thought it refers to acts of reasoning, reflection, imagining, and other personal activities. Psychological methods are evaluated in terms of their effectiveness in changing actual psychological functioning.

Trait theory

Trait theorists are concerned with how dispositions generate behaviour and motivate and guide it as well as with assessing personality traits and testing their predictive utility. Recent research developments suggest specific models of personality-disease relationships. Among these are the investigating the role of Type A behaviour syndrome in the aetiology of coronary heart disease, and the potentially protective role of positive emotional states and coping styles in the development of illness.

Rotter's social learning theory

The theory infers that behaviour is a function of expectancy and reinforcement value in a specific situation Training in mature decision making, healthy behaviour, coping with stress and other life skills is of great importance.

Bandura's social cognitive theory

The theory ascribes a central role to the mechanisms through which the individual operates: cognitive processes, motivational processes, affective processes, selection processes, and the power of forethought to override feedback control. Self-monitoring, self-regulation, including appropriate goal-setting, self-efficacy, and self-control mechanisms are described as effective and productive cognitive coping strategies.

Creativity in everyday life

Recent research suggests that these individuals that use to understand and control events in their lives include the creation of new original ways to act upon the environment and their life conditions. They engage in the creative process as they construe their world, plan their activities, and regulate their behaviour within some reality constraints. Creativity involves awareness of context and the flexibility of thinking that can lead a person to the creation of multiple perspectives and new ways of looking at things. Creative individuals take risks and have a willingness to try out new ideas. Attributes that are related to creativity are: autonomy, seeking out information that leads to change, independence of judgment, willingness to take risks, self-confidence, and creative self-image (1).

Application of psychological theory and research to health, illness, and health care

As a science and a field, health psychology is now so diverse and productive that it has made substantial contributions to the understanding of healthy behaviours and to the comprehension of the myriad factors that undermine health and often lead to illness. By the end of 1990s the following definition of health psychology had regained wide acceptance. Health psychology is recognized as the "educational, scientific, and professional contributions of the discipline of psychology to the promotion and maintenance of health, the prevention and treatment of illness, the identification of etiologic and diagnostic correlates of health, illness and related dysfunction, and health policy formation" (2).

More recent investigations have gone beyond the simple relationships between psychological factors and health and illness to an attempt to specify the models and pathways whereby psychological factors can be integrated into the

nature of health and illness. This trend is evidenced in research on health promotion, stress and illness, personality and disease, coping, social support, and the factors affecting patient's recovery. These investigations have addressed theoretical and conceptual frameworks that elucidate:

Life transitions and health

The life course approach addresses critical periods in human development. That is, to a large extent, change in psychosocial structures and processes that confront the person with the necessity to adapt and cope. Such life changes include a number of events as: transition from primary to secondary school; leaving parental home; engagement; marriage; pregnancy; job insecurity or loss; loss of a spouse, family members or close friends, and others. Some life events and circumstances are specific to each transition point in the course of life and may result in disability. More over, common denominators in the cause of psychosocially induced ill health are: the discrepancy between human needs and environmental possibilities for their satisfaction; the discrepancy between human capacity and environmental demands; and the discrepancy between human expectations and the situation perceived. Such discrepancies are common in times of environmental deprivation or excess, when there is conflict between social roles, or when social change is rapid and there are no generally accepted rules of conduct. Research on life- events from birth to death suggests that the experience of profound and loving human relationships builds a strong psychological resource for the person's ability to cope with stressful events during the whole life course. High self-esteem and problem-solving abilities are valuable resources for coping throughout life, and especially with psychological changes associated with aging. More over, the elderly are subjected to multiple psychological stresses brought about by such factors as social isolation, grief over loss of loved ones, and fears of illness and death.

Cultural profile and health

Cultural profile is very important factor in the successful implementation of health education for culturally different individuals. Key variables of the cultural profile may influence health care beliefs and practices of individuals. Certain cultural components are present in every social group. Assessing cultural background and gathering data have significant meaning to the development of a culturally appropriate health care. Research provides a framework for pursuing culturally sensitive health care (3). Important cultural components are:

- Cultural identity - including patient's own cultural values, beliefs, and priorities;
- Value orientation - the nature of people's relationships to one another, the

main purpose of life, the value of time in the culture, the relationship between individuals and nature, cultural values regarding human nature;

- Communication style – as examples must be noted:

  - Language and dialect preference of the individual;

  - Non verbal behaviours: body language, facial expresses, and the use of personal space;

  - Community customs: specific health care beliefs and practices;

- Learning styles – informal and formal ways of education; often health educational programs are too traditional in their approach, giving individuals information on health issues but failing to use imaginative, interactive ways of providing training;

- Religion – preferences, beliefs, rituals, and taboos;

- Health beliefs – attitudes to the alternative health care; response to pain; crisis and illness beliefs;

- Family relationships – family roles, lifestyles, decision making and living arrangements;

- High - risk psychosocial situations. Four general categories of these situations are identified by Levi (4):

  - Uprooting – in the sense of depriving individuals and groups from experiences that provide emotional support, sense of belonging, and purpose in life;

  - Dehumanization of health care institutions - in the sense that needed services are provided impersonally and mechanically ignoring patients, and treating them as passive recipients of health care;

  - Psychosocial side-effect of the spread of innovations - in the sense that a given technology may change the behaviour of people in an unexpected and hazardous manner. Examples are the increasing anonymity and mechanization;

  - Psychosocial factors as constraints on health programs and activities – in the sense that important measures meet obstacles arising out of cultural and behavioural patterns of the population. Included here are, for instance, the stigma attached to certain health conditions, communication difficulties, clashes of values arising from cultural diversity.

Life-style factors

The role of behavioural factors in development of disorders and chronic diseases is increasingly clear. The practice of health behaviours has been recognized as one key to the success of primary, secondary, and tertiary prevention, as well as of health promotion. Each health habit has a complex pattern of aetiology, maintenance, change, and relapse. Much recent attention has been focused on how best to combine the advantages of the individualized approaches (such methods have great impact on personal behaviour however they are very expensive, and affect a small portion of the population) and mass-media appeals to change some targeted health habits - they may produce only modest behaviour changes but they affect many different groups of people, and are low-cost intervention methods (5).

Cognitive factors in health and illness

People's psychological attributions and beliefs, and the representations that people hold regarding their health conditions are involved in the experience of health and illness. For example, a significant part of patient complaints made to doctors are psychological in nature and have no significant physical counterpart. If the psychological problem is resolved all symptoms disappear. Headaches or weakness without physical explanation are such examples. These symptoms may result purely from interpersonal tension. In the clinical practice people's adherence, uptake and preparation for medical procedures are of great importance too (6).

Personality and disease

Recent research on personality and disease has identified at least two major psychological factors that play a part in the precipitation of disease. The first involves personality and coping style. The second major factor involves stress stemming from life events. Until recently, research focuses on:

- The direct impact of stress and other psychological states on physiological processes;
- The impact of psychological factors on risky health practices;
- The impact of psychological factors on people's response to potential illness conditions.

Research has succeeded in identifying certain broad principle of behaviour. For example, the importance of feelings of personal control when people practice particular health behaviours, and experience stress, as well as whether their pain control efforts are successful, and how they adapt to chronic disease and disability.

Other important developments include advances in the conceptualization and measurement of the high-risk psycho-physiological processes in the organism.

Such pathogenic mechanisms are:

- Subjective reactions and health – the occurrence of anxiety or depression in response to a great variety of environmental stresses in our everyday experience;
- Behavioural reactions and health – dependence on alcohol, psychoactive drugs and nicotine;
- Physiological reactions and health – sympatho-adrenomedullary reactions, adrenal cortical reactions, thyroid reactions, endocrine reactions, bodily function, and health (7).

Different models of psychosocial factors highlighted how best to structure influences and create belief systems and personal competencies. These models suggest that the personal activity in a given situation depends on inherited characteristics, previous experience, and socialization over the life course.

Stress and illness

Stress is a concept that has been defined in many different ways by researchers. Commonly the definition considers stress to be the state of an organism when reacting to new circumstances. Lazarus and his associates identified psychological appraisal as a crucial mediating process in the experience of stress. Events are judged to be positive, negative, or neutral in their implications, and if judged negative, they are further evaluated as to whether they are harmful, threatening, or challenging.

Coping strategies. Coping as defined by Lazarus is the process of managing external or internal demands that are perceived as taxing or exceeding a person's resources. Coping may consist of behaviours and psychic responses designed to overcome, reduce, or tolerate these demands. Coping mechanisms can take three forms:

- Psychological resources – they represent the abilities that people have. They are personality characteristics upon which people draw from within themselves to help them deal with threats imposed by the environment. Examples are self-esteem (the positive attitudes people have toward themselves), feelings of mastery and competence, and the feelings of control people have over their lives;
- Social resources – they represent support that people have. They are aspects of peoples' interpersonal networks. They involve the social support available from family, friends, fellow workers, neighbourhood. It is usually equated with emotional support but it may also involve tangible resources such as information and cooperation;
- Specific coping responses – they represent the things that people do. In another words, their concrete efforts to deal with specific strains of life. These

specific coping responses may be influenced by both the psychological resources of the person and social resources. Specific coping responses concern behavioural mechanisms and include techniques such as the relaxation response, biofeedback, running. Coping techniques involve cognitive mechanisms that involve efforts of controlling meaning, that is, specific interpretations made to neutralize the effect of the stressful life event or interpreting the event as a challenge (8).

Application of psychological skills to health care delivery

The WHO "Health for All Policy for the twenty-first century" emphasizes the importance of the basic psychological determinants and prerequisites for health. Educational and intervention strategies aim at improving the life skills and psychosocial wellbeing of people, helping them to manage life situations and make healthy choices. People should have an increased ability to cope with stressful life events. They should be enabled to develop and use their own potential in order to lead socially, economically and mentally fulfilling lives. Health professionals should help people at all ages to gain a sense of coherence, build and maintain social relations, and cope with stressful situations and events (9).

The last two decades show an increasing sense that health psychology issues are well integrated into the health enterprise. On the research side, the emphasis on cost-containment draws researchers heavily into primary prevention activities designed to keep people healthy with the goal of reducing the use of health care services. By identifying risk behaviours and by developing programs that best help people to achieve a healthy lifestyle psychology contributes to the larger endeavour that attempts to keep people healthy. On the clinical side, psychology increasingly identifies the benefits and liabilities of self-help groups, peer counselling, self-management programs and other educational ways to provide service delivery that integrate more effective psychological approaches.

Individuals who are identified early as at risk for particular disorders need to be trained in how to change any modifiable risk-related behaviours as well as in how to cope psychologically with their risk status. Increasingly, the psychological approaches will be called to address concerns of aging, including the problems of living with chronic disability and disease. There is now extensive literature demonstrating the success of psychology in analyzing life-skills. Life-skills are defined as those personal, social, cognitive and physical skills which enable people to control and direct their lives and to develop the capacity to live with and produce change in their environment (10).

Successful self-management program could be achieved with careful attention to two areas. These are the learning program which provides appropriate knowledge and skills, and the attitudes, beliefs and perceptions that determine the extent to which any person develops and maintains an appropriate self-man-

agement regime. Education must therefore be a continuous component of long-term clinical care. Therefore health professionals have to undergo some training in educational methods. Health care team should give patients and their families enough psychological support to enable them to pass through the psychological crisis that follows diagnosis and to accept a new concept of life. Attention should be focused on the handicapped. There is a need for appropriate services because they are not available to many handicapped that are particularly vulnerable to acute and prolonged psychological and emotional distress.

It would be extraordinarily useful if health professionals teach people how to communicate more effectively in health care. The key issue is sensitivity. People have to learn to be more sensitive to their own feelings, to others so that, when they do make themselves vulnerable, that vulnerability to be treated with care and respect. The recent years have witnessed an interest in the self-concept phenomena. Among the main components that influence health communication none is more central and pervasive than the self – concept. It is central element of communication, which is built from the values the person holds; his or her beliefs, attitudes and perceptions of the world and of those who inhabit it. The self – concept once created, is not a static entity. It can change, as beliefs, values and perceptions of the world change. The self – concept also creates the way in which a person presents him or herself to the world. More recently there is a great number of research evidence for pro-active, competence motivation in people. This means motives urging people to ignore safety and security, and to take on new, difficult, and challenging tasks. In this context the patient is the active and curative agent in the therapeutic relationship.

Health education strategies are called on to increase individual and collective responsibility for behaviour and life-styles that threaten people's health or wellbeing. Health programs tend to concentrate on giving people the knowledge and skills needed to overcome the barriers to successful and healthy lives so that more people to have a wider and easier range of healthy choice.

EXERCISES

1. What are your experiences with cultural differences in the medical practice? Explain key positive traits of a culturally appropriate health care.

2. What personal experience have you had with team work? Explain any positive or negative outcomes.

3. How have psychological factors affected your job satisfaction and performance? Have you met barriers and possibilities imposed by the environment?

4. Give specific competences and skills that are key criteria for the professional carrier of doctors and nurses in the health care delivery.

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RECOMMENDED READINGS

1. Journal of American Psychologist
2. Journal of Medical Ethics
3. Journal of Personality and Social Psychology
4. Journal of Health Psychology
5. British Medical Journal

HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Stress as a Determinant of Health**
Module: 3.2	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Tzekomir Vodenicharov, MD, PhD, DSc, Professor** Dean of the Faculty of Public Health, Medical University-Sofia **Mariana Dyakova, MD, MPH, Teaching assistant** Department of Preventive medicine, Faculty of Public Health, Medical University-Sofia **Elena Shipkovenska, MD, PhD, Professor** Vice-dean of the Faculty of Public Health, Medical University-Sofia
Address for correspondence	Prof. d-r Tzekomir Vodenicharov, Dean Faculty of Public Health, Medical University-Sofia 8 Bialo More Str 1527 Sofia, Bulgaria Tel./Fax: +3592 9432127 E-mail: dr_dyakova@abv.bg
Keywords	Stress, health, determinant, theory, acute stress, chronic stress, manifestation, stress-related, disease, adaptation
Learning objectives	After completing this module students and public health professionals should: • Be aware of the different theories for the definition of stress; • Increase their knowledge about the mechanisms of stress syndrome; • Differentiate the possible causes of stress and the vulnerable social groups; and • Identify the potential effects of stress and stress related pathology.

Abstract	In recent years, it has been largely accepted that the acute as well as the chronic experience of stress have undesirable consequences for one's health and safety. Stress is conditioned by, and is blamed to contribute to major economic and health problems. Stress also seems to cause considerable disturbances in productivity and competitiveness. And most of this is highly likely to be preventable. Four basic points should be considered, when discussing stress as one of the determinants of health. The first one is the nature of stress; the second is the impact of stress on health; the third one is stress measurement or evaluation; and the fourth one - stress management and prevention. This paper discusses the first two issues, trying to figure out the main causes of stress as well as its consequences. The most popular approaches to the definition of stress are revealed. The individual and group differences in the experience of stress are discussed, as well as the most vulnerable groups. The causes of stress, its manifestations and stress-related pathology are summarised. Stress can provoke various diseases under certain conditions, such as the intensive exposure, chronicity, and/or repeatedness of this phenomenon. Common stress – related or induced problems include a wide range of physical and mental morbidity and even death. However, when individuals feel "in control", stress becomes a challenge instead of a threat. Stress in this physiological sense – adaptation, cannot be eliminated. Without it, the process of life would stop as the complete absence of stress means death.
Teaching methods	Teaching methods should include lectures and individual work (paper review), interactive methods such as small group discussions and seminars.
Specific recommendations for teachers	It is recommended that 1/3 of the module is work under teacher supervision (lectures) and 2/3 is individual students' work. No special facilities or equipment are required. Target audience – medical and public health specialists, social workers, psychologists, healthcare managers and politicians.
Assessment of students	Assessment should be based on a seminar paper (on certain defined topics) and case problem presentation of a particular example of stress concerned research.

STRESS AS A DETERMINANT OF HEALTH

Tzekomir Vodenicharov, Mariana Dyakova, Elena Shipkovenska

Introduction

The great political changes in Central and South-Eastern European countries in the 90-ies revealed severe problems in their healthcare systems. The life expectancy of their population (which comprises half of the European region) is 7-8 years lower than that of the people, living in the western part of the continent. The mortality from chronic non-infectious diseases is high.

Number of factors and conditions - health determinants, influence the health indicators. These phenomena exist also in Western Europe, but in its central and eastern parts they have malignant power: conflict situations regarding dwelling, unemployment, lack of high quality and wholesome foods, speculations, blackmail, considerable socio-economic problems, lack of legal stability. They are cause for the exhausted adaptation capacity of the people and lead to psychosocial stress.

In recent years, there has been a growing belief that the acute as well as the chronic experience of stress has undesirable consequences for the health and safety of individuals. This belief has been reflected both in public and media interest and in increasing concern put forward by professional and scientific organizations. Stress is conditioned by, and contributes to major environmental, economic and health problems. Stress is blamed to contribute to human suffering, disease and death. It also causes very considerable disturbances in terms of productivity and competitiveness. And much of all this is highly likely to be preventable.

Four basic points should be considered, when discussing stress as one of the determinants of health. The first one is the nature of stress, the second is the impact of stress over health (both addressed in this subchapter); the third one is stress measurement or evaluation and the fourth - stress management and prevention (addressed in the next subchapter).

Definitions, nature and causes of stress

According to a common dictionary, the word "stress" has derived from middle English - "stresse" (hardship, distress), from Old French - "estresse" (narrowness), from Latin - "strictus" (tight, narrow), from the past principle of "stringere" (to draw tight, to tighten). According to the biological concept of stress (1), it is "the lowest common denominator in the organism's reactions to almost every kind of exposure, challenge, and demand", in other words - the stereotypy, the general features in the organism's reaction to all kinds of stressors. The phenomenon "stress" can be generally described by referring to Selye's "rate of wear and tear in the organism" - a kind of "revving up" or "stepping on the gas", preparing the organism for action, for muscular and other activity (2). According to the UK Health and Safety Commission, "stress is the reaction people have to excessive pressures or other types of demand placed on them" (3).

It can be assumed that stress is a pattern of "stone-age" reaction that occurs in response to different exposures and prepares the human organism for fight or flight, i.e. for physical activity (4). In the dawn of the history of mankind, stress helped our ancestors to survive when they were facing danger, e.g. a pack of wolves. Through their senses they became aware of the impending threat. In response, their cerebral cortex signaled to their hypothalamus to prepare, to cope with this threat. The hypothalamus, directly and indirectly, passed on the signal to every part of their bodies, through three separate but closely interrelated body systems - the nervous, the endocrine and the immune systems - to increase such preparedness for fight or flight. In response, their hearts began to beat faster (to provide the organism with more blood), and their lungs started to breathe faster (to secure the necessary oxygenation of the blood). There was a dilatation of the blood vessels serving their muscles with the necessary fuels at the expense of some of their visceral organs, which could be put on the back burner temporarily. An increased release of the hormones adrenaline and noradrenalin led to an increased mobilization of two major "fuels" - glucose and free fatty acids, into the blood stream from the stores in the body. All these reactions occurred very rapidly and in an automatic manner, as components of "nature's master plan for the survival of the fittest". Those of our ancestors who showed a good ability to react in this way survived, multiplied and filled the earth with a race - our race - very prone to react with stress. Since then, conditions of life have changed dramatically. Very few of us ever confront an aggressive wolf pack. In most everyday life contexts, we do not need our "stone age" stress reactions. They are, however, genetically determined and do not change, except over a very long perspective. This is probably why our ancient but persisting genetic programming, in combination with our modern, usually long-lasting social, occupational, environmental and other exposure, has become a threat to our health and wellbeing (4).

Today, it is assumed that stress is often maladaptive and disease-provoking. It can be defined as a pattern of emotional, cognitive, behavioral and physiological reaction to adverse and noxious aspects of everyday life. It is a state characterized by high levels of arousal and distress and often by feelings of not coping. There are essentially three different, but overlapping, approaches to the definition of stress (5).

Engineering approach

The engineering approach treats stress as an objective *characteristic* of the environment (situation), usually perceived as the load or level of demand placed on the individual, or some threatening or noxious element of that environment (6, 7). According to this approach, stress should produce a strain reaction which although often reversible could, on occasions, prove to be irreversible and damaging (8, 9). The concept of a "stress threshold" grew out of this way of thinking and individual differences in this threshold have been used to account for differences in stress resistance and vulnerability.

Physiological approach

This approach received its initial impetus from the work of Selye (10, 11). He defined stress as "a state manifested by a specific syndrome which consists of all the non-specific changes within the biologic system" that occur when challenged by aversive or noxious stimuli. Stress is treated as a generalized and nonspecific physiological response syndrome. For many years, the stress response was largely conceived of in terms of the activation of *two* neuro-endocrine systems, the anterior pituitary-adrenal cortical system and the sympathetic-adrenal medullar system (12, 13).

According to Selye the physiological response was *triphasic* in nature involving an initial *alarm* stage (sympathetic-adrenal medullar activation), followed by a stage of *resistance* (adrenal cortical activation) giving way, under some circumstances, to a final stage of *exhaustion* (terminal reactivation of the sympathetic-adrenal medullar system). Repeated, intensive or too long experience of this physiological response seems to increases the wear and tear on the body, and contributes to what Selye has called the "diseases of adaptation" (11). This apparently paradoxical term arises from the contrast between the immediate and short-term advantages of the physiological response to emergency situation (energy mobilization for an active behavioral response) to the long-term disadvantages (increased risk of certain "stress – related" diseases) (5).

These two models bear some criticisms. First, they do not take into consideration the entire existing data. At present many research studies have shown that if the stress response syndrome exists it is not non-specific. There are small but

important differences in the overall pattern of response. A good example is the work of Dimsdale & Moss (14). They examined 10 young physicians, engaged in public speaking, and found that although levels of both adrenaline and noradrenalin increased under this circumstances, the levels of adrenaline were far more sensitive. This sensitivity was associated with feelings of emotional arousal which accompanied the public speaking. It was suggested that noradrenalin activation was related to the physical activity, to the constraints and frustrations, while adrenaline activation was more related to feelings of effort.

The second criticism is that the engineering and physiological models of stress are set within a relatively simple stimulus-response model, and largely ignore individual differences of a psychological, perceptual and cognitive nature (6, 9). They also ignore the different interactions between the person and their various environments which are an essential part of systems-based approaches to biology, behavior and psychology.

Psychological approach

It explains stress in terms of dynamic interaction between the person and its environment. It is inferred from the existence of problematic person-environment interactions or measured in terms of the cognitive processes and emotional reactions which cause those interactions. There is now a consensus developing around this approach to the definition of stress (5).

Variants of this psychological approach dominate contemporary stress theory - among them two distinct types can be identified: the interactional and the transactional. The first focuses on the structural features of the person's interaction with their environment, while the second is more concerned with psychological mechanisms.

Interactional theories of stress:

- Person-environment fit (15). Two basic aspects of fit were identified:

– The degree to which a person's attitudes and abilities meet the demands of the environment;

– The extent to which the environment meets one's needs.

It has been argued that stress is likely to occur, and well-being is likely to be affected, when there is a lack of fit in either or both respects (16).

- "Demand-control" model suggests that surrounding characteristics may not be linearly associated with health, and that they may combine interactively in relation to health. But this model seemed too simple and ignoring the moderating effect of social support (17).

- "Demand-Control-Support" model was created by adding a third dimension - "social support" (18, 19). It refers to all levels of helpful social interaction and seems to play an essential role in the management of stress. It serves as a buffer against possible adverse health affects of excessive psychological demands (20). This model fails to consider individual differences in susceptibility and coping potential.

Transactional definitions

According to them, stress results from high effort spent in combination with low reward obtained. Two sources of effort are distinguished: an *extrinsic* source, the demands of the environment (family, job, society), and an *intrinsic* source, the motivation of the individual in a demanding situation. Three dimensions of reward are important: financial gratifications, socio-emotional reward and status control. Stress can be described as a negative *psychological state involving aspects of both cognition and emotion*. It is an internal representation of particular and problematic transactions between the person and their environment.

- Theories of appraisal and coping**.** They focus on the possible imbalance between demands and ability or competence. *Appraisal* is the evaluative process that gives these person-environment transactions their meaning (21). *Coping* is an important part of the overall stress process. However, it is perhaps the least well understood despite many years of research. Lazarus suggested that it has three main features (22):

– First, it is a process of what the person actually thinks and does in a stressful situation.

– Second, it is context-dependent, influenced by the particular environment or appraisal that initiates it and by the resources available to manage with that surrounding.

– Finally, coping as a process is and should be defined *'independent of outcome'*; that is, independently of whether it was successful or not.

Individual and group differences

Most contemporary theories of stress allow for individual differences in the experience of stress, and how well it is coped with. Individual difference variables have been investigated as either: components of the appraisal process, or moderators of the stress-health relationship (23). *First,* individuals are different in their perception of demands and pressures. Anxiety susceptibility seems to moderate person's perception of role conflict. *Second*, people vary in their ability to cope with demands, and also in their perception of those abilities. Such variation is dependent on their intelligence, their experience and education, or their self-esteem and belief in self-efficacy (24). *Third*, differences are found in the

amount of control the person can exercise over any situation, not only as a function of that situation but also as a function of his/her assumptions about control. *Fourth*, individuals may have different needs for social support, skills to exploit such support, and perceptions of support. *Finally*, the stress-health relationship is obviously moderated by individual differences not only in secondary appraisal but also in coping behavior and emotional and physiological response tendencies and patterns (5).

Type A behavior. Over the last 30 years, much attention has focused on individual vulnerability to coronary heart disease and on the role of psychological and behavioral factors in reacting to and coping with stressful situations. As a result, "type A behavior" was described as a major behavioral risk factor for cardiovascular ill health (25). There are at least three characteristics that mark out the type A - individual whose risk of coronary heart disease appears, from studies in the United States, to be at least twice that of the non type A:

- A strong commitment to work and much involvement in everything done;
- A well developed sense of time urgency;
- A strong sense of competition and a marked tendency to be aggressive.

Such behavior is probably learnt, and is often valued by and maintained through particular organizational or family culture. There have been various suggestions as to its most important dimension. The two that have attracted most attention are:

Control. The type A individual always feels like fighting to maintain control over events, which are often seen to be beyond their grasp. Faced with these situations, they simply expend more time and effort trying to "get events under control" and never really feel as if they have succeeded.

Anger & Hostility. Indices of anger and hostility have been validated in prospective research as predictors of cardiovascular ill health.

Causes of stress

The major stressors can be put in the following three categories (26):

- *Physical factors*, such as excessive noise, heat, humidity, vibration or work with toxic or dangerous substances etc.
- *Psychological and social factors:* political and economic instability, experience and exposure to suffering, sickness, injury or danger, threats of violence etc.
- *Management factors* - the new hazards of our century.

Over its approximately 500 000 years of existence, the human race has expe-

rienced a rather limited number of work life transitions. The first one occurred only some 10 000 years ago when hunting and gathering nomadic tribes turned to agriculture. The next transition started only a few centuries ago with the industrial revolution. Presently, we are in the midst of a third transition, into a post-industrial era characterized by an information economy, by globalization, corporate reorganization, the introduction of new technologies (such as computerization, robotisation and biotechnology), the introduction of new management philosophies, increased workforce diversity and increased expectations in the workforce (27, 28). Unprecedented in the history of mankind, these changes are also occurring at breakneck speed. It goes without saying that many of these developments carry a great potential for health, wellbeing and prosperity. It is equally obvious that some of them demand increased flexibility both in terms of number, function or skills and create side-effects in terms of ill health (5).

Groups at risk

Every person has his or her breaking point. In addition, the nature and conditions of life are changing at whirlwind speed. This increases the risk we run, or may run. Often, those who are particularly at risk of ill health are also more exposed to noxious conditions of life and work. High vulnerability and high exposure thus tend to coincide (4).

Kasl has attempted to summarize the different criteria and factors that define vulnerability as: socio-demography (e.g. age and educational status), social status (e.g. living alone), behavioral style (e.g. type A behaviour), skills and abilities, health status and medical history, and ongoing non-work problems (29). Such factors are moderators of the hazard-stress-harm relationship and probably interact in defining the high risk or vulnerable groups. Some of them are (4):

The young (especially at earlier age or orphans);

Single parents (the majority are women);

Elderly workers (increasing number in Europe with the increase of the life-expectancy);

The disable -it is rather difficult to define, because "disability" must always be considered in relation to both the psycho-social and physical ecosystem in which the individual is expected to function and his or her compensatory potential. Among them are the blind, deaf, physically disabled, mentally retarded or ill, drug addicts, alcoholics, minority groups, migrants etc.

Increased vulnerability and exposure - often coincides with an increased exposure to stressful occupational and other environments. In these situations, various factors "sort out" those individuals who are most in need of more favourable living and working conditions. In this way, maximal vulnerability is combined

with maximal exposure to environmental stressors, increasing the risk of subsequent decline in health and wellbeing (30).

Stress as a health determinant

At the end of the 20th century there has been a common belief that the experience of stress necessarily has undesirable consequences for health. Nevertheless, more evidence has been found that the experience of stress does not *necessarily* have pathological effects. Many of the person's reactions to that experience, both psychological and physiological, are within the body's normal homeostatic limits and need not cause any lasting disturbance or damage. However, it is also obvious that the negative emotional experiences which are associated with the feeling of stress detract both from the general quality of life and from the person's sense of well-being. In this way the experience of stress reduces the sense of well-being, but does not inevitably contribute to the development of physical or psychological disorder. For some, however, this experience may influence pathogenesis: stress may affect health. At the same time, a state of ill health can both act as a significant source of stress, and may also sensitize the person to other sources of stress by reducing their ability to adapt. Within this framework, the common assumption of a relationship between the experience of stress and poor health appears justified (31).

Manifestations of stress

A brief overview of the broad range of health and health-related effects which have been variously associated with the experience of stress is presented. They are categorized under the following four headings but are usually interfering and tightly interwoven (4).

Emotional manifestation. Here are included reactions of anxiety and depression, feelings of hopelessness and helplessness. If a stressor exposure is intense, often repeated or long-lasting, and/or if the exposed one is vulnerable to such exposures, the anxiety and/or depression grow deeper or more long-lasting and may transform into disease.

Cognitive manifestations. Under conditions of stress many people find it difficult to concentrate, recollect, learn new things, be creative, and make decisions. Again, if pronounced, such reactions may develop into a dysfunctional state.

Behavioural manifestation. Exposure to different stressors can trigger pathogenic health-related behaviors. Some use alcohol as a way to relax, or they start or increase smoking (stress smoking). Others feel comfort in overeating (increasing the risk of obesity and subsequently of cardiovascular diseases and diabetes); in drugs, or take unnecessary risks at work or in traffic. Aggressive, violent or

other types of antisocial behavior may be another outlet chosen. Many of these reactions can lead to accidents, disease and premature death. Examples of stress influenced, behavior-related health outcomes concern the "principal killers" in the European Union, namely cardiovascular diseases, cancer, respiratory diseases and "external causes" (which include accidents and suicides). Together, they account for about 75% of all deaths. A major survey among European adults in all 15 EU Member States (32) shows that the category "lack of time", comprising time factors such as "irregular work hours" and "busy life-style", constitutes one of the most frequent barriers to healthy eating (EU average = 34%).

Physiological manifestations. As described above, the stress reactions include a preparation for fight or flight. The typical reactions may be increased blood pressure, accelerated blood clotting, increased or irregular heart rate, muscular tension (with subsequent pain in the neck, head and shoulder), or overproduction of acid gastric juice. Virtually every organ and organ system can be influenced. If such manifestations become chronic, health is likely to suffer (33, 34).

General effects of stress

The experience of stress can alter the way the person feels, thinks, and behaves, and can also produce changes in their physiological function (35, 36). Many of these changes simply represent a modest dysfunction and possibly some associated discomfort. Many are easily reversible although still damaging to the quality of life at the time. However, under some circumstances, they might translate into psychological and social problems and into poor physical health (37). Nevertheless, the overall strength of the relationship between the experience of stress and its antecedents on one hand and health on the other is consistent but moderate (38). It is convenient to summarize the possible health and health-related effects of stress under two headings: psychological and social effects, and physiological and physical effects.

Psychological and social effects.

These effects involve changes in cognitive-perceptual function, emotion and behavior. Some of these changes may represent attempts to cope, including changes in health-related behaviors. There is evidence that some health-promoting behaviors, such as exercise and relaxation, sleep and good dietary habits, are impaired by the experience of stress, while other health risk behaviors, such as smoking and drinking, are enhanced. Other behaviors, such as sexual behavior, which may be health-neutral, can also be impaired and that impairment becomes a secondary cause of stress. Similarly, increases in health-risk behaviors can also become secondary causes of stress if sustained. Particular reference may be made to psychological dependency on alcohol or smoking.

Social behavior, and interpersonal relations, may be impaired by the experi-

ence of stress, possibly reflecting more fundamental psychological changes in, for example, irritability, attention span and memory. Stress-related impairments of social relations may both create secondary problems and reduce the availability of social support. Interestingly, the literature which describes the translation from a normal psychological reaction to events to *psychological* illness is not well formed, except in the case of post traumatic stress and related disorders (39, 40). A variety of psychological sequel has been related to exposure to extremely threatening situations such as catastrophes and disasters, war and terrorism.

Psychological and physical effects.

Contemporary research into physiological and physical health correlates of stress began in the 1920s and 1930s with the work of Cannon (41) and Selye (42). Since then much has been published in this area. A large body of data has been accumulated concerning physiological responses in people exposed to stressors in laboratories. Adrenaline and cortisol have become known as *stress hormones* because, in men, levels of both hormones consistently rise in response to stress in laboratory-based investigations. If chronically repeated, elevation of adrenaline and cortisol is likely to have long-term consequences for health, especially - cardiovascular health, partly via the effects of the hormones on blood pressure and serum cholesterol levels (43).

Some stress-related pathology

The evidence from laboratory animal experiments shows that four physiological systems are particularly vulnerable to stress. They are:

- Cardiovascular system (44);
- Endocrine system (45);
- Gastro-intestinal function (46) and
- Immune system (47).

Stress-related dysfunction in these systems is potentially significant for physical health. Because of this unofficial consensus the literature on stress and physical health largely focuses on a number of particular conditions, although a large number of others are commonly cited as being, to some extent, stress-related.

Heart disease and stroke. Cardiovascular diseases (CVD) are the leading cause of death and one of the most common causes of disability in the 15 EU Member States. The combination of high psychological demand and low decision latitude (control) increases the risk for cardiovascular morbidity or mortality (48, 49). With regard to stroke, the evidence is less conclusive, but the risk factors for stroke are similar to those for ischemic heart disease (smoking, hypertension, poor diet and diabetes).

Number of studies show that the Acute Myocardial Infarction (AMI) has often been preceded by a prolonged psychic state as anxiety, nervousness, aggression, depression, social isolation, etc. Some authors consider that stress (in this forms) is the leading risk factor for arterial hypertension and acute myocardial infarction. Classical examples of this theory are the extremely high number of cases of AH and AMI during earthquakes, blockades, other military actions, etc. Nevertheless there are considerable data that these diseases not always develop in abnormal situations. In this way the Cortico-visceral theory works together with the High cardio-vascular risk theory, which points out the importance of many risk factors among which the stress appears to be an additional one (50).

Cancer. One-third of all males and one-quarter of all females in EU *develop* cancer before the age of 75. One-fifth of them and one in ten women will *die* from cancer before that age (51). Stress itself surely does *not* cause cancer but it is known to contribute to a variety of stress-related *behaviors* that secondarily increase the risk for that disease.

One of the viewpoints for the way the experience of stress may influence the development of cancers is that stress-associated pathologies will not be observed (even under stress conditions), if there is no malignant process already in existence (52). So, here is discussed the role of stress in the development of existing cancers rather than in the etiology of new cancers. Second, even if there is an existing latent pathology, the effects of stress will not be observed unless the disease is under the control of the immune system. This may account for stress effects on the development of some cancers and not others. Third, the effects of stress will only be observed if there is some functional balance between the individual's defenses and the developing cancer. Where one or other is obviously dominant, any additional effects of stress may be impossible to detect. This means that the effects of stress may not be detectable in the early and terminal stages of cancer development. This model was largely developed from Riley's studies on rodents to account for cancer development but might be usefully applied to other diseases which involve the immune system activity (53).

Musculoskeletal diseases. There is supportive evidence indicating that a combination of muscular tension and multiple traumata to parts of the musculoskeletal system (caused by unsatisfactory ergonomic work arrangements), can contribute to frequent, lasting and incapacitating conditions of musculoskeletal pain, particularly in the upper extremities, the neck and in the lower back (54).

Gastrointestinal diseases. Early claims that peptic ulcer was stress-related have not been confirmed. On the other hand, it seems clear that many of its symptoms are found in frequent stress-related cases of *non-ulcer dyspepsia* (NUD). Similarly, the *irritable bowel syndrome* (IBS), with its painful spasms of the large intestine, is a rather common reaction to stress (34).

Anxiety disorders include *acute stress disorder* with its pattern of anxiety and dissociation occurring during or immediately after a traumatic event, lasting for at least two days and resolving within one month. In contrast, *posttraumatic stress disorder* (PTSD) occurs in response to an overwhelming traumatic event and leads to debilitating reactions lasting more than one 24 month. Such reactions occur in combat veterans, victims of torture and survivors of natural disasters, but also in response to a workplace trauma in law enforcement, fire fighting, emergency rescue, retail banking (with its risk of armed robbery), workplace violence and suicide, and severe occupational accidents (55).

Depressive disorders. Sadness and grief is a normal reaction to significant separations and losses. Even in the absence of actual clinical depression, these feelings and their behavioral and/or psychophysiological concomitants, often lead to sickness, medical consultations, and various types of medical treatments. Both are characterised by suffering and dysfunction in the individuals, as well as in their families and at their workplace (56).

Accidents, suicides. In the 15 - 34 age group, accidents and suicides represent more than half of the deaths in the European Union (51). It is likely that stress is one of several factors contributing to the approximately 5 million accidents at work recorded in the EU in 1994, each resulting in more than 3 days absence, and to many of the approximately 48 000 annual suicides and 480 000 suicide attempts (57).

Other pathologies. A considerable variety of different pathologies, both psychological and physical, have been associated with the experience of stress. Those disorders usually cited as being *stress-related* include: bronchitis, mental illness, thyroid disorders, skin diseases, certain types of rheumatoid arthritis, obesity, tuberculosis, headaches and migraine and diabetes. There has been evidence for a long time that the experience of stress can contribute to an acceleration of the disease process in at least one particular type of rheumatoid arthritis (58).

Conclusions

It is not easy to summarise the theoretical basis about stress, its causes and its effects, having in mind the numerous, sometimes controversary data and research work. It is inevitable to ask the question: Is stress dangerous? The answer could be - yes, and no. Stress *can* be disease-provoking under certain conditions when they are intensive, chronic, and/or often repeated. Common stress – related or induced problems include a wide range of physical and mental morbidity and even death.

The answer is more likely to be “no” when we feel in control. Stress becomes “the spice of life”, a challenge instead of a threat. Stress in this physiological sense

- *adapting* cannot be eliminated. Without it, the process of life would cease, for the complete absence of stress means death. But when we lack this crucial sense of control, stress can be devastating - for us, for our health and our life. To feel "under STRESS" as a part of our everyday life, affects the rate at which processes of wear and tear in our body take place. The more "gas is given", the higher the "revolutions per minute (RPMs)" at which our body's engine is driven, the more rapidly our engine wears out - "the kiss of death" (4).

EXERCISES

Task 1: Choose one of the theories, concerning the mechanisms of stress, find more materials about it and try to defend its principles in a short presentation.

Task 2: Find out data (statistics) for your country, region, and for Europe, concerning stress and stress-related diseases and compare them.

Task 3: Write analysis of the situation in your town / region / country, related generally to

- stress at work place (particular company or profession);
- within the family;
- within a particular social group (disabled, minorities, socially excluded etc.).

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Basic Aspects of Stress Evaluation, Stress Management and Prevention of Stress-Related Diseases**
Module: 3.3	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Elena Shipkovenska, MD, PhD, Professor** Vice-dean of the Faculty of Public Health, Medical University-Sofia **Mariana Dyakova, MD, MPH, Teaching assistan**t Department of Preventive medicine, Faculty of Public Health, Medical University-Sofia **Lidia Georgieva, MD, PhD, Associated professor** Head of the department of Preventive medicine, Faculty of Public Health, Medical University-Sofia
Address for correspondence	Prof. d-r Elena Shipkovenska, Vice-dean Faculty of Public Health, Medical University-Sofia 8 Bialo More Str 1527 Sofia, Bulgaria Tel./Fax: +3592 9432127 E-mail: e.shipkovenska@doctor.bg
Keywords	Stress, measurement, prevention, risk factor, management, hazard, standard, policy, plan
Learning objectives	After completing this module students and public health professionals should: • Be aware of some ways of measuring stress; • Increase their knowledge about stress as a risk factor for CVD; • Understand evidence from different epidemiological studies; • Know the principles of stress-management; • Identify risk hazards and evaluate the risk; and • Be able to prepare a stress-management programme and write a policy paper.

Abstract	Four basic points should be considered, when discussing stress as a determinant of health. The first one is the nature of stress; the second is the impact of stress over health; the third one is stress measurement or evaluation and the fourth - stress management and prevention. This chapter discusses the second two issues, trying to figure out a valid and reliable way to measure stress and to show some examples of stress evaluation, stress management and prevention. Logically, the measurement of the stress state must be based primarily on self-reports although such self-report measures are insufficient and bear many methodological problems. There is an imperative need to establish the validity of self-report data with reference to external evidence, to develop standardized procedures for the corroboration of qualitative data with quantitative measures, and between sets of qualitative data from different sources. A great variety of measures have been described, proposed and applied to measure many aspects of different stressors, individual and organisational stress responses, and the resulting outcomes in terms of individual and organisational health and wellbeing. Few examples of stress-related epidemiological studies are presented. The principles of stress management are revealed and some examples of stress-prevention programmes and policy papers are provided.
Teaching methods	Teaching methods should include lectures, individual work and interactive methods such as small group discussions and seminars.
Specific recommendations for teachers	It is recommended that 1/3 of the module is work under teacher supervision (lectures), and 2/3 is individual students' work. Target audience – medical and public health specialists, social workers, psychologists, managers and other executive staff in companies, as well as politicians.
Assessment of students	Assessment should be based on a seminar paper - writing a stress-management programme or a policy paper.

BASIC ASPECTS OF STRESS EVALUATION, STRESS MANAGEMENT AND PREVENTION OF STRESS-RELATED DISEASES
Example Case Studies And Strategies

Elena Shipkovenska, Mariana Dyakova, Lidia Georgieva

Measuring stress – is it possible?

In the previous chapter it has been suggested that the available evidence supports a psychological approach to the definition of stress, and that transactional models are among the most adequate and useful at present. Within this framework, stress is defined as a psychological state which is both part of and reflects a wider process of interaction between the person and their environment. This process is based on a sequence of relationships between the objective environment and one's perceptions, between those perceptions and the experience of stress, and between that experience, changes in behavior and physiological function, and health. This sequence provides a basis for measurement, but the different measures which can be derived from the sequence cannot be easily or defensibly combined into a single stress index (1).

Logically the measurement of the stress state must be based primarily on self-report measures which focus on the appraisal process and on the emotional experience of stress (2, 3). Measures relating to appraisal need to consider the perceptions of the demands on them, their ability to cope with those demands, their needs and the extent to which they are fulfilled by work, the control they have and the support they receive. Dewe (4) has argued that it is necessary to go beyond simply asking whether particular demands, etc. are present (or absent) in their environments and measure various dimensions of demand such as frequency, duration and level. Furthermore, such measures need to be used in a way which allows for the possibility of interactions between perceptions, such as demand with control (5) or demand and control with support (6, 7). The importance of coping needs also to be taken into account (8).

However, such self-report measures are quite insufficient and with many methodological problems. The existing literature has identified the need to establish the validity of self-report data with reference to additional, external

evidence. There are number of "triangulation" strategies that researchers have adopted. There is an imperative need to develop standardized procedures for the corroboration of qualitative data with quantitative measures, and between sets of qualitative data from different sources. Finally, it must be noted that the concepts of *process* and *interaction* have important implications for the operationalisation of stress theory: the measurement of the "stress process" is, when approached scientifically, unavoidably complex and not adequately addressed by single one-off measures (1).

Evaluation of stress, its causes or effects (example case studies)

To gather primary information about the basic stressogenic factors and conditions, as well as the state of stress and its consequences, both observational and interventional epidemiological studies have been used (cross-sectional, follow-up etc.). The data is usually collected by special questionnaires, including different number and types of questions, most often regarding:

- Presence, strength and duration of the stressogenic factors;
- Presence, strength and duration of stress-related manifestations and conditions as affective, depressive or other psychosomatic symptoms; and
- Presence of symptoms of a disease.

For more complete and precise evaluation, different scales and special coefficients have been introduced (e.g. average weighted strength of influence of a stressogenic factor, average weighted frequency of symptoms etc.). For example, one specific factor can be measured, referring to its presence as well as to its "average weighted strength of influence". Thus, according to the presence, duration and severity of the stress experience, three groups of conditions can be formed:

- Constant stress (having constantly at least two stress symptoms);
- Intermediary stress (not less than three symptoms with interrupted presence); and
- Transient (short-lived) stress (rare presence of different number or type of symptoms).

Case studies (examples)

Stress "measurement"

Many attempts have been made to identify and scale stressful life events and to determine their relative importance. Dohrenwend (9) have described the careful development (and strengths and weaknesses) of the *PERI2 Life Events Scale*. A list of 102 objectively verifiable life events was constructed from previous

studies in New York. These events were classified according to 11 life domains: school, work, love and marriage, having children, family, residence, crime and legal matters, finances, social activities, health and miscellaneous. Subjects were asked to rate events against marriage, which was given an arbitrary rating of 500. Subjects were grouped according to a number of criteria such as age, sex, and ethnic background, and mean sub-group ratings were calculated for each event. This avoided giving undue weight to sub-groups over-represented in the overall sample. However, the events were also scored according to their mean rankings: this gave equal weight to all subjects regardless of sub group. Of the 102 life events, 21 related to work. The highest ranked work event was *suffered business loss or failure.* The lowest ranked work event was *changed job for one which was no better or worse than last one.* As far as non-work events were concerned, the highest ranked event overall was *child died* with *divorce*, and the lowest, *acquired pet.*

Stress as a risk factor for cardiovascular diseases (CVD) - two epidemiological studies

A cross-sectional study - "Sofia Heart Study – 1994".

It is one of the biggest cross-sectional epidemiological studies, concerning risk factors for CVD in Bulgaria, with 1996 participants (10). Individual evaluation in groups of people between age of 25 and 75 was made. The majority of the participants (1255 interviewed, 66.8%) consider psycho-emotional stress a factor with great influence on health. This complies with the Framingham investigation, as well as with some other observations of Bulgarian authors. They have found out that over 50% of the hospitalized patients with AMI do not have the basic CV risk factors appointed by the European and American associations and point out - stress as the major reason for their present condition. This requires a thorough patient history with an accent on psycho-social factors to be taken upon patient admission.

The results from our investigation show that unfavorable life events are the major cause of stress among the interviewed. The biggest percent represents health associated misfortunes (of the person himself or his relatives) – 38.3%. Financial problems and unemployment follow with 35.6% of the answers. To evaluate the state of stress, the presence and duration of 20 affective symptoms, which characterize the psycho-emotional condition of tension have been investigated. As a direct stress-reaction, the asked people point out:

- Overall exhaustion (fatigue), sense of uselessness – 59.4%;
- Problems with the sleep and difficult falling asleep – 43.5%;
- Feeling of pain in the chest or heart – 36.3%;
- Feeling nervous or easy irritated – 33.8%.

The presence of these affective symptoms does not give enough information of the state of tension e.g. of affective stress. That's why these feelings were characterized also with their duration or frequency of appearance in four levels: almost never; rarely; from time to time; often. The last level characterizes the chronic stress, whereas the levels – "rarely" or "from time to time" – are indicators of the transitional forms of stress.

From the data received, it can be concluded that very few from the affective symptoms have permanent presence in the interviewed people (22.6%). In men, the condition of transitional stress is prevailing (43.6%) and in women – the stress is more often and permanently experienced (31.4%). The percent of people, considering that the stress, experienced during the last one year has affected their health is 18.1% (24.1% women, 13.3% men, $p<0.001$).

The analysis of the data from this study did not aim at finding a causational relationship between stress and CVD because of two reasons:

- This study is descriptive, cross-sectional and it can only raise a hypothesis for a possible dependency between the risk factor - stress and a CVD (it cannot give a proof).
- Studying stress with the classical methods of modern epidemiology is uncertain and tricky; because the influence of all stressogenic risk factors is always transformed by the individual perception and feelings and afterwards these factors may cause pathological reactions (disease).

Usually the participants in a study cannot be separated in equal groups according to their reaction towards the same psychosocial factors (events). That is one of the main reasons why most of the studies over stress are descriptive and very few are analytical (experimental).

According to some other Bulgarian studies, the most vulnerable to stress groups in the country are the teachers, the physicians and the social workers. This is due mainly to their working environment, including discipline problems, aggression, low level of motivation and awareness of patients and students, lots of paper work, inadequate salaries, beurocracy, lack of family and work support, etc.

A prospective cohort study: Low Job Control and Risk of Coronary Heart Disease in Whitehall II (11)

Objective: To determine the association between adverse psychosocial characteristics at work and risk of coronary heart disease among male and female civil servants.

Design: Prospective cohort study (Whitehall II study). At the baseline examination (1985-8) and twice during follow up a self report questionnaire provided

information on psychosocial factors of the work environment and coronary heart disease. Independent assessments of the work environment were obtained from personnel managers at baseline. Mean length of follow up was 5.3 years.

Setting: London based office staff in 20 civil service departments.

Subjects: 10 308 civil servants aged 35-55 were examined - 6895 men (67%) and 3413 women (33%).

Main outcome measures: New cases of angina (Rose questionnaire), severe pain across the chest, diagnosed ischemic heart disease, and any coronary event.

Results: Men and women with low job control, either self reported or independently assessed, had a higher risk of newly reported coronary heart disease during follow up. Job control assessed on two occasions three years apart, although intercorrelated, had cumulative effects on newly reported disease. Subjects with low job control on both occasions had an odds ratio for any subsequent coronary event of 1.93 (95% confidence interval 1.34 to 2.77) compared with subjects with high job control at both occasions. This association could not be explained by employment grade, negative affectivity, or classic coronary risk factors. Job demands and social support at work were not related to the risk of coronary heart disease.

Conclusions: Low control in the work environment is associated with an increased risk of future coronary heart disease among men and women employed in government offices. The cumulative effect of low job control assessed on two occasions indicates that giving employees more variety in tasks and a stronger say in decisions about work may decrease the risk of coronary heart disease.

Key messages:

- Low job control in the work environment contributes to the development of coronary heart disease among British male and female civil servants
- The risk of heart disease is associated with both objective low job control and perceived low job control.
- Increase in job control over time decreases the risk of coronary heart disease. This suggests that policies giving people a stronger say in decisions about their work or providing them with more variety in work tasks may contribute to better cardiovascular health

Principles of stress-management

Stress management can be classified in terms of its objectives and strategies, its focus or target, and the agent through which it is carried out (1).

Objectives

There are, at least, three distinct sets of objectives which can be adopted by individuals and organisations in managing stress and its health effects (12):

- *Prevention*, often control of hazards and exposure to hazards;
- *Timely reaction*, often based on management and group problem-solving, to improve the ability to recognize and deal with problems as they arise; and
- *Rehabilitation*, often involving offering enhanced support (including counselling) to help one cope with and recover from problems which exist.

Within this model, many authors make a distinction between those objectives which concern or focus on the *organisation* (organisational stress management) and those that concern and focus on the *individual* (personal stress management).

There are three common types of intervention to be found in the literature on stress management (12, 13, 14):

- *Primary:* some form of organisational or work development which attempts to reduce stressors (e.g. 15)
- *Secondary:* training either in the form of health promotion or psychological skills (e.g. 16)
- *Tertiary:* assistance (largely focused on the provision of counseling).

Stress management training

Many existing off-the-shelf "stress" surveys fail to provide a sufficiently detailed basis for sound intervention programmes. Stress management programmes have been classified according to some basic principles of intervention: objective (prevention, timely reaction, or rehabilitation), agency (organisation and/or employees) and target (organisation and/or individuals).

In 1984, Murphy reviewed thirteen published and unpublished studies on personal stress management for NIOSH (17). Although the programmes varied considerably in terms of the work groups involved, the nature of the techniques and the outcome measures used, Murphy was able to make several general observations on those programmes and their effectiveness. The majority of the programmes focused on training in techniques such as relaxation and other behavioral skills, meditation, biofeedback, and cognitive restructuring. All techniques seemed to involve, to some degree, strengthening the person's self esteem or sense of personal worth. The scientific literature suggests that organisational-level interventions (or, at least, intervention programmes that target the organisation *as well as* the individuals) may be the most beneficial for both individuals and organisations.

The cost-benefit considerations of personal stress management programmes were brought forward. A cost-benefit ratio has been attempted for such techniques by Manuso (cited in 18). He calculated that every dollar spent on personal stress management programmes might realize $5.52 in benefits for the organisation as a result of decreased symptom activity and increased performance.

Prevention of stress-related diseases

Theoretically, environment and lifestyle-related disease may be prevented at any of the links in the pathogenic chain. Thus, environmental stressors might be eliminated, reduced, or avoided. Preventive interacting variables might be promoted (e.g. by improving social networks, or developing coping abilities). Pathogenic emotional, cognitive, behavioral and physiological mechanisms might be counteracted (e.g. by drugs blocking adrenergic beta-receptors, tranquillizers, antismoking campaigns, psychotherapeutic counseling). Precursors of disease might be detected and treated so that they do not progress to overt disease. And positive health might be promoted in different initiatives. In order to safeguard people's rights, prevent the perpetuation of harmful or useless measures, limit losses to the community's or enterprise's purse, and advance knowledge for the future, any of these actions (and others) ought to be *evaluated* when implemented. Such evaluation is the modern, humane substitute for nature's slow and cruel "survival of the fittest", and is a means of enabling man to adapt with minimal trauma to a rapidly changing environment and to control some of its changes (19).

The management of stress should be based on the adaptation and application of a control cycle approach such as that made explicit in contemporary models of risk management. Many "stress surveys" tend to identify only hazards or only outcomes, whereas the object of a risk assessment is to establish an *association* between hazards and health outcomes, and to evaluate the risk to health from exposure to a hazard. An almost unavoidable corollary of the paucity of adequate risk assessments is that most "stress management" interventions target the individual rather than the organization (the former is usually seen as cheaper and less cumbersome) are often *off-the-shelf* designs, and are entirely divorced from the process of diagnosis of the problems - if diagnosis takes place at all (20). A different type of approach is therefore required in order to carry out risk assessments which can then inform the design of interventions - in other words, a strategy that actually *asks the question* before giving the answer. Such a strategy has already been suggested for the control of physical hazards (21): the *control cycle*, which has been defined as "the systematic process by which hazards are identified, risks analyzed and managed, and workers protected" (22) comprises 6 steps:

1. Identification of hazards (Management of standards)
2. Assessment of associated risks

3. Implementation of appropriate control strategies

4. Monitoring of effectiveness of control strategies

5. Re-assessment of risk

6. Review of information needs and training needs of employees exposed to hazards.

The standards:

Demands: Includes issues like workload, work patterns, and the work environment.

Control: How much say the person has in the way they do their work.

Support: Includes the encouragement, sponsorship and resources provided by the organisation, line management and colleagues.

Relationships: Includes promoting positive working to avoid conflict and dealing with unacceptable behaviour.

Role: Whether people understand their role within the organisation and whether the organisation ensures that the person does not have conflicting roles.

Change: How organisational change (large or small) is managed and communicated in the organization.

Each step can be conceptualized as a further cycle of activities similar to a goal seeking process (23). As a systematic and comprehensive approach to assessing the risks within the environment, the control cycle satisfies current legal requirements. However, it is still necessary to evaluate whether it represents a scientifically valid and reliable strategy to assess psychosocial hazards. However, considerable difficulties emerge when trying to broaden the risk assessment approach to include psychosocial hazards: The first task is to achieve a definition of the terms used in risk assessment. This is far from straight-forward and has often proved difficult even in the more *tangible* area of physical hazards. A review of the literature suggests that there is reasonable consensus on the definitions of the basic terminology. For example, the EU Member States have agreed on "accepted and practical" definitions for the following fundamental terms:

Hazard: The intrinsic property or ability of something (e.g. work materials, equipment, work methods and practices) with the potential to cause harm.

Risk: The likelihood that the potential for harm will be attained under the conditions of use and/or exposure, and the possible extent of the harm. (24)

In different countries this approach is given different names, and a wide vari-

ety of local arguments are deployed to support its use. However, the underlying philosophy is the same, and this approach offers the best way forward.

Stress prevention programmes

Stress prevention programmes aim at a variety of targets and are based on various philosophies (25). If the working conditions – the "shoe", do not fit the worker - the "foot", one approach is to influence the "shoe factories" (the three parties on the labour market) to manufacture a wide variety of "shoes" in different sizes and configurations to fit every, or almost every "foot". Whenever possible, the instructions to the "shoe factories" should be evidence based - based on measurements of a representative, random sample of all "feet", all "shoes", and of the existing "fit" (cf. 26). This is *a first - diagnostic - step* in a primary prevention approach on a population level.

Another approach, again based on primary prevention, aims at finding the right "shoe" for each individual "foot" - putting "the right person in the right place".

A third approach is that the owner of each "foot" should have access to and be encouraged to utilise a "lasting device" to adjust available "shoes" to fit his or her "feet". Here, the emphasis is on empowerment, on active, responsible workers, able, willing and encouraged to make adjustments - within reasonable limits - to the surrounding conditions, to improve the environment-person fit.

Presently, in the European Union and elsewhere, most work stress prevention approaches are oriented towards secondary or tertiary prevention only (cf. 27). Most of them involve e.g. the provision of on-site fitness facilities, smoking cessation programmes, dietary control, relaxation and exercise classes, health screening, psychological counselling, or some combination of these, packaged as a multimodular programme (28, 29).

A multifaceted approach. An obvious difficulty with primary prevention lies in the fact that "one size does not fit all". It follows that we need a multifaceted approach to stressor prevention and to the objective of healthy workers in healthy companies. Attempts to design such an approach have been made in USA mostly (25).

As it is not in the scope of this handbook to reveal health prevention and promotion strategies, we are not going to discuss in details the different methods and approaches to achieve a "free-of-stress" work and life or to control the surrounding environment in order to reduce the stressogenic factors.

Nevertheless we offer an example of a certain management strategy, which can be applied in every company or other organisational setting and which serves as a basis for the required exercises.

Stress management programme by Health & Safety Executive - HSE (30) (an example)

Step 1 - Identify the hazards

Find out what's causing stress in your workplace. The Standards look at the six key areas of work that, if properly managed, can help to reduce work-related stress (demands, control, support, relationships, role, and change). The Standards help you to measure performance in managing work-related stress. Each standard provides simple statements about good management practice in each of the six areas. It is not expected that every employer meets all the Standards at first attempt. The Standards are goals that employers should be working towards through an ongoing process of risk assessment and continuous improvement.

Step 2 - Decide who might be harmed and how

All employees could suffer from work-related stress, but they could also be part of the solution. Before you begin Step 2, you should have look for the hazards:

- Read and understood the Stress Management Standards;
- Secured senior management commitment to tackling stress;
- Involved employees and employee representatives in taking the work forward; and
- Informed employees of the latest developments and plans for next steps.

Step 3 - Evaluate the risk and take action

This is the most important part of the process of tackling stress. This section will help you to assess how well your organisation is tackling/managing stress and to take appropriate action. It includes information on how to gather data, link problems to solutions, and communicate your results to staff.

Gathering information. Employers should not rely on just one measure of work-related stress but should try to get an overall picture by considering data from several sources. In particular, try to avoid using questionnaires in isolation – use a blend of methods.

Using existing information. Your organisation may already collect information that can be used to indicate potential problem areas. For example:

- High levels of sickness absence may indicate a potential problem area. Checking the reasons given for absence may help identify the cause.
- Low productivity can be an indicator of problems. Talking to employees should help you explore the reasons behind this.

- High employee turnover could be an indication of high stress levels. Investigate why people are leaving – conducting exit interviews is one way of doing this.

Starting a new survey. HSE has developed an Indicator Tool and an associated Analysis Tool. The Indicator Tool questionnaire can be used on its own or the questions can be used with other questions in a wider survey of staff opinions. However, surveys should not be used in isolation. Other data should be used to confirm the survey findings and inform the action you will take.

Alternatives to surveys – focus groups. If you do not want to use surveys, or if you are looking for ways to explore the results of surveys and set action plans, you can go into a group discussion.

- Linking problems to solutions. You should now be at a point where:

– you have identified what the biggest problems appear to be; and

– you have identified where they appear to be having the most impact.

However, you need to take action using the information you have obtained. Continue to talk to employees and their representatives to confirm the nature of the problems and develop ideas for solutions.

- Possible solutions.

As each organisation is unique, it is not possible to prescribe solutions. Evidence shows that the most successful and cost-effective solutions are those that are developed from within an organisation, in partnership with employees and their representatives.

Step 4 - Record your findings

Make a plan and stick with it. It is important that you record the results of your risk assessment in an action plan. If your risk assessment has identified areas of concern and you have taken steps to develop some solutions, it is important that you:

- record these and how you identified them;
- agree realistic timescales with employees and their representatives;
- share your plans with senior management and employee representatives;
- communicate the outcome to employees; and
- decide how you are going to review the results.

The best method of achieving this is to write and disseminate an action plan.

It will:

- help you set goals to work towards;
- help you to prioritise;
- demonstrate that you are serious about addressing employees' concerns; and
- provide something to evaluate and review against.

An action plan is a key part of your risk assessment and should at least include the following:

- what is the problem;
- how was the problem identified;
- what are you going to do in response;
- how did you arrive at this solution;
- some key milestones and dates for them to be reached;
- a commitment to provide feedback to employees on progress; and
- a date for reviewing against the plan.

The action plan needs to be agreed with employees, senior management and employee representatives. The final plan should be shared with employees.

Step 5 - Monitor and review

Measure and share your success. It is essential that you review any action you take to tackle stress. There are two elements to this:

- Monitor against your action plan to ensure the agreed actions are taking place; and
- Evaluate the effectiveness of the solutions you implement.

Follow-up surveys. One way to measure progress is to use the surveys again after a period of time. You may want to consider an annual survey. It is important to remember that the Standards are about making steady improvements in the way you manage stress. It is critical that you are committed to continuously working with employees to identify and address the problems in your workplace that could lead to stress related ill health.

Sources of stress at work – example questionnaire:

NB: Your responses to this questionnaire will remain anonymous and only group data will be presented. It will not be used as an evaluation of your work or capabilities.

Demands		
I am able to cope with the demands of my job		
Often	Sometimes	Seldom Never / Almost never
Control		
I am able to have a say over the way I do my work		
Often	Sometimes	Seldom Never / Almost never
Support		
I believe that I receive adequate support and information from my colleagues and superiors		
Often	Sometimes	Seldom Never / Almost never
Relationships		
I am subjected to unacceptable behaviours (e.g. bullying) at work		
Often	Sometimes	Seldom Never / Almost never
Role		
I understand my role and responsibilities within the organisation		
Often	Sometimes	Seldom Never / Almost never
Change		
The organisation engages staff frequently when undertaking organisational change		
Often	Sometimes	Seldom Never / Almost never

Stress policy paper by Health & Safety Executive - HSE (31)

(an example)

Introduction

We are committed to protecting the health, safety and welfare of our employees and recognises that workplace stress is a health and safety issue and acknowledge the importance of identifying and reducing workplace stressors. This policy will apply to everyone in the company and managers are responsible for implementation and the company is responsible for providing the necessary resources.

Definition of stress

The Health and Safety Executive define stress as "the adverse reaction people have to excessive pressure or other types of demand placed on them".

Policy

- The company will identify all workplace stressors and conduct risk assessments to eliminate stress or control the risks from stress. These risk assessments will be regularly reviewed.
- The company will consult with Trade Union Safety Representatives on all proposed action relating to the prevention of workplace stress.
- The company will provide training for all managers and supervisory staff in good management practices.
- The company will provide confidential counseling for staff affected by stress caused by either work or external factors.
- The company will provide adequate resources to enable managers to implement the company's agreed stress management strategy.

Responsibilities

Managers

- Conduct and implement recommendations of risks assessments within their jurisdiction.
- Ensure good communication between management and staff.
- Ensure staff is fully trained to discharge their duties.
- Ensure staff is provided with meaningful developmental opportunities.
- Monitor workloads to ensure that people are not overloaded.
- Monitor working hours and overtime to ensure that staff is not overworking.
- Attend training as requested in good management practice and health and safety.
- Ensure that bullying and harassment is not tolerated within their jurisdiction.
- Be vigilant and offer additional support to a member of staff who is experiencing stress outside work e.g. bereavement or separation.

Occupational Health and Safety Staff

- Provide specialist advice and awareness training on stress.
- Train and support managers in implementing stress risk assessments.
- Support individuals who have been off sick with stress and advise them and their management on a planned return to work.
- Refer to workplace counselors or specialist agencies as required.
- Monitor and review the effectiveness of measures to reduce stress.
- Inform the employer and the health and safety committee of any changes and developments in the field of stress at work.

Human Resources

- Give guidance to managers on the stress policy.
- Assist in monitoring the effectiveness of measures to address stress by collating sickness absence statistics.
- Advise managers and individuals on training requirements.
- Provide continuing support to managers and individuals in a changing environment and encourage referral to occupational workplace counselors where appropriate.

Employees

1. Raise issues of concern with your Safety Representative, line manager or occupational health.
2. Accept opportunities for counseling when recommended.

Role of the Safety Committee

1. The joint Safety Committee will perform a pivotal role in ensuring that this policy is implemented.
2. The Safety Committee will oversee monitoring of the efficacy of the policy and other measures to reduce stress and promote workplace health and safety.

Conclusions

There is a wealth of scientific data on stress, its causes and its effects. Although this wealth of scientific data exists, it still needs to be translated into practice, and the effectiveness of this practice evaluated. This is another set of needs, which will only be settled outside the laboratory and through the development of consensus and common practice.

A great variety of measures have been described, proposed and applied to measure many aspects of different stressors, individual and organisational stress responses, and the resulting outcomes in terms of individual and organisational health and wellbeing. It is desirable to have a set of standard measures for all these variables in order to make them comparable. The measures should ideally be transculturally and transsectorally applicable and should fit the wide variety of branches, professions and tasks within each branch. They should further have high validity (i.e. they should measure what they intend to measure) and reliability (i.e. they should provide similar answers irrespective of who is administering them, in what setting, and how many times). In reality, all this appears to be difficult to be achieved (1).

Generally stress management and stress prevention have to be carried out in two directions: individual and organizational. Everyone, especially those in the high risk groups (type A-behaviour, exposed to high levels of work load and demand etc.), should try and train him/herself to maintain stable control over the work and life rhythm, over one' s emotions and feelings. Only in this way, using different coping, relaxation and other strategies, the contemporary individual can survive under the pressure of everyday stress. Of course, as this depends on one's will, strength of character and psychological specific features, it is quite often difficult and almost impossible to achieve. Here comes the responsibility of the organization and its executive – to provide the most effective stress management scheme and stress prevention plan and thus to secure a friendly and productive environment for the worker.

Finally to return to our present world and age, full of work, competition, inequalities, environmental disasters, social discrepancies, economic uncertainty, moral dilemmas, family conflicts, unhealthy lifestyles… all suggests and causes

"malignant" stress, according to the widespread understanding. From this point of view, one of the most important steps in stress prevention and promotion of stress-free lifestyle would be the involvement of national and international structures and policies. The creation of international task forces, of state (governmental) anti-stress strategies and action plans (to improve generally environmental, infrastructural and other conditions for life and work) will facilitate the local and individual attempts to fight, ignore and manage with stressors and to maintain good coping ability and adaptation potential.

EXERCISES

Task 1: Find out different epidemiological studies, concerning stress as a risk factor for different diseases (CVD, Cancer etc.). Present and discuss in a group the methods used for evaluation and the validity and reliability of the evidence received.

Task 2: Find different scales for stress measurement and discuss their validity.

Task 3: Place yourself on the place of the executive manager of a big company and try to create a policy paper for stress prevention of your workers. Then place yourself on the place of a worker and do the same. Would the two papers differ in any way? Explain.

Task 4: Propose a stress prevention strategy for your work place / district / region.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Interpersonal Violence and Public Health**
Module: 3.4	**ECTS (suggested): 0.5**
Author(s), degrees, institution(s)	**Tozija Fimka, MD, PhD**, Assoc. Professor of Social Medicine, Medical Faculty, Skopje, Macedonia **Alexander Butchart, MA, PhD,** Coordinator, Prevention of Violence, Department of Injuries and Violence Prevention, World Health Organization, Geneva, Switzerland
Address for correspondence	Tozija Fimka, MD, PhD, Assoc. Professor of Social Medicine, Republic Institute for Health Protection 50 Divizija No 6 1000 Skopje Macedonia Tel: + 389 23 125 044 ext. 110 Fax: +389 23 223 354 E-mail: ftozija@mt.net.mk
Keywords	Ecological, evaluation, prevention, program, public health, risk factors, violence.
Learning objectives	After completing this module students and public health professionals should be able to: • Understand the nature, magnitude, root causes and risk factors of interpersonal violence; • Make use of the ecological model and the public health apprach; and • Identify the multilevel prevention programmes against violence, as well as to understand the basic principles of programme evalutaion.
Abstract	The public health approach is presented as a guiding framework for violence risk assessment and prevention activities, through the following four steps: problem definition; identification of risk and protective factors; development and evaluation of interventions; and implementation. The ecological model is described, which enables better understanding of violence and its risk factors at multiple levels. The basic principles and criteria for the identification of multilevel prevention programmes against violence, as well as the rationale for conducting evaluations of prevention programs are discussed. WHO recommendations for prevention of violence and future challenges for actions at national and local level are emphasized.

Teaching methods	Teaching methods should include lectures, interactive small-group discussions, and case studies. Students should apply the new knowledge by working in small groups, identifying different problems related to violence, risk factors and intervention activtities against youth violence. Case-problem analysis should be used for evaluation of prevention programmes aimng to reduce violence.
Specific recommendations for teachers	This module should be organised in 0.5 ECTS, with 70% of the work under direct supervision of teachers and 30% individual students' work. Teaching venue with available notebooks, LCD projectors and flip charts are needed for interactive teaching and group-work. Students should be computer literate and fluent in English.
Assessment of students	Assessment of students should be based on the group-work, seminar papers, and case-problem presentations.

INTERPERSONAL VIOLENCE AND PUBLIC HEALTH

Tozija Fimka, Alexander Butchart

Interpersonal violence as a global public health problem – the need for action

Violence - directed towards one's self, between individuals and between larger groups and nations - is now recognized as a significant public health and social problem. Nelson Mandela emphasizes this in the foreword of the *World report on violence and health* (1): "The twentieth century will be remembered as a century marked by violence … Many who live with violence day in and day out assume that it is an intrinsic part of the human condition. But this is not so. Violence can be prevented … We must address the roots of violence. Only then will we transform the past century's legacy from a crushing burden into a cautionary lesson" (1).

This Module focuses upon interpersonal violence, which is non-politically motivated violence (including child abuse, youth violence, intimate partner and sexual violence, and elder abuse) between individuals or small groups of individuals.

In 2000, homicides from interpersonal violence accounted for 520 000 deaths globally or 1 400 deaths daily, for a SDR of 8.8 per 100 000 population. Deaths are only the most visible part of the interpersonal violence iceberg, as for every death there are many more non-fatal cases. Of the hundreds of victims that survive, many require medical treatment and a significant proportion suffer long term physical and mental health consequences. Interpersonal violence occurs in the home and in public settings (such as streets, bars, clubs, workplaces, schools, hospitals and residential care facilities). It is widespread, but discrete and far less visible than the collective violence of terrorism and war (1). The direct costs and indirect costs of productivity loss due to interpersonal violence represent an enormous economic burden to victims, families and society. The highest rates of interpersonal violence occur in the poorest communities with the fewest resources to cope with the financial, social and psychological strains (1-2).

The World Health Organization's (WHO) *World report on violence and health* (1), gave special attention to the global burden of violence in general, and interpersonal violence in particular. The Report is the first comprehensive summary of this public health problem on a global scale, and presents an exhaustive review of the scientific literature on the root causes, risk factors and settings for

different types of violence; on the human and social toll arising from its consequences, plus national-and international-level recommendations for violence prevention policies and programmes. The 2003 World Health Assembly adopted the Resolution 56.24 (on implementing the recommendations of the *World report on violence and health*), which encourages Member States to prepare a report on the magnitude of the problem, the risk factors, current efforts to prevent violence, and future action to encourage a multisectoral response. To help governments, non-governmental organizations and communities around the world activate prevention activities, WHO has published a guide for implementing the recommendations of the World report on violence and health (3). International agencies are increasingly providing financial, technical and policy support to strengthen prevention activities and make them more effective at local, national, regional and international levels.

Magnitude, nature and consequences of interpersonal violence

Global mortality data for the year 2000 show that approximately 5.8 million people died from injuries. Of these, violence accounted for an estimated 1.6 million deaths, made up of 815 000 suicides, 520 000 homicides due to interpersonal violence and 310 000 deaths directly due to war. There are major variations in violence mortality rates between different regions in the world (Table 1) and between different gender and age groups (Table 2). Violent deaths in low-to-middle income countries occur at over twice the rate (32.1 per 100.000) of those in high income countries (14.4 per 100.000), due to a greater number and variety of hazards that expose inhabitants to violence, fewer resources for violence prevention, less treatment for the resulting injuries and other health consequences, and less care for the rehabilitation of victims (Table 1) (1,2). In low-to-middle income countries homicides and war are dominant, while in high income countries suicides predominate. Homicide rates are higher in countries with high levels of income, social and gender inequalities, and among residents in poorer neighbourhoods and households.

Table 1. Estimated global violence-related deaths, 2000

Type of violence	Numbera	Rate per 100 000 populationb	Proportion of total (%)
Homicide	520.000	8.8	31.3
Suicide	815.000	14.5	49.1
War-related	310.000	5.2	18.6
Totalc	1.659.000	28.8	100.0
Low to middle income countries	1.510.000	32.1	91.1
High income countries	149.000	14.4	8.9

Source: WHO Global burden of disease project for 2000, Version 1
[a] *Rounded to the nearest 1000; b age-standardized;*
[c] *Includes 14.000 intentional injury deaths resulting from legal intervention*

Worldwide, homicide rates are significantly higher among males (13.6 per 100.000) than females (4.0 per 100.000 population). Males are also more exposed to suicides; with a rate of 18.9 per 100.000 compared to 10.6 per 100.000 in females (Table 2) Violence affects people at all ages, although homicides are most frequent during the age range 15-44 years. For the year 2000, it was estimated that 57.000 children aged 0-14 years were victims of homicide, with the highest rates occurring among children aged 0-4 years. In the same year, 199.000 young people aged 10-29 years died as a result of interpersonal violence (1).

Table 2. Estimated global homicide and suicide rates by age groups, 2000

Age group	Homicide rate (per 100.000 population)		Suicide rate (per 100.000 population)	
	Males	**Females**	**Males**	**Females**
0-4	5.8	4.8	0.0	0.0
5-14	2.1	2.0	1.7	2.0
15-29	19.4	4.4	15.6	12.2
20-44	18.7	4.3	21.5	12.4
45-59	14.8	4.5	28.4	12.6
>60	13.0	4.5	44.9	22.1
Total	13.6	4.0	18.9	10.6

Source: WHO Global burden of disease project for 2000, Version 1
Age-standardized reates

Fatalities represent only a fraction of the full interpersonal violence problem. Unfortunately, precise national and international estimates of non-fatal violence are lacking, partly because of under-reporting due to a range of factors, including inadequate health services for victims and criminal justice systems (1). However, it is estimated that 10% of males and 20% of females have been sexually abused as children; that for every homicide among 10-29 year olds there are other 20-40 non-fatal cases which require hospital treatment; that rape and domestic violence account for 5-16% of healthy years of life lost in women of reproductive age, and that 10-50% of women have experienced physical violence at the hands of intimate partners over their lifetime (3).

The majority of victims of interpersonal violence are in the most economically productive age range of 15-44 years, and for every one of the thousands of millions of dollars spent on direct medical care for victims many more financial resources are lost due to indirect factors, such as time away from work and disruption of family routines. The economic costs of interpersonal violence are, therefore, very high. For instance, recent studies show that the economic burden of interpersonal violence in the USA is 3.3% of the GDP, while in England and Wales the annual total costs from violence are estimated at US$ 40.2 billion (3).

The root causes of violence and the majority of its consequences are located across different levels of society involving individual, social, economic and political factors. Violence prevention programs should therefore be conducted at

different levels by a range of international, national, local government and civil society. The United Nations, world economic agencies, human rights organizations, national governments, non-governmental agencies, and concerned individuals have initiated prevention activities. Some outstanding successes in preventing violence have been well evaluated and well documented, whereas others, particularly those in developing countries, remain unevaluated and poorly described (4).

Methods and Conceptual framework

This Module provides a conceptual basis for understanding interpersonal violence as a public health problem, and suggests a number of practical approaches for the design, implementation and evaluation of prevention programmes that, if implemented at sufficient scale and for a long duration, are likely to be effective in reducing the amount and severity of interpersonal violence.

The public health approach and the ecological model, as used in the *World report on violence and health* (1), are presented in this Module as a conceptual framework for organizing information about the root causes and risk factors for interpersonal violence as well as prevention activities (4).

The public health approach has been presented as a guiding framework for violence risk assessment and prevention activities. Its four steps are discussed (defining the problem; identifying risk and protective factors; developing and evaluating interventions; and implementing effective interventions widely).

The ecological model is described, which enables better understanding of violence and its risk factors at multiple levels. The basic principles and criteria for the identification of multilevel prevention programmes and the rationale for conducting evaluations of the prevention programmes are discussed, too.

WHO recommendations for prevention of violence are reviewed, and future challenges for actions at national and local level are identified.

Definitions and key terms

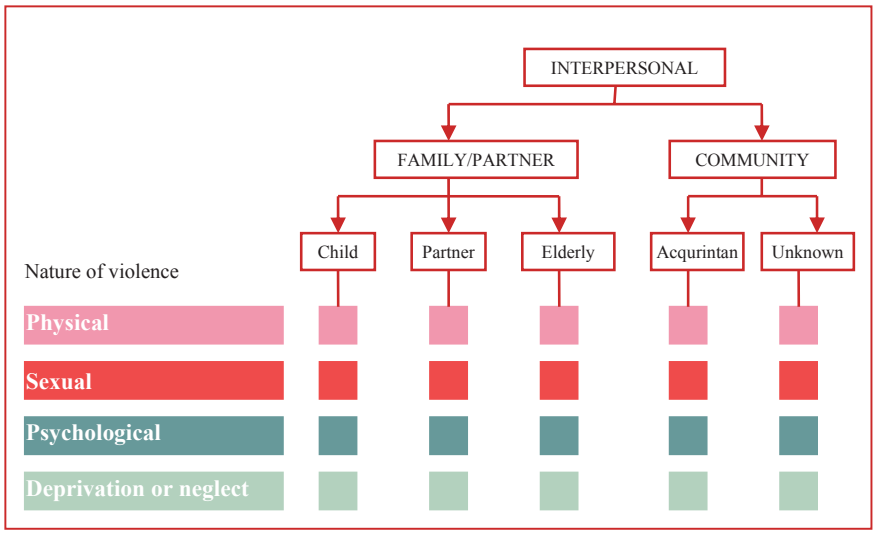
Interpersonal violence - interpersonal violence is defined as "The intentional use of physical force or power, threatened or actual, against another person, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation (1).

Interpersonal violence is subdivided into two categories: family and intimate partner violence and community violence (Figure 1).

- *Family and intimate partner violence* occurrs between family members and intimate partners, usually taking place inside the home and including child abuse and neglect, intimate partner violence, and elder abuse.

• *Community violence* includes violence between unrelated individuals, who may or may not know each other, generally occurs outside the home, and includes: youth violence, random acts of violence, rape or sexual assault by strangers, and violence in institutional settings such as schools, workplaces, prisons and nursing homes. As shown in Figure 1, each category of violence is defined by the victim-perpetrator relationship and involves physical, sexual and psychological violence, as well as deprivation or neglect (1).

Figure 1. Typology of interpersonalviolence



Source: Krug EG, Dahlberg LL, Mercy JA et al., eds (2002). World report on violence and health. Geneva, WHO

Prevention - prevention means to stop acts of interpersonal violence by eliminating or reducing the risk factors and increasing protective factors.

• *Primary prevention* involves strategies and interventions to stop violent events from taking place, and relates to the time before violence actually occurs. Examples of primary prevention programmes include pre-school enrichment programmes, training in parenting, assisting high risk youth to complete secondary schooling, and situational interventions to reduce alcohol-related violence.

• *Secondary prevention* includes strategies aimed at minimizing harm following a violent event and preventing re-victimization and re-offending. Secondary prevention examples include the early identification by health professionals of child abuse, intimate partner violence and elder abuse, and subsequent interventions to prevent further abuse.

- *Tertiary prevention* includes all activities for the treatment and rehabilitation of victims and perpetrators and facilitating their re-adaptation to society.

Interventions can also be described with reference to their target populations.

- *Universal interventions* are interventions that target everyone within the population without regard to their differences in the risk of becoming a victim or perpetrator of violence (e.g. the enactment and enforcement of laws to regulate the consumption of alcohol and firearm ownership).

- *Selective interventions* target people at enhanced risk of violence only (e.g. parent training and home visits for high-risk families in selected low-income settings).

- *Indicated interventions* are applied to individuals and groups that have already been involved in violent behaviour (as perpetrators and/or victims) in an effort to reduce re-victimization and repeated offending.

Programme is defined as a series of interventions, interrelated preventive activities, or projects, usually with a formal set of goals and procedures designed to have the desired outcome of reducing the level or consequences of violence. Programmes can differ in terms of scope (degree of coverage), complexity (multiple levels and sites versus single level, single site interventions), and time frame (short-term and long-term interventions) (5). Features that characterize programmes are the following: clearly defined goals and objectives; intended beneficiaries (the target group); some measures of success; programme components (i.e. the means to achieve the goals); programme infrastructure; a human resource base; stakeholders with a direct or indirect interest in the programme; a specific context (or setting) (6).

Evidence base of programmes. The aim of violence prevention programmes is to reduce the amount and severity of violence in the target population, and therefore programmes shown to be effective in this regard should be chosen ahead of programmes that lack evidence or which have been shown to be ineffective. The evidence base of programmes refers to the scientific literature describing outcome evaluations of interventions and programmes, and should be used to inform recommendations for prevention, the identification of elements to improve a specific programme and in determining whether a particular programme should be repeated or applied elsewhere (4). The *World report on violence and health* (1) and Preventing violence, the guide to its implementation (3), both describe this evidence base in detail.

The public health approach

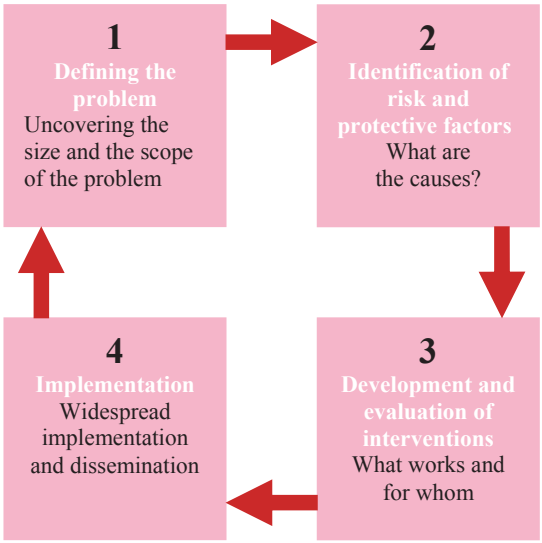
The public health approach is a science-based, multi-disciplinary approach for understanding and preventing violence. The approach is intended to help coordinate actions by representatives of many different sectors relevant to violence prevention, including welfare, social work, education, employment offices, health, police, and justice. As shown in Figure 2, the public health approach consists of four steps.

Problem definition – step 1 of the public health approach - examines the how, when, where, and what of violence. It involves developing case definitions of violence with clear agreement on what is being studied and counted. These should take into account the typology of violence, according to the different forms of violence (physical, sexual, psychological or due to deprivation or neglect) the setting, and the relationship between the victim and perpetrator. Violence should be described with numbers and rates of new cases, the demographic characteristics of victims and perpetrators, the victim–perpetrator relationship, the mechanisms of violent injury, the involvement of weapons and substances, and the temporal and geographical characteristics of violent incidents (1).

Risk factor identification – step 2 of the public health approach - looks at the why of violence. Risk factors are aspects of the person, place and social environment that are shown to increase the possibility of becoming a victim or a perpetrator of violence (e.g. social isolation, which is a risk factor for many types of violence, including elder abuse, child abuse and intimate partner violence). Protective factors are those that reduce the risk of violence or its consequences (e.g. living in a society where there is high social capital and little income inequality) (1). Problem definition, risk factor analysis, and the identification of causes help to show how levels of violence are an outcome of the relationships between people, products and the physical and social environments, and therefore how violence can be prevented by altering these causal relationships.

Development and evaluation of interventions – step 3 of the public health approach - aims to identify effective prevention strategies by using scientific evaluation studies to find out what strategies do work and which are effective. The effectiveness of strategies for preventing interpersonal violence will depend on a combination of the type of intervention, the timing of its delivery and the population at risk. Certain types of intervention will be specific to the developmental stage (infancy, adolescence, adulthood, old age) of the target group. For instance, home visitation and parent training programmes are effective in preventing child maltreatment and later violence among adolescents and young adults when delivered during infancy (ages 0–3 years), but are not designed for later stages in the life-cycle.

Figure 2. The public health approach to Interpersonal violence



Source: Sethi D. et al. Handbook for the documentation of Interpersonal violence prevention programmes.WHO,Geneva, 2004.

Implementation - step 4 of the public health approach - includes the translation of effective programmes into wide-scale implementation through the dissemination of effective practices and programmes and their adaptation to different populations and settings. It deals with the sustained implementation of effective interventions, practices and violence prevention initiatives, as a basis for developing public health policy and practice, institutional support and funding for violence prevention on a large scale (4).

Information arising from activities in steps 1 and 2 is vital for developing and evaluating interventions (step 3), and for widespread implementation and dissemination of proven and promising strategies (step 4). Individual violence prevention programmes will usually include activities relevant to only some of the steps, while national-level violence prevention policies and plans should ensure that all steps are adequately addressed, and that programmes dealing with the different steps are fully informed about the data and evidence from each of the other steps.

Ecological model

Violence is an outcome of a complex interaction of many factors at different levels: biological, social, cultural, economic and political. The ecological model developed in the *World report on violence and health* is used to capture this complexity and understand the root causes and risk factors of violence as a basis for developing prevention strategies at four levels: individual, relationship, community, and societal (Figure 3.) (1,4). "Whilst some risk factors may be unique to a particular type of interpersonal violence, more often the various types of violence share a number of risk factors" (1).

Examples of risk factors for more than one type of interpersonal violence and at the different ecological levels are given below.

Individual level - personal history and biological factors that influence how individuals behave and increase their likelihood of becoming a victim or a perpetrator of violence include early developmental experiences, demographic characteristics (age, education, income), psychological or personality disorders, substance abuse, and a history of behaving aggressively or having experienced abuse.

Personal relationships - such as with family, friends, intimate partners and peers, influence the risks of becoming a victim or perpetrator of violence, and growing up in a family with severe marital conflict, or having violent friends, strongly influence whether a young person engages in, or becomes a victim of violence.

Community - community-level risk factors for violence include situational factors (e.g. unsafe routes to school, poorly lit streets), high residential mobility, high unemployment, weak institutional policies in schools, clubs, bars and workplaces, and the existence of a local drug or gun trade.

Societal - economic and social policies that maintain socio-economic inequalities between groups, firearm availability, and social and cultural norms (e.g. male dominance over women, parental dominance over children, and the use of violence as a normal method to resolve conflicts) are all risk factors for most types of violence.

The ecological model is multilevel, showing the interaction of factors within each level and across the different levels. To address these multilevel risk factors, prevention programmes also need to operate in multiple levels. For instance, multilevel prevention interventions for youth violence could include: individual level provision of support and incentives to complete secondary schooling; relationship level efforts to prevent child abuse and intimate partner violence; community level programmes to reduce demand for and access to firearms and alcohol, and societal level interventions to increase employment and reduce inequalities in gender and wealth (1).

Characteristics of prevention program

The definitions of violence and prevention, and the overview of the public health approach given in this Module help to suggest criteria for interpersonal violence prevention programmes and principles for programme evaluation. Programmes for interpersonal violence prevention must have clearly defined goals and quantifiable objectives; must be designed to address clearly the identified risk factors at one or more different levels of the ecological model; must be based on a logical framework for prevention (e.g. the public health approach); must clearly identify their target populations, and must have an administrative and logistic infrastructure.

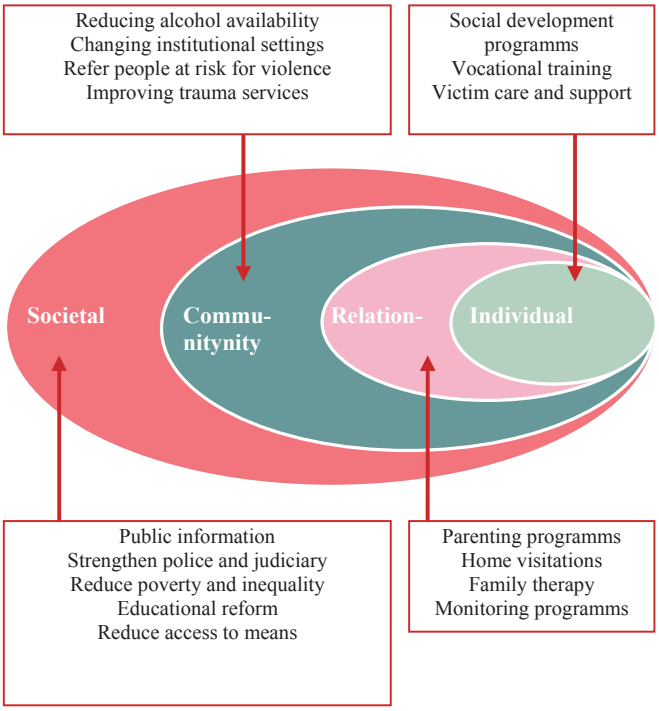
Programme characteristics are common elements which can be used for their description and comparison, such as: scope (local, national, international); geographical location; setting of the target population (rural, urban or peri-urban context); socioeconomic variables; type and nature of interpersonal violence addressed; theoretical/philosophical orientation; nature and ecological level of interventions; target populations; sites and settings; evaluation mechanisms; outcomes, and infrastructure and resources.

Interpersonal violence prevention programmes may focus directly on one or two risk factors, or may address many different risk factors and ecological levels at the same time. Some programmes have violence prevention as their only objective, while in others the prevention of violence is one among many aims, such as community empowerment programmes and pre-school enrichment programmes that, while aimed primarily at increasing education performance, have also been demonstrated to be effective in reducing youth violence and the risk factors for youth violence (1, 4).

Multilevel prevention

This section uses the ecological model to identify and cluster prevention strategies at the four different levels - individual, relationship, community and societal (see Figure 3). Programmes may assume a singular or multiple focus (youth violence, child abuse, violence against women by partners); target one or more at-risk environments (schools, recreational facilities), and risk factors (poverty, lifestyles); one or more at-risk groups and sub-groups, or whole populations (e.g. children, young men aged 15–24, the elderly), and one or more different levels (individual behaviour factors, close relationships, schools or other communities, or the larger cultural, social and economic factors) (4).

Figure.3 Ecological model for interventions to prevent violence



Source: Sethi D et al. Handbook for the documentation of Interpersonal violence prevention programmes.WHO,Geneva, 2004.

Individual level

Individual level interventions focus on changing the attitudes, beliefs and behaviours of individuals, and can include: educational programmes providing adolescents and youth with vocational training and educational support, and social development programmes teaching very young children social skills, anger management and conflict resolution (1).

- *Interventions using treatment and rehabilitation* include individual counselling and social skills training, impulse control, assertiveness training, coaching in how to manage sexual relationships, empathy, and perspective-taking, treatment and rehabilitation services for victims of violence, treatment and rehabilitation services for perpetrators of violence, treatment of child abuse offenders, probation or parole programmes, and residential programmes in psychiatric or correctional institutes (1, 9).

- *Educational interventions* for the prevention of interpersonal violence aim at strengthening the educational level of individuals, providing incentives for youths at high risk of violence to complete secondary schooling, higher/vocational training and academic enrichment programmes (including pre-school enrichment) (1).

- *Skills development interventions* involve teaching the cognitive and social skills needed to develop and sustain positive, friendly and cooperative behaviour for younger children (5–12 yr) and for teenagers (13–18 yr), skills' programmes, sexual abuse prevention training, and life skills training (10,11).

Relationship level

Relationship level interventions influence close relationships, such as between parents and children, between intimate partners and between peers, to reduce the risk of child abuse; mentoring programmes to match young persons with caring adults to prevent antisocial behaviour; and home visitation programmes (1).

- *Skills development interventions* at the relationship level, involve teaching people the skills needed to change the behaviour of other people, focusing specifically on parents and teachers, to modify the behaviour of children in their care: parent skills training, conflict resolution for pre-school child minders, mentoring, and home–school partnership programmes to promote parental involvement (1, 13).

- *Home visits, care groups, services* - are interventions involving home visits (prenatal and/or postnatal visits) by health care professionals, who provide education, training and support in parenting skills, identifying and treating maternal depression, and identifying and providing support for families considered at high risk for abusing their children. Parental education and home visitation implies working with parents being high-risk perpetrators of child abuse (young mothers, single parents, those of low socioeconomic status, and with substance misuse problems), or may be targeted at all new parents. Day care refers to the provision of care for pre-school children (aged 0–4 years old), so that their parents can go out to work (13-14). Multidisciplinary intervention teams support the caregivers of the elderly or disabled in order to prevent the abuse in their care.

- Interventions using treatment can be used for family therapy and additional support for at-risk families, cognitive treatment for behavioural disorders in children and treatment for the families of adolescents with conduct disorders (15-16).

Community level

Community level prevention includes raising public awareness about violence, stimulating community action and providing care and support for victims, addressing community level risks and the physical and social characteristics of settings such as schools, hospitals, neighbourhoods and workplaces (1). Such interventions include media campaigns to target entire communities or educational campaigns for settings such as schools, workplaces and other institutions; modifications of the environment, such as improving street lighting and creating safe routes for children and youths on their way to and from school, and reducing the availability of alcohol. These programmes can be enhanced by appropriate training of police, health professionals and teachers to help them identify and respond better to different types of violence, and improved trauma services to cope with the consequences of violence.

- *Empowerment* involves developing community capacities to gain control over problems and to build social capital, developing community leadership and efforts to enhance communication and support networks and organizational empowerment to enhance the capacity of organizations that work with disadvantaged groups.

- *Media campaigns* may be directed at interpersonal violence in general, or at child abuse and neglect, youth violence, intimate partner violence, sexual violence and elder abuse, aimed to increase knowledge, raise awareness and change attitudes and violent behaviour at community level, by giving educational messages to the community via mass media (television, radio, posters, internet, newspapers).

- *Community based campaigns* use participatory methods to develop and enact community campaigns for the prevention of violence (involving community members in organizing marches or demonstrations, creating local theatre productions highlighting issues around violence, development of community support or action groups that may campaign for legal changes), rights-based campaigns, or school violence-prevention curricula.

- *Reform of institutional settings* are interventions that refer to efforts at preventing interpersonal violence by changing institutional settings (schools, workplaces, hospitals and long-term care institutions for the elderly) through appropriate policies, guidelines and protocols.

- *Screening in primary care settings* are interventions to identify women who have experienced domestic violence and provide support and referral to specialist services, by training the health professionals in a variety of settings (emergency departments, antenatal care, or primary health care settings) to identify victims of domestic violence and by using a standard protocol to ask questions and document findings.

• *Strategies and special services* to enhance community safety that aim to reduce interpersonal violence through the implementation of community level interventions that address the physical infrastructure and exposure to risk factors such as alcohol, drugs and firearms, community policing, police clampdown on gang activities, reducing the availability of alcohol, after-school programmes, buying back guns, increasing the availability and quality of child care facilities, increasing the availability and quality of preschool enrichment programmes, providing after-school programmes to extend adult supervision, improve lighting on dark streets, installing closed-circuit television (CCTV) cameras in high-risk areas, and create safe routes for children and youth (1).

Societal level

Societal level prevention strategies include changes in legislation, policies and the larger social and cultural environment to reduce the risk of violence both in various settings as well as in entire communities. Legislative and judicial changes at this level are: criminalizing spouse, improvement of the fairness and efficiency of the justice system and licensing and control of guns. Policy changes to reduce poverty and inequalities with improved support for families in need are also included, as are the efforts to change societal and cultural norms to tackle gender-based or child abuse issues. Socioeconomic policies such as the control of alcohol use through pricing and licensing are also relevant here (1). It is important to recognize that programmes may involve prevention strategies at more than one level, and that interventions may be intricately linked across the different levels.

Governments may launch broad programmes, which may be aimed at reducing interpersonal violence either directly or indirectly, such as: reduction of income inequality, de-concentrating poverty, enforcing laws prohibiting the illegal transfer of guns, strengthening and improving police and judicial systems, reforming educational systems, establishing job creation programmes for the unemployed (1, 4).

Evaluation of interpersonal violence prevention programmes

Programme evaluation can be defined as the systematic process of collecting and analysing data using a science-based methodology to determine whether the programme has achieved its stated objectives and to measure the implementation process and its outcomes or impacts. The evidence may be qualitative or quantitative (5-6). There are essentially four main reasons for evaluation:

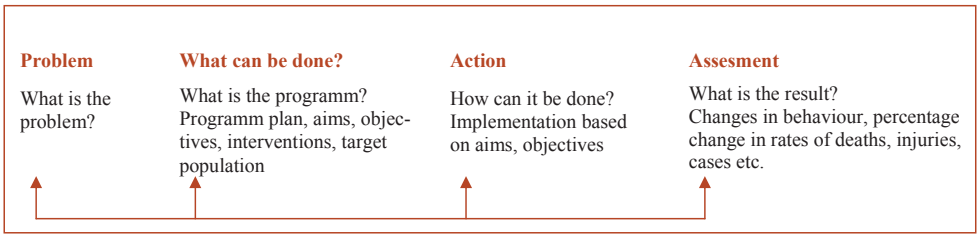
• To make decisions of quality, cost-effectiveness and achievement of the stated objectives;

• To improve programmes, by enhancing strengths and overcoming weaknesses;

- To generate knowledge or information;
- To gain knowledge on whether the programme can be repeated effectively elsewhere.

The planning and implementation of prevention programmes should always follow a clear, stepwise logic: a problem is identified; a programme is developed to "do something about it"; the programme is implemented; and an assessment is conducted to determine if the desired outcomes are achieved (Figure 4).

Figure 4. Logic of prevention programmes



Source: Sethi D et al. Handbook for the documentation of interpersonal violence prevention programmes.WHO,Geneva, 2004.

Based on this logic, the *evaluation* (internally or externally) asks questions that cover all the stages of an intervention programme. Questions that should be asked in any programme evaluation are about: *relevance* (is there a need for the programme?); *quality* – how satisfactory is the process, performance, outcomes and effects; *efficiency* (how efficiently are resources used?); *replicability* (can the programme be repeated elsewhere? (17). The evidence can include qualitative and quantitative information, and the sources of information may range from case histories, self-reports, focus group discussions, interviews, documents and reports.

The results of a rigorously conducted evaluation will highlight strengths and weaknesses of either the whole programme or specific interventions within the programme. These can be used to make modifications to strengthen the programme. In addition, the programme and lessons from it may be transferable to other settings for different target populations.

The evaluation of a programme is for all stakeholders, including those directly involved in the programme such as staff, the target population, policy makers, donors and others involved in the violence prevention field. The evaluation practice should include the following: engage the stakeholders; describe the programme; focus on the design of the evaluation; gather credible evidence

(indicators, sources of information, quality, and quantity); justify the conclusions (rigorous standards should be used); disseminate to the stakeholders with feedback and follow up.

Global campaign against violence

The WHO Global Campaign for Violence Prevention includes contributions from WHO Member States, nongovernmental and community based organizations, private sector foundations and other United Nations organizations.

The Campaign is built around 6 country-level and 3 international-level recommendations made in the *World report on violence and health* and endorsed by the WHO (1, 3).

The 6 national-level recommendations are to:

1. Create, implement and monitor a multisectoral national action plan for violence prevention;

2. Enhance capacity for collecting data for violence;

3. Define priorities for, and support research on, the causes, consequences, costs and prevention of violence;

4. Promote primary prevention responses;

5. Strengthen responses for victims of violence;

6. Integrate violence prevention into social, educational policies, and thereby promote gender and social equality.

The 3 international-level recommendations are to:

7. Increase collaboration and exchange of information on violence prevention;

8. Promote and monitor adherence to international treaties, laws and other mechanisms to protect human rights;

9. Seek practical, internationally agreed responses to the global drugs trade and the global arms trade.

In terms of implementing these recommendations, future challenges for interpersonal violence prevention identified by the Campaign include:

- Conducting more descriptive and analytic epidemiological studies documenting the magnitude, characteristics and causes of interpersonal violence;
- Engaging in stronger advocacy to draw the attention of politicians and get political commitment for violence prevention;

- Applying the public health approach systematically;
- Equipping stakeholders with the tools for planning, implementing and evaluating violence prevention programmes;
- Working in partnerships of all kinds and at all levels;
- Sharing violence prevention experiences within and between different sectors, communities, countries, and regions of the world.

Conclusion

After completing this module, students and public health professionals should have improved their knowledge about the nature, magnitude, root causes and risk factors for interpersonal violence as a whole; become familiar with the use of the ecological model and the public health apprach; and be able to identify the multilevel violence prevention programmes as well as to understand the basic principles of programme evalutaion.

EXERCISES

Task 1: Students should work in small groups, applying the newly learnt methods of the public health approach to violence prevention and the ecological model to the situation in their own countries with regard to the following aspects of youth violence: definition of the problem; identification of multilevel root causes and risk factors; existing and potential multilevel preventive interventions.

Task 2: Case-problem analysis should be used for evaluation of violence prevention programmes, by analysing three different evidence-based prevention programmes.

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RECOMMENDED READINGS

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Case Study: Psycho-Social Determinants of Health in Albania**
Module: 3.5	**ECTS (suggested): 0.25**
Author(s), degrees, institution(s)	**Enver Roshi, MD, Ph.D.** Department of Public Health, Faculty of Medicine, Tirana, Albania **Genc Burazeri, MD, MPH** Department of Public Health, Faculty of Medicine, Tirana, Albania **Lidia Georgieva, MD, Ph.D.**, Assoc. professor Department of Preventive Medicine and Epidemiology, Faculty of Public Health, Medical University-Sofia, Bulgaria **Ulrich Laaser, MD, DTM&H, MPH**, Professor Section of International Public Health, University of Health Sciences, Bielefeld, Germany
Address for Correspondence	Enver Roshi Faculty of Medicine, St. "Dibres", No.371 Tirana, Albania Tel.: +355 4262782 Fax.: +355 4257420 E-mail: e_roshi@yahoo.com
Keywords	Behaviour, education, income, health, psycho-social, socio-demographic, stressor, transition.
Learning objectives	At the end of the module, students should be able to: • Address the difficult issues of socio-economic changes in the past decade in South East Europe; • Understand the impact of socio-economic transition on health; and • Assess the main structural factors (macro level) and individual factors (micro level) and their potential pathways, which determine health outcomes in the populations of former communist countries.

Abstract	Psychosocial environment plays a major role in explaining the excess risk of many diseases across populations. Recent research in countries of Eastern Europe has shown that disease patterns may be strongly related to the organization of society and the way society invests in its human capital. After the collapse of the communist regime in 1990, Albania adopted a market-oriented economic system. Nonetheless, continuous social upheaval has characterized the difficult transition in the past decade. The turmoil of 1997 was due to the economic collapse of the bank savings schemes known as "pyramids". Transitional difficulties, the economic losses in 1997, the high rate of unemployment, the emigration and the consequences of war in the region have changed the ill-health paradigm in Albania. Mortality data show excess death, which is increasing every year, particularly so for cardiovascular disease. Excess mortality can not be attributed solely to the quality of medical care and classical risk factors. It is also due to the social transition Albania is experiencing. It is believed that the high rates in cardiovascular deaths, to a great extent, are explained by other factors that mediate this association, namely psychosocial factors and health behaviour. We propose a research model that attempts to explain the extent to which selected psychosocial factors might determine the health status of the Albanian population. Future research in countries of Eastern Europe should focus on psycho-social and psycho-behavioural factors and estimates of their impact on populations' health.
Teaching methods	After presentation of the Albanian case study, students should be divided into small groups and asked to design specific models which illustrate the impact of psycho-social environment on health.
Specific recommendations for teachers	This module should be assigned 0.25 ECTS.
Assessment of Students	Individual assignment (take-home essay): socio-economic transition (towards a market-oriented system) and its association with health outcomes.

PSYCHO-SOCIAL DETERMINANTS OF HEALTH IN ALBANIA – CASE STUDY

Enver Roshi, Genc Burazeri, Lidia Georgieva, Ulrich Laaser

Structural factors and health – socio-political transition in Albania

It is well accepted that ill-health is determined by factors operating beyond the level of individuals, as well as individual characteristics (1-3). From this perspective, structural factors at societal level such as economic development and poverty, gender inequalities, and mobility of sub-populations are recognized as facilitators of individual risk for development of various diseases (1,3). One major structural factor relevant for Albania in the last decade is the socio-political change and the transition towards a market-oriented economy. Well-being and health are influenced by social structure via inducement of different socio-economic stressors. The most important stressor for the Albanian society in the last decade was probably the dramatic economic loss resulting from the collapse of the pyramid banking scheme in 1997, known as the "*pyramid phenomenon*". The "pyramid phenomenon", has been experienced by most of the countries in transition, was nevertheless, it is unique in Albania due to the extremely large proportion of the population's involvement (4-5). The World Bank estimated that almost 2/3^{rds} of the Albanian population participated in these savings schemes, and that the total money lost exceeded one billion USD in a country whose total GDP was not more than 2.5 billion USD (5).

Previous health status

Structural factors at the societal level are key in determining the health of the individual (1,3). Nevertheless, previous individual health status is a major individual capital whose role is crucial in development of diseases. Thus, individuals with impaired health before the socio-political changes that took place in Albania are expected to have suffered the consequences of economic turmoil in 1997 more than individuals who were healthy prior the socio-economic crisis. Previous poor health status may relate to a predisposing genetic makeup that induces vulnerability to different diseases, such as high blood pressure, obesity, diabetes, angina pectoris, or a family history of chronic diseases. Nowadays, there is much

interest in the genetic basis of human disease. Researchers in this tradition look for the interaction of genetic predisposition with some individual exposures to account for (individual) differences in disease. A classical example is cigarette smoking: most smokers do not die from lung cancer, which suggests that there must be some genetic predisposition that "selects selectively" i.e. places smokers into different strata (survival vs. death). Nevertheless, it is well accepted that genetic predisposition plays a partial role only (6). As Sir Michael Marmot has convincingly argued (1), individual constitution fails to explain the following phenomenon: over short periods of time, genetic predisposition to disease of individuals and populations can not change materially but disease rates can change markedly according to changes in socio-economic conditions, environment, etc (1,6). From this standpoint, previous individual health status is an important individual capital that plays a role in the later development of chronic diseases, in addition to socio-structural and other individual factors (socio-demographic as well as psycho-social factors).

Socio-demographic factors

Socio-demographic characteristics are well recognized as major determinants of ill-health producing conditions in populations worldwide. The most important socio-demographic factors that have been object of an extensive research are: gender, age, education, ethnicity, religiosity, occupation, and social class (7). It is widely recognized that socio-demographic factors are intimately involved in the genesis, progression, treatment and prognosis of most diseases. There is a substantial body of literature indicating that the incidence and mortality of cardiovascular diseases increases with age, male gender, low social class, low education, and minority groups (1,3,7-10). These patterns prevail in both developing and developed countries. Through advances in technology, in recent years, it has been possible to demonstrate that certain socio-demographic factors even influence the very progression of early atherosclerotic vascular disease. Socio-demographic factors are also associated with exposure to stressors such as socio-economic transition, political changes and psycho-social resources. Nonetheless, the limited evidence from Albania in this regard (Roshi E et al. – unpublished data) has linked an increased occurrence of acute myocardial infarction with the more educated residents in Tirana. This provocative evidence drawn in a hospital-based case-control design, which resembles the early evolutionary stages of coronary epidemic in developed countries, needs nevertheless further and more robust investigation. We are designing a large community-based case-control study in order to determine the relationship of dietary components, psycho-social factors and socio-economic factors with acute coronary events in Tirana.

Psycho-social pathways from socio-political transition (macro level) to individual health

Stressor: economic loss

Economic loss, as a major stressor induced by the socio-political transition in Albania in 1997, influences health directly via material deprivation and indirectly via inducement of changes in health behaviour, use of health services, psycho-social mediators or work status (11-12). Absolute economic deprivation caused by the loss in the savings schemes might be a direct cause of ill-health for the Albanian population. From this point of view, an association between lower socio-economic status and poorer health has been consistently observed over the past centuries (7). A considerable body of literature indicates that there is evidence for a consistent relationship between low socio-economic status (expressed in terms of absolute economic deprivation) and the incidence and prevalence of cardiovascular disease, as well as the prevalence of cardiovascular risk factors (7-10). Economic loss (an indicator of actual low socio-economic status of a large proportion of the Albanian population) might influence ill-health indirectly via mediation of a whole range of psycho-social factors, such as the stress induced by the cognitive perception of economic loss, low control over health and in general low control over life-events (impairment of sense of mastery), or psychological health (11-12). The psycho-social factors in their turn, might influence ill-health via neuro-endocrine pathways and/or central nervous system, or might engage the individuals in unhealthy behaviours such as smoking, excessive alcohol consumption, lack of physical activity, obesity, etc. (13-16).

Psycho-social mediators

In stress and health theory, the social/environmental stressors are considered as central determinants of health via cognitive appraisal (of the stressors) and psychological and social support resources (mediators) (17). The resources influence the way people behave with regard to their health. As mentioned above, economic loss might influence health via psycho-social mediators. Cognitive perception of economic loss might play an important role in later development of chronic diseases such as diabetes or cardiovascular disease. The stress induced by the economic loss in addition to the individual personality characteristics might lead to loss of the sense of control over life-events (loss of sense of mastery) (18-20). Stress has short-term effects on the human body and mind as well as long-term effects (17). People's social and psychological circumstances can damage seriously their health in the long term. Chronic anxiety, insecurity, low self-esteem, social isolation and lack of control over life-events appear to undermine mental and physical health. Social support (which has been defined as "resources provided by other persons") plays a key role in prevention or deterioration of individual health affected by social structural changes manifested at the individual level by the loss in the savings schemes (21-24). Strong social networks

(both, emotional and instrumental), both perceived and received by the individual, might ameliorate the negative effects of the economic loss. The positive effects of social support might be direct through health induced behaviours (reduced fat in diet, quitting smoking, physical exercise, etc.) or increase of perception of control over the environment giving an assurance of self-worth, which in turn may improve well-being and immunity to disease (25-26). On the other hand, the effect of social support might be indirect (known as "buffering effect"); social support helps to moderate the impact of acute and chronic stressors on health (25-26). However, it is also possible that social support might have a direct effect on the neuro-hormonal responses of the body to environmental stress (14,16).

Weak social support might lead to depression and hopelessness in individuals affected negatively by the economic loss in Albania. These psycho-social factors might be the leading causes to poor health, even stronger than the absolute economic loss itself. There is important evidence, though debatable, which suggests that psycho-social pathways may exert a more powerful influence on health than (do) pathways involving direct exposure to material deprivation. From this standpoint, the correlation between income and health should be interpreted primarily as correlation between health and relative – rather than absolute – income or material standards. The implication is that what is important is not what your absolute level of material prosperity is, but how it compares, or where it places you, in relation to others in society (27).

This may suggest that in Albania, the extent of economic loss experienced by the individuals is related to their health not so much through its role as a determinant of material living standards, but rather as a marker for social status. This leads to the following hypothesis: *the relative extent of economic loss in the savings schemes is closely related to ill-health.* The differences in economic loss might lead to social mobility, which might be thought as one of the psycho-social factors playing a key role in the development of cardiovascular disease or, more generally, in poor self-assessed health.

Work status

The relationship between the psycho-social work environment and health has attracted considerable attention (28-30). In modern western societies, this focus seems logical because of the dramatic changes in the workplace. Job loss is shown to be a highly stressful event (a form of bereavement). Stress resulting from the job loss may affect physical health as well as psychological health as a result perhaps of chronically increased levels of anxiety (28). Unemployment is associated with unhealthy behaviour, though such an association should be seen in the context of the longer-term development of health behaviours (29-30). In Eastern European countries also, there is evidence suggesting that functioning of psycho-social work environment depends heavily on how work is organized and that health-promoting factors in the work organization

can improve well-being. In occupational medicine as well, psycho-social working conditions have gained recognition in recent years (31). While once this field was focused exclusively on physically noxious exposures, researchers and clinicians have now turned some attention to behavioural and social workplace issues. Cardiovascular disease has been regarded as an important outcome in the study of the relationship between working conditions and health. Different models have been proposed trying to link psycho-social work environment and the risk for development of cardiovascular disease. The major explanatory models were developed by Karasek (1979) and Siegrist (1986) (28-30). Karasek's model implies that job demands are related to psychological stress at work, which generates lack of control (hence, the model is known as the *demand-control model*). Siegrist's model links individual health consequences to the degree to which workers are rewarded for their efforts (hence, the model is known as the *effort-reward imbalance model*).

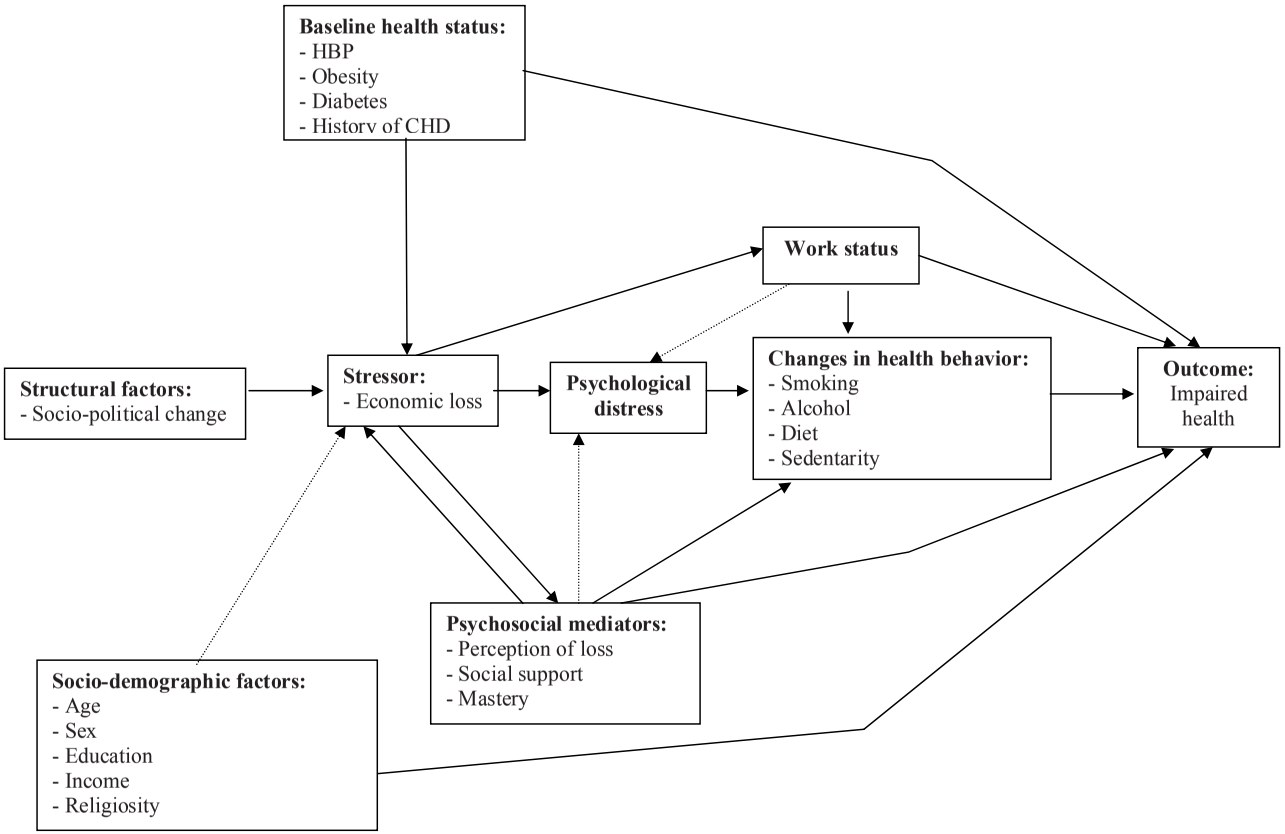
The economic turmoil experienced in 1997 has led to profound changes in work status and working conditions in Albania. Job loss as well as changes in work environment might in turn have affected ill-health either through changes in health behaviour (smoking, excessive alcohol consumption, or lack of physical exercise), or through neuro-endocrine pathways. In short, the mechanisms through which unemployment might influence the health of individuals are: poverty (resulting from job loss), stress (resulting from continuous tension), and changes in health behaviour and insecurity (which may lead to lack of control). Unemployment and work insecurity might be part of a process through which health disadvantage can be accumulated over the life course (1, 27).

Changes in health behaviour

The impact of health behaviours on chronic disease morbidity and mortality is well known. Recent data suggests that two-thirds of all cancer deaths can be linked to modifiable behaviours, such as smoking, excessive alcohol consumption, diet and obesity, and lack of physical exercise. Data from 35 MONICA centres show that smoking, lack of physical activity and obesity are major risk factors for the incidence of coronary heart disease and mortality associated with it. Many studies have shown a social patterning of individual health behaviours with low-educated and low-income sub-groups having a much higher likelihood of cigarette smoking, and difficulties in giving it up.

The economic loss experienced in 1997 might have led to changes in health behaviour among individuals affected by the savings schemes' collapse. The social context in Albania was unable to shape healthy behaviour norms or to enforce patterns of social control due to a deterioration of formal social networks. Society, as a whole, was unable to provide individuals, affected by the loss, with environmental opportunities to engage in healthy behaviours, hence social capital, as an ecological feature (measured at societal level), was rather weak (32-33).

Figure 1. Psycho-social determinants of health – the case of Albania: a proposed pathway from social structure to poor health



Source: Marmot M. In: Social determinants of health, Marmot M, Wilkinson RG (eds.). Oxford University Press, 2000.

Outcome: impaired health

Fig.1 presents a conceptual framework with emphasis on individual characteristics as well as societal structure, adapted from Marmot M (1), and provides a public-health view. In this framework, factors operating beyond the level of the individual, as well as individual characteristics are recognized. The social structure in Albania in 1997 (socio-political changes and development of a market-oriented economy) affected ill-health through inducement of different stressors, probably the most important of which was the economic loss due to collapse of the savings schemes. The economic loss might have affected health directly through neuro-endocrine or central nervous system pathways, or indirectly through psycho-social mediators and changes in health behaviours. Socio-demographic characteristics and previous individual health status might have played an important role interacting with the psycho-social factors, work environment and changes in health behaviour leading to development of cardiovascular disease or, more generally, to impaired health.

EXERCISES

Students are required to provide *models from their own counties*, which portray the link between socio-economic transition and health outcomes.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Women Health and Violence**
Module: 3.6	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Bosiljka Djikanovic, MD,** Assistant professor Institute of Social Medicine, School of Medicine, University of Belgrade Dr Subotica 15 11000 Belgrade Serbia and Montenegro
Address for correspondence	Bosiljka Djikanovic, MD Institute of Social Medicine, School of Medicine, University of Belgrade Dr Subotica 15 11000 Belgrade Serbia and Montenegro E-mail: bosiljka_djikanovic@yahoo.com Tel: +381 11 643 830 Fax: +381 11 659 533
Keywords	Health, violence, women health.
Learning objectives	After completing this module, students and public health professionals should be able to: • List the main determinants of women health; • Explain the differences between sex and gender; • Know the most important international health policy documents which address women's health; • Recognize the different types of violence against women; • Understand the immediate and long-term health consequences of intimate partner violence; and • Realize of the magnitude of this global public health problem.

Abstract	Women health is more complex and vulnerable than men's, not just because of biological differences, but societal disparities as well. Gender refers to the social, cultural and economic attributes and opportunities that are associated with male or female being, in particular social settings. The experience of intimate partner violence is a significant risk factor for well being of women. There are different types of violence: physical, psychological, sexual, and other forms. Each of them can cause immediate and long-term consequences for health. Although violence is widespread in every country and culture, research on this topic and data collection regarding its prevalence are rather sensitive issues. It includes certain ethical recommendations where women and their safety and wellbeing are on the first place. Intimate partner violence has a high cost in all societies. It is an important dimension of women health and therefore there is an emerging need for effective strategies in order to prevent this global public health problem.
Teaching methods	Teaching methods include lectures, interactive group discussions, and seminars.
Specific recommendations for teachers	This module should be assigned 0.5 ECTS, of which two thirds should include lectures and guided discussions, and one third should include group work: searching Internet in order to find the latest data regarding frequency of event, legislations, and national strategies in place.
Assessment of students	Quality of paper based upon literature search.

WOMEN HEALTH AND VIOLENCE

Bosiljka Djikanovic

Women health and its specificities

Women's health involves their emotional, social and physical well-being and is determined by the social, political and economic context of their lives, as well as by biology" (1). Building on the definition of health in WHO's constitution, the Platform for Action adopted it in the Fourth World Conference for Women, Beijing, 1995 (1).

During their lifespan, women are exposed to a wide range of risk factors, more so than their male peers are. Certain inequalities are present at birth, childhood, during the adolescence, reproductive age period, and in old ages. In some cultures, giving birth to a female child instead of a male one is considered undesirable and therefore it could be followed by a wide range of such passive either active caregivers' behaviour which results in harm. Infanticide is the extreme form of this phenomenon. During their childhood, girls may be less advantaged regarding food allocation. Their education is usually considered less important than boys' education. Physical and sexual abuse, incest, harmful traditional practices (such as feminine genital mutilation in Sub-Saharan Africa) appear in different cultures and, by all means, they affect women's health, both in short and in long terms. Unequal working conditions; less working opportunities; fewer earnings than men; and exploitation, altogether are prerequisites for being economically dependent and therefore easier to be overpowered (2). Poor access to education and health services, lack of information, unwanted marriages, marital rape as socially acceptable in some cultures, forced sex in marriage or by intimate partner, lack of control over production, physical, sexual and mental violence by intimate partner are all elements which indicate a great disparity between men and women (2).

Differences between sex and gender - Gender Issue

Differences between males and females are based on their biological foundation as well as a wide range of societal factors. Sex refers to biological differences between males and females, while gender refers to the economic, social and cultural attributes and opportunities associated with being male or female in a particular social setting, at a particular point of time (3). In general, gender differences are ascribed as:

- Differences in roles (who does what);
- Differences in the relationship of women and men to the access and control over resources (including information, decision-making, bargaining power, educational opportunities, time, income and other economic resources, as well as internal resources such as self-esteem and confidence);
- Social norms which value women and men differently and expect different behaviours from them (3, 4).

International health policy and women health

Gender issues and women health are incorporated and recognized in various major international policy agreements, such as Beijing Platform for Action, Millennium Declaration and United Nations resolutions.

In the United Nations International Conference on Population and Development (ICPD) held in Cairo, in September 1994, a Programme of action was adopted, with Chapter IV addressing gender equality, equity and empowerment of women (5). There were elaborated the need for imbalanced relations between women and men, needs to empower woman, to protect girl children, and to achieve gender equity in all spheres of live. Gender equality and equity are recognized as ends in themselves and as essential elements of sustainable development (5). As such, women should receive the education necessary to meet their basic needs and exercise their basic rights. Their economic self-reliance should be promoted, and their rights should be respected in all regards. Women should be protected from all forms of discrimination, including sex-selection before birth, higher mortality after birth, lack of education and poor nutrition. The value of a girl child to society must be increased. This section further states that violence against women must be eliminated (5).

The Fourth World Conference on Women Health, Beijing, China, 1995, formulated its policy through strategic objectives, which concern women's access throughout the life cycle to appropriate, affordable and effective health care, availability of information and related services, and actions which has to be taken in this regard (1). There were also emphasized preventive programmes that promote women's heath, gender-sensitive initiatives that address sexually transmitted diseases, and reproductive health within the community. Promoting research and dissemination of information on women's health were also recognized as areas of particular importance (1).

The Millennium Development Goals (MDG) and targets were signed by 189 countries, including 147 Heads of State, in September 2000 (6). The goals and targets are inter-related and should be considered as a whole. Goal number three reads as follows: "Promoting gender equality and empower women". Goal

number four: "Reduce Child Mortality", and goal number five: "Improve maternal health". The last two goals are also connected to women health (6). Since gender is an aspect of all activities and actions of life, its relevance is rather wider and can be applied to other MDG goals too.

Recognizing this, the Department of Gender and Women's Health (GWH) within World Health Organization (WHO) has examined health related MDGs (goals 1, 4, 5, 6, and 7), trying to identify areas of gender concerns (7). Thus, GWH emphasized some factors which programme planers and researchers should not miss in order to ensure that gender concern is addressed (7). Development of indicators sensitive to gender dimensions is the next step to pursue by GWH (7).

In the past few years, WHO, the American Medical Association, International Federation of Obstetricians and Gynaecologists, Royal College of Nursing and other professional medical organizations have stated that violence against women is one of the most important public health issues, with both immediate and long term consequences on women well-being and societal functioning in general (8).

The World Report on Violence and Health, 2002, comprises all the relevant knowledge and facts with regard to this problem, although studies are usually not comparable due to discrepancies in methodologies and study populations (9).

Violence against women can have different forms, based on relationships between perpetrators and the victims, within societal context: intimate partner violence; sexual abuse by non-intimate partners; trafficking; forced prostitution: sex selective abortion, female infanticide, deliberate neglect of girls; and rape in war (8, 9). Since the intimate partner violence is the most frequent form, this type of interpersonal violence will be the main focus of this paper.

Violence by intimate partner

"Violence against women is perhaps the most shameful human rights violation. And, it is perhaps the most pervasive. It knows no boundaries of geography, culture, or wealth. As long as it continues, we cannot claim to be making real progress towards equality, development, and peace".

United Nations Secretary General Kofi Annan, 1999

WHO defines intimate partner violence (IPV) as: "Behaviour within an intimate relationship that causes physical, sexual or psychological harm, including acts of physical aggression, sexual coercion, psychological abuse and controlling behaviours" (9). The term covers violence by both current and former spouses and partners. Although women can be also violent towards men in a relationship, and violence can be presented in same-sex partnership as well, the largest burden of intimate partner violence is inflicted by men against their female partners (9).

This definition emphasizes the effects of violence – harm, which is produced by certain behaviour, although it is not always the intention of perpetrator. Indeed, there might be considerable disparities between intended behaviours and intended consequences, but perpetrators may not perceive it as such (9).

Violence against women serves as a demonstration of power based on sex inequality with aim to maintain this unequal balance of power (8, 10).

IPV is a worldwide phenomenon which is occurring in all countries, regardless the socioeconomic status, religious affiliation, or cultural circumstances (9).

Collection and availability of data

Although there is no doubt about the existence of this phenomenon in every society, it is quite a complex procedure to collect relevant epidemiological data upon which the magnitude of IPV can be assessed. Over the past 20 years, the evidence of the extent of violence against women has increased, aiming to present and scientifically support this sensitive subject (9). This issue bears many ethical concerns and the analysis should be conducted carefully, where women safety and their well-being should be at first place (11). Despite the efforts and recommendations, a big number of IPV cases are still unreported.

The most accurate data on the prevalence of the intimate partner violence comes from cross-sectional population surveys (9). The findings, nevertheless, show great varieties between studies, due to the differences in research methods; definition of violence; sampling techniques; and the quality of training of interviewers and their established skills (9,11). The careful selection and training of interviewers, along with technical and emotional support to them during field research can significantly affect the level of disclosure on partner violence (9, 11, 12).

In 1997, WHO initiated a Multy-Country Study on Women Health and Domestic Violence, designed to identify the prevalence, health implications and risk factors for domestic violence (13). Between 2000 and 2003, population surveys were conducted in eight countries with different cultural settings: Bangladesh, Brazil, Japan, Namibia, Peru, Samoa, Thailand and United Republic of Tanzania. In addition, the study was conducted in Chile, Ethiopia, Indonesia, New Zealand, and Serbia and Montenegro (12). Data for Serbia and Montenegro were collected in 2003 based on a representative sample of the population residing in Belgrade. Preliminary data shows that IPV affects one in four women in Belgrade.

Certain ethical issues are involved in these sensitive studies. All kinds of data, identity of women and their privacy, are considered as confidential (9, 11, 12). In order to achieve reliable, high quality data, the way of framing and delivering questions is one of the essential point. Questions should be formulated in a behaviourally specific way (e.g.: “Have you ever been forced to have sexual inter-

course against your will?", rather than: "Have you ever been abused or raped?") (9, 11, 14).

International studies are concentrated mainly on physical violence because it is easier to measure and conceptualize, although qualitative studies suggest that some women rate psychological abuse and degradation even more intolerable than physical violence (9, 11, 12). According to the WHO data (available at www.who.int/inf-fs/en/fact239.html), in every country where reliable, large-scale studies have been conducted, results indicate that between 10% and 50% of women report they have been physically abused by an intimate partner in their lifetime.

In the first national wide research on domestic violence conducted by the women's NGO association "Refleksione" in Albania in 1996, S. Miria offered the first data indicating that 64% out of 849 surveyed women reported that they had experienced physical, emotional or sexual abuse by their husbands or partners (15, 16). In addition, 35% of interviewees had witnessed serious physical and psychological violence in their families of origin (15).

A medical expert at the Forensic Institute in Chisinau, Moldova, estimated that each year 40% to 45% of all patients they see are women, and roughly two-thirds of their injuries result from domestic violence. Out of the 13,000 people examined per year, he estimated that 4,000 suffer from injuries related to domestic violence (17).

In a survey of university students in Macedonia, conducted by the Humanitarian Association for Emancipation, Solidarity and Equality of Women ("ESE"), more than 31% of female students reported that they had been victims of physical or psychological violence (18, 19). Approximately, 26% of these women reported being violated by a husband or partner (19). Of all the women surveyed, 4.25% acknowledged that they had been victims of sexual assault (19). In addition, more than 17% of both men and women surveyed reported that they had noticed acts of domestic violence in their own families (19).

The perpetrators of violence against women are almost exclusively men, and women are at the greatest risk of violence from men they know. According to the Three Years Report (2000-2002) of feminist-consultative work of NGO Autonomous Women Centre from Belgrade, perpetrators of domestic violence against women are men in 92.53% of the cases, out of which, current husbands in 47.91% of the cases, former husbands in 13.93%, and partners in 6.37% (20). Unfortunately, social institutions in charge of protecting citizens often ignore or even blame battered women.

Types of violence

Intimate partner violence includes any kind of behaviour within intimate relationships that cause physical, psychological or sexual harm to those in the relationship (1). According to the World Report on Violence and Health, such behaviour includes the following (9):

- Acts of physical aggression, such as slapping, hitting, kicking and beating;
- Psychological abuse – such as intimidation, constant belittling and humiliating;
- Forced intercourse and other forms of sexual coercion; and
- Various controlling behaviours, such as isolating a person from their family and friends, monitoring their movements, and restricting their access to information or assistance.

When abuse occurs repeatedly in the same relationship, the phenomenon is often referred to as "battering" (9).

According to the three year-experience in consultative work of Autonomous Women Centre, an NGO from Belgrade, psychological violence is present in 89,93% of the cases, physical violence in 69.79%, economical violence in 23.57%, and sexual violence in 20.82% (20). Usually, there is an overlapping between all these types of abusing behaviour; thus, in the same sample of women, physical and psychological violence were coupled in 64.99% of cases, whereas physical and sexual violence in 21.97% of cases (20). On the other hand, 29% of women reported only one form of violence (20).

Impact on Health

Living in violent relationships has multifaceted influence on women health. Long-term violence is a risk factor, which usually leads to a low self-esteem and the way in which women perceive themselves. In addition, it affects the entire community.

Research has revealed that relationships with abusive male partners can have a profound impact on women's health. There can be direct health consequences, such as injuries and wounds; furthermore, being a victim of violence can be regarded as a risk factor, which increases the prevalence of many diseases and conditions, as shown in Table 1 (9). Table 1 presents data from the World Report on Violence and Health, 2002; it summarizes the consequences that have been associated with intimate partner violence. A history of being the target of violence puts women at an increased risk for depression, suicide attempts, chronic pain syndromes, psychosomatic disorders, physical injury, gastrointestinal disorders, irritable bowel syndrome, and a variety of reproductive health consequences (9).

Table 1. Health consequences of intimate partner violence (9)

Physical	Sexual and reproductive	Psychological and behavioural	Fatal health consequences
• Abdominal/ thoracic injuries • Bruises and welts • Chronic pain syndromes • Disability • Fibromyalgia • Fractures • Gastrointestinal disorders • Irritable bowel syndrome • Lacerations and abrasions • Ocular damage • Reduced physical functioning	• Gynaecological disorders • Infertility • Pelvic inflammatory disease • Pregnancy complications/ miscarriage • Sexual dysfunction • Sexually transmitted diseases (STI), including HIV/ AIDS • Unsafe abortion • Unwanted pregnancy	• Alcohol and drug abuse • Depression and anxiety • Eating and sleep disorders • Feeling of shame and guilt • Phobias and panic disorder • Physical inactivity • Poor self-esteem • Post-traumatic stress disorder • Psychosomatic disorders • Smoking • Suicidal behaviour and self-harm • Unsafe sexual behaviour	• AIDS-related mortality • Maternal mortality • Homicide • Suicide

Source: Krug EG at al., eds. World Report on Violence and Health. Geneva, World Health Organization, 2002.

Effects of violence may also be fatal because of intentional homicide, severe injury or suicide.

Physical health and violence

Richardson et al. reported that over a third of patients attending general practice had experienced physical violence from a male partner (current and/or former) (21). Furthermore, population-based studies suggest that 40-72 % of all women who have been physically abused by their partners have also been injured at some point in time, ranging from cuts and bruises to permanent disability and death (9).

Comparative reports on Reproductive, Maternal and Child Health in Eastern Europe and Eurasia have been derived from 16 surveys conducted from 1993-2001 (22). A report, including both physical and sexual abuse, was generated from the surveys conducted between 1997 and 2001. In six countries namely Moldova, Romania, Russia, Ukraine, Azerbaijan and Georgia, women were asked about their experience of verbal and physical abuse. In five of the coun-

tries, 14% to 29% of ever-married women reported at least one episode of physical abuse by a male partner during their lifetime. Women who had witnessed or experienced *parental abuse* were two to three times more likely to experience *intimate partner violence* in adulthood compared with women who had not witnessed or experienced violence in childhood (22).

In the most severe cases, domestic assault results in death. A physician in the Criminal Medicine Department in Sofia, Bulgaria, estimated that, since the changes to a democratic form of government in Bulgaria in 1989, approximately fifteen women per year are fatal victims of domestic violence in Sofia (23).

Injuries, however, are not the most common physical outcome of partner abuse. Thus, outcomes that are more common are "functional disorders" – a host of ailments that frequently have no identifiable medical cause, such as irritable bowel syndrome, fibromyalgia, gastrointestinal disorders, or various chronic pain syndromes (9).

Reproductive health and violence

Population-based studies report that between 12 and 25% of women have experienced attempted or completed forced sex by an intimate partner or ex-partner at some time in their lives (24).

Currently, behind the most intractable reproductive health issues are the following: unwanted pregnancies; sexually transmitted infections including HIV; complications of pregnancy, and physical and sexual abuse (25). Black et al. in their meta-analysis study have shown that violence can lead to unwanted pregnancy either *directly*, if women are forced to have sex, or *indirectly*, due to the fear of using contraception or condoms because of their partners' reaction (14, 25).

Researchers have assumed that the stress of having many children increases the risk of violence, but actually, data from a survey conducted in Nicaragua in 2000 suggests that the direction of the relationship may be the opposite (26). Violence can be a risk factor for having many children, and it can be suffered even during pregnancy, with consequences not only for women, but also for the developing foetus (9, 26).

The mental health consequences of sexual violence can be very serious and long lasting. Victims of child sexual abuse, for example, are more likely to develop depression, post-traumatic stress disorder (PTSD), substance abuse and suicide in later life than their non-abused counterparts. Worldwide child sexual abuse is a major cause of PTSD, accounting for an estimated 33% of cases in females and 21% of cases in males (27).

A history of sexual abuse in childhood can also lead to unwanted pregnancies and sexually transmitted diseases *indirectly* by increasing sexual risk-taking behaviour in adolescence and adulthood (25).

Mental health and violence

Many women consider psychological consequences of abuse to be even more serious than its physical effects. The experience of abuse often erodes women's self-esteem and puts them at greater risk of a variety of mental health problems (25).

Women who are abused by their partners suffer more depression, anxiety and phobias than non-abused women, according to Black's meta-analysis (14). In addition, they have a greater risk of suicide and suicidal attempts. Women who are victims of partner violence are about six times more likely to be depressed and to feel in bad health, and four times more likely to use psychoactive pills than other women. Moreover, there is a strong association between the past and the current violence (28).

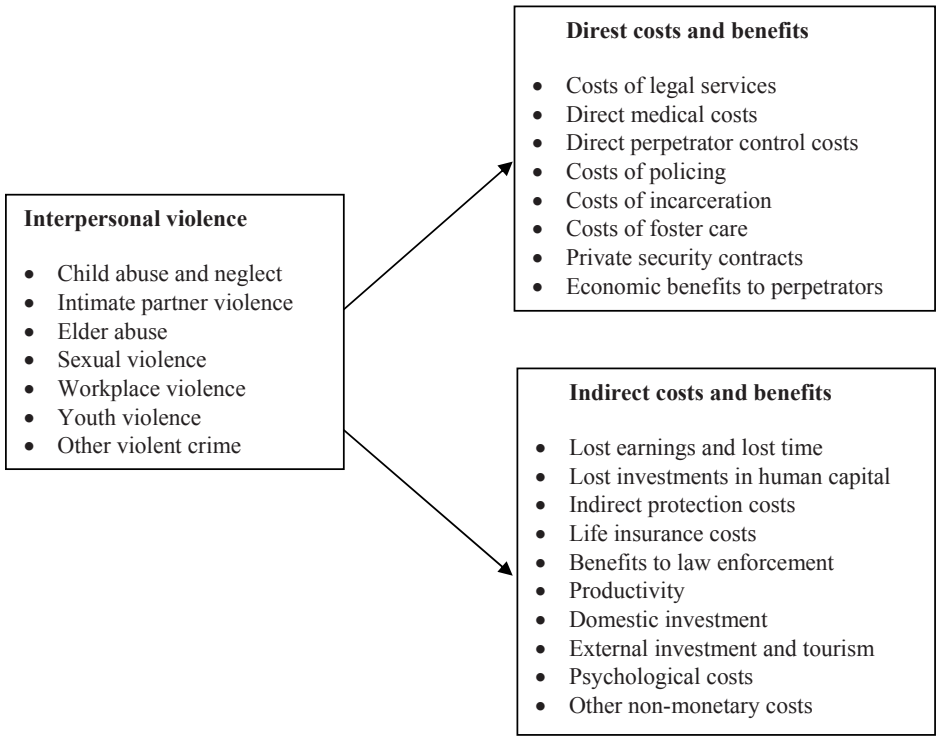
Health services and costs for societies

On average, abuse victims have frequent operative surgery, more visits to doctors, hospital stays, visits to pharmacies and mental health consultations over their lifetime compared to non-victims, even after controlling for potential confounding factors (9).

In addition to its human costs, violence places an enormous economic burden to societies in terms of loss of productivity and an increased use of social services. On the other hand, as with the other types of interpersonal violence, there are complex methodological issues involved in measuring the economic impact of intimate partner violence (29). Since many incidents of intimate partner violence are unreported, the effects of abuse on investments in human capital and productivity are difficult to estimate (29). Figure 1 shows a broad range of categories for direct and indirect costs and benefits, which are relevant for all kinds of interpersonal violence (29).

A recent study conducted in Albania shows that a high prevalence of intimate partner violence appears in this society in transition, where empowered women (more educated and with better job opportunities) are at the highest risk (30). Societies where women remain in a very low status usually do not "endanger" male authority (9). On the other hand, in societies where women have gained sufficient power, there may be possibilities to change the traditionally rooted gender roles (9).

Figure 1. Costs and benefits of interpersonal violence (29)



Source: Waters H, Hyder A, Rajkotia Y, Basu S, Rehwinkel JA, Butchart A. The Economic dimensions of interpersonal violence. Department of injuries and Violence Prevention, World Health Organization, Geneva, 2004.

WHO's publication "The economic dimensions of interpersonal violence" pointed out the enormous costs of violence in all societies (29). Cost-effectiveness analysis of different interventions is a powerful tool for the advocacy and policy-making process in order to prevent this global public health issue.

EXERCISES

Finding relevant data for estimating violence against women at national level.

Working in pairs, students should explore Internet and available publications in order to report on the following:

- Frequency of domestic violence in their own countries (if data on prevalence of intimate partner violence do not exist for their countries, students should present data from neighbouring countries);
- Current legislation in this field; and
- Services for supporting victims, their nature and distribution (in both governmental and non-governmental sectors).

Based on their findings, students should prepare a Case Study or a Seminar Paper, which should be presented to their peers.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Health Risk Attributed to Smoking**
Module: 4.1	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Lidia Georgieva, MD, MPh, PhD** Associate Professor Faculty of Public health, Medical University, Sofia, Bulgaria **Gencho Genchev, PhD** Associate Professor Medical Faculty, Medical University, Sofia, Bulgaria **Ulrich Laaser, Dr. Med, DTM&H, MPH** Professor, Faculty of Health Sciences, University of Bielefeld, Germany
Address for correspondence	Lidia Georgieva Faculty of Public health Bialo more 8 Sofia, Bulgaria Tel: +359 888266431 Fax: + 359 29432216 E-mail: lidia@omega.bg
Keywords	Tobacco smoking, public health, risk factors
Learning objectives	After completing this module students and public health professionals should: • Be aware of the magnitude of the problem of tobacco smoking; • Recognise smoking as the biggest avoidable cause of death; • Increase knowledge of smoking prevention policy; • Understand that tobacco control as everybody's responsibility;

Abstract	Tobacco smoking and exposure to tobacco combustion products through passive smoking contribute considerably to illness and premature death from more than 20 different diseases. Tobacco smoking is the largest single external and, therefore, avoidable risk factor for death from cardiovascular diseases and cancer, which are the most prevalent causes of death in the countries of South and Eastern Europe. It has been estimated that cigarettes cause death in one of two persistent users (smokers), and that approximately half a billion people currently alive - 8% of the world's population - could eventually be killed by tobacco, if current smoking patterns persist. Despite this pandemic, tobacco consumption continues and is increasing in many countries especially in Southern and Eastern Europe. Public health significance of tobacco smoking as biggest cause of death and disability is described. Magnitude of the problem in the countries of South Eastern Europe (SEE) is explored. Although many countries have implemented strategies for reducing tobacco use at individual and population level, no country to date has adopted a truly comprehensive control programme. The ten-point programme for successful tobacco control is presented. Tobacco control as everybody's responsibility is underlined.
Teaching methods	Teaching methods could include lectures, exercises, individual work, interactive methods such as small group discussions, seminars etc.
Specific recommendations for teachers	Access to "Health for all" data base of WHO, Internet.
Assessment of students	Assessment could be based on multiple choice questionnaire (MCQ), structured essay, seminar paper, case problem presentations, oral exam, attitude test etc.

HEALTH RISK ATTRIBUTED TO SMOKING

Lidia Georgieva, Gencho Genchev, Ulrich Laaser

Description of the problem

Tobacco smoking and exposure to tobacco combustion products through passive smoking contribute considerably to illness and premature death from more than 20 different diseases.

Tobacco smoking is the largest single external and, therefore, avoidable cause of death from cardiovascular diseases and cancer, which are the most prevalent cause of death in the countries of South and Eastern Europe.

Smoking accounts for about 30% of all deaths from cancer, with lung cancer comprising about 20% of smoking-attributable excess deaths in smokers. The strong link between cigarette smoking and the risk of lung cancer has long been demonstrated. Regular smokers have been found to have a risk of lung cancer 10 to 30 times greater than that of non-smokers. Tobacco smoking accounts for about 90% of lung cancer cases in populations where cigarette smoking has been widespread for two generations or more. In women, the big increases in cigarette smoking in recent decades are now reflected in rising rates of lung cancer.

Most studies (1,2) have demonstrated a dose-response effect, with the amount smoked and duration of regular smoking contributing to the increased risk of disease. About half of tobacco related excess deaths in smokers are due to cardiovascular diseases and two thirds of these to coronary heart disease. Regular cigarette smoking doubles the calculated risk of overall cardiovascular death (3).

The combined effect of smoking with other risk factors, such as elevated blood pressure, elevated serum cholesterol level and physical inactivity, is known to increase in a multiplicative way, the risk of developing a disease.

In addition, there is strong evidence of a causal relationship between cigarette smoking and cancer at other sites, including the oral cavity and upper respiratory tract, oesophagus, pancreas, bladder and cervix. Smokeless tobacco use has been associated with a substantially increased risk of developing oral cancer (4). Prolonged cigarette smoking causes even more deaths from other diseases than from lung cancer. In developed countries, the absolute age-sex-specific lung cancer rates can be used to indicate the approximate proportions due to tobacco of

deaths not only from lung cancer itself but also, indirectly, from vascular disease and from various other categories of disease.

In countries where cigarette smoking has been common for many decades, tobacco now accounts for a substantial proportion of premature deaths (5,6).

In developed countries tobacco is already causing about two million deaths a year and this number is still increasing. About half of those killed by this habit are still only in middle age, making tobacco the most important cause of premature death.

Additionally, smoking accounts for the great majority of deaths from chronic obstructive lung disease. The risk of this disease is reported to be about 5-8 times greater in smokers than in non-smokers.

Smoking during pregnancy is associated with an increased risk of miscarriage, low birth weight, premature foetal death and retarded physical and mental development after birth. Smoking is also associated with decreased fertility in women and increased sperm abnormalities in men.

Women who smoke have an increased risk of osteoporosis and bone fractures in later life.

Finally, cigarette smoking affects both the expectancy and quality of life. Of smokers aged 35 years, women can expect to live 5 years less than non-smokers, and men, 7 years less.

It has been estimated that cigarettes are the cause of deaths of one in two of their persistent users, and that approximately half a billion people currently alive - 8% of the world's population - could eventually be killed by tobacco if current smoking patterns persist. Despite this pandemic, tobacco consumption continues and is increasing in many countries especially in Southern and Eastern Europe (7).

Methodology

As smoking is the most common form of tobacco use in most countries, the extent of the tobacco epidemic can be reasonably measured through the prevalence of cigarette or other tobacco smoking.

Smoking prevalence data used in the NATIONS system is, to a great extent, the same data that was presented in the Tobacco Control Country Profiles (TCCP) of WHO (8). Smoking prevalence refers to the proportion (expressed as a percentage) of the study population who are smokers. Where possible, prevalence is presented separately for males and females within the adult, youth, and health professional populations.

The definitions for tobacco use supplied by the survey sources are used in the

country profiles. No attempt has been made to standardize these definitions. The most common designations include (9):

– *Current daily smoker (including definitions of "at least one cigarette per day");*

– *Smoker;*

– *Regular smoker; and*

– *User of some form of tobacco (including multiple sources).*

Most surveys specify the meaning of "smoker" and "regular smoker" but often this is not recorded.

Public health significance

Cigarette smoking is the single biggest avoidable cause of death and disability. For most smokers, quitting smoking is the single most important thing they can do to improve their health (10).

It is estimated that worldwide there are about 1.2 billion smokers. Half of these smokers will die prematurely of a disease caused by their smoking, losing an average of eight years of life; this currently represents four million smokers each year worldwide. Deaths from smoking are projected to increase to more than 10 million a year by 2030. Stopping smoking has substantial immediate and long term health benefits for smokers of all ages. The excess risk of death from smoking falls soon after cessation and continues to do so for at least 10-15 years. Former smokers live longer than continuing smokers, no matter what age they stop smoking, though the impact of quitting on mortality is greatest at younger ages. For smokers who stop before age 35, survival is about the same as that for non-smokers (11).

The rate and extent of reduction of risk varies between diseases - for lung cancer the risk falls over 10 years to about 30%-50% that of continuing smokers, but the risk remains raised even after 20 years of abstinence. There is benefit from quitting at all ages, but stopping before age 30 removes 90% of the lifelong risk of lung cancer. The excess risk of oral and oesophageal cancer caused by smoking is halved within five years of cessation.

The risk of heart disease decreases much more quickly after quitting smoking. Within a year the excess mortality due to smoking is halved, and within 15 years the absolute risk is almost the same as in people who have never smoked (12). Smoking cessation also reduces the risk of death after a stroke and of death from pneumonia and influenza.

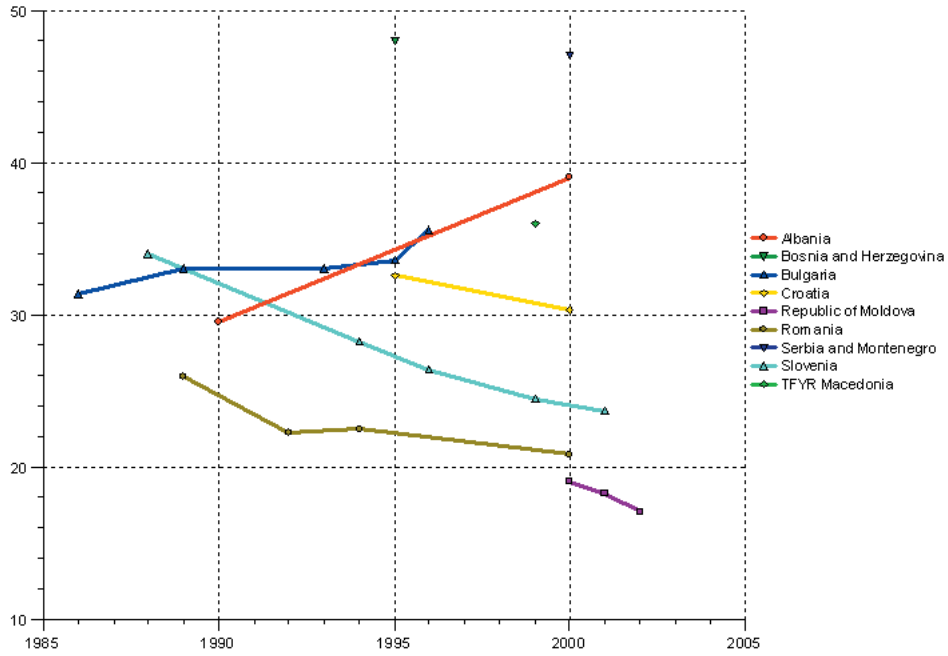
Magnitude of the problem in countries of South Eastern Europe (SEE)

The countries from SEE have very different dynamic's trends of proportion of regular daily smokers in the population, age 15+ (fig. 1) (13).

For example, Croatia, Republic of Moldova, Romania and Slovenia demonstrated trend to decrease the proportion of regular daily smokers while in Albania and Bulgaria –this proportion increasing.

Bosnia and Herzegovina, Serbia and Montenegro and TFYR Macedonia have a high percent of regular daily smokers, but it is not possible to define the trend for those countries because the data for them are available only for one year.

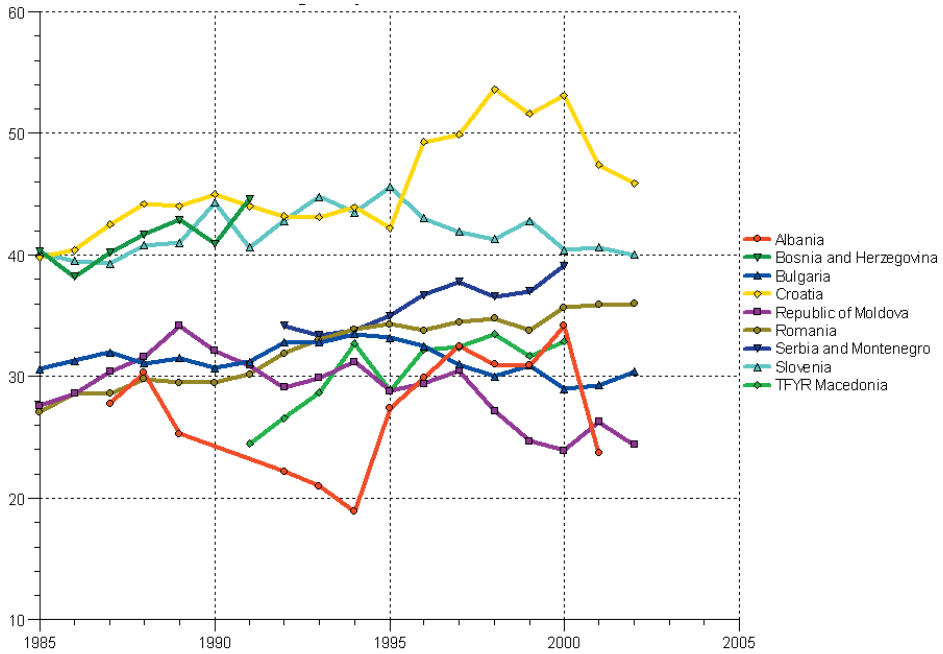
Figure 1. Percent of regular daily smokers in the population, age 15+



Source: HFA Data Base, updated June 2004. WHO, Regional Office for Europe

Figure 2 shows mortality from trachea, bronchus and lung cancer per 100000 in the countries from SEE. Almost each of the observed countries has trend to increase cancer mortality except Republic of Moldova and Slovenia. The decrease of the mortality in those countries could be considered in relation with the observed trend of decreasing in the proportion of regular daily smokers.

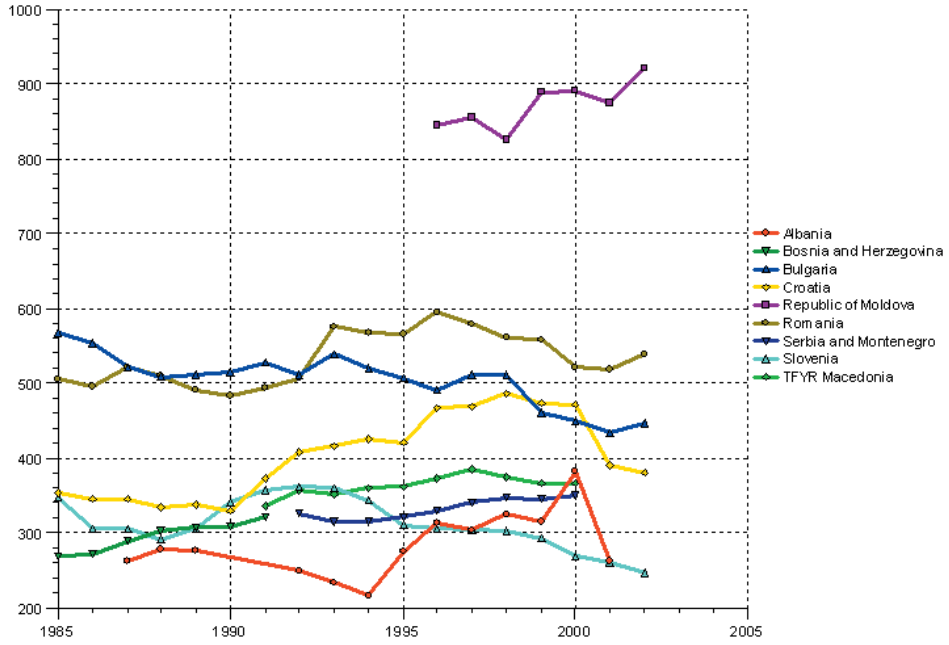
Figure 2. Mortality standardized rate from trachea, bronchus and lung cancer, all ages per 100000



Source: HFA Data Base, updated June 2004. WHO, Regional Office for Europe

Figure 3 presents the mortality standardized rate from selected smoking related causes for the countries from SEE. It is only in Slovenia, where there is a continuous long term decrease of the mortality standardized rate from selected smoking related causes.

Figure 3. Mortality standardized rate from selected smoking related causes, per 100000



Source: HFA Data Base, updated June 2004. WHO, Regional Office for Europe

Tobacco control - everybody's responsibility

Although many countries have implemented strategies for reducing tobacco use at individual and population level, no country to date has adopted a truly comprehensive control programme. In addition, the tobacco industry and the strategies it uses to counteract policies on tobacco control and thereby maintain and develop its commercial markets have both continued to evolve. All communities therefore face at least some "problems" in relation to tobacco control.

The ten-point programme for successful tobacco control, derived from **World Health Assembly** resolutions, along with recommendations from other international and intergovernmental bodies lists some key elements that should be included in comprehensive national tobacco control programmes.

A TEN-POINT PROGRAMME FOR SUCCESSFUL TOBACCO CONTROL

1. Protection for children from becoming addicted to tobacco.
2. Use of fiscal policies to discourage the use of tobacco, such as tobacco taxes that increase faster than the growth in prices and income.
3. Use a portion of the money raised from tobacco taxes to finance other tobacco control and health promotion measures.
4. Health promotion, health education and smoking cessation programmes. Health workers and institutions set an example by being smoke-free.
5. Protection from involuntary exposure to environmental tobacco smoke (ETS).
6. Elimination of socio-economic, behavioural and other incentives which maintain and promote use of tobacco.
7. Elimination of direct and indirect tobacco advertising, promotion and sponsorship.
8. Controls on tobacco products, including prominent health warnings on tobacco products and any remaining advertisements; limits on and mandatory reporting of toxic constituents in tobacco products and tobacco smoke.
9. Promotion of economic alternatives to tobacco growing and manufacturing.
10. Effective management, monitoring and evaluation of tobacco issues.

Many of these elements extend beyond the domain of the health sector; therefore, real progress in tobacco control cannot occur without the involvement of other sectors. It is not sufficient for tobacco control to be merely a top public health priority. It is, and must be seen, as a top public policy priority.

Community interventions

The increased understanding of the combined effects of environmental, social, and cultural conditions on tobacco use has resulted in an emphasis on interventions that include comprehensive, community based approaches (14). Such an approach targets multiple systems, institutions, or channels simultaneously, and employs multiple strategies. In general, community interventions have multiple components, and involve the use of community resources to influence either individual behaviour and community norms or practices related to adolescent tobacco use. This includes the involvement of families, schools, community organisations, churches, businesses, the media, social service and health agencies, government, and law enforcement, with intervention strategies generally focused on making changes in both the environment and individual behaviour. Although community interventions take a variety of shapes, common elements among them include a shared emphasis on altering the social environment or social context in which tobacco products are obtained or consumed, and a shared goal of creating a social environment that is supportive of non-smoking or cessation (15).

A new campaign has been devised for the **European Commission** by a consortium of health experts and PR professionals. In June 2005, a TV advertising campaign was broadcasted in all 25 Member States. As well as promoting tobacco-free lifestyles to young people, the campaign will also highlight the dangers of passive smoking and support the trend towards tobacco-free public places. Adolescents (15 to 18 year olds) and young adults (18 to 30 years olds) will be the main target groups for this campaign.

Table 1. Documents pertaining EU initiatives

Date	Document
10 September 2003	2003/641/EC: Commission Decision of 5 September 2003 on the use of colour photographs or other illustrations as health warnings on tobacco packages (Text with EEA relevance) (notified under document number C(2003) 3184) Official Journal L 226 , 10/09/2003 P.0024 - 0026
20 June 2003	Directive 2003/33/EC of the European Parliament and of the Council of 26 May 2003 on the approximation of the laws, regulations and administrative provisions of the Member States relating to the advertising and sponsorship of tobacco products (Text with EEA relevance). Official Journal L 152 , 20/06/2003 P. 0016 - 0019
25 January 2003	Council Recommendation of 2 December 2002 on the prevention of smoking and on initiatives to improve tobacco control (Official Journal L 022 , 25/01/2003 P. 0031 - 0034)
18 July 2001	Directive 2001/37/EC of the European Parliament and of the Council on the approximation of the laws, regulations and administrative provisions of the Member States concerning the manufacture, presentation and sale of tobacco products
30 June 1997	Television broadcasting activities Directive 97/36/EC of the European Parliament and of the Council of 30 June 1997 amending Council Directive 89/552/EEC on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the pursuit of television broadcasting activities.
26 November 1996	Council Resolution on the reduction of smoking in the European Community
19 October 1992	Council Directive 92/85/EEC on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding (tenth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC)
30 November 1989	Council Directive 89/654/EEC concerning the minimum safety and health requirements for the workplace (first individual directive within the meaning of Article 16 (1) of Directive 89/391/EEC)
03 October 1989	Television broadcasting activities Council Directive of 3 October 1989 on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the pursuit of television broadcasting activities
18 July 1989	Resolution of the Council and the Ministers for Health of the Member States, meeting within the Council on banning smoking in places open to the public

The **Ministry of health** must be an energetic advocate of policies such as high tobacco taxes, and must encourage other departments to beware of the dangers of accepting highly attractive investment from transnational companies intending to exploit new markets. **Parliaments** need to hear from all ministries about the importance of tobacco control legislation. A clear lead from senior ministers can set the framework for effective intersectional action. For example, in Lithuania, in the early 1990s, the Cabinet declared itself smoke-free. Such initiatives send a clear message of the importance of tobacco control to parliament, the media, and to the general public.

National Ministries of Health, working together with **nongovernmental health organizations,** such as national heart, lung, and cancer societies, and anti-drug and anti-tobacco groups play crucial roles in tobacco control, particularly in helping to bring about healthy public policies.

Health care professionals play a key role as well, individually as well as collectively. Health professionals are leaders with regard to any issue affecting public health, and can participate effectively in public debate on tobacco issues, both as individuals and as members of medical organizations.

Individuals and institutions in the **healthcare industry** have an important exemplar role. In many countries especially in CEE the prevalence of smoking among doctors differs little from that in the wider community. This considerably undermines individual practitioners' credibility in advising patients not to smoke and denies the profession as a whole the influence it might wield on public and political opinion and policy on tobacco.

Ministry of Finance could play a substantial role in tobacco control. Examples from a number of countries show that raising tobacco taxes has a proven effect on discouraging tobacco consumption, particularly in youth. For example, a 10% real price increase will typically result in a reduction in consumption of about 5%.

In many countries, the **tobacco industry** is no longer controlled by government monopolies, but by transnational tobacco companies (TTCs) overtly committed to market expansion. The TTCs will point out the economic growth and employment that are consequences of their investments in the country.

Legislation is a key component of comprehensive tobacco control programmes. Many parties are involved in developing, implementing, administering and enforcing tobacco control legislation. Lawyers can advocate for legislative change, help in the drafting and amendment of laws, and provide vigorous defence against tobacco industry arguments and challenges to tobacco control legislation.

Education authorities could require that children receive effective education about the dangers of tobacco use and the benefits of a tobacco-free life at repeated intervals throughout their schooling. A tobacco-free policy could be set at all schools and institutions for both students and staff.

Many education projects now seek to engage **young people** in action both in school and in their communities. This often leads to young people becoming involved in tobacco control activities, and in networking and alliance building. However, it is important that the activities arise from the young people's concerns, rather than from an adult political agenda. Reducing smoking among young people is a challenge. Preventing uptake of smoking would result in the greatest population health gain. Young people who have friends and family members who smoke are more likely to start themselves, and, for many young people, smoking is a social activity, with the first cigarette being provided by friends.

The media play an important role in influencing both the smoking behaviour of individuals and the actions of government policy makers. All forms of media can be valuable means of disseminating important educational messages about the hazards of tobacco use and the benefits of a smoke-free life. Mass media are also in a position to inform policy makers and citizens about the public policy that continues to promote tobacco.

Ministry of sports and Ministry of culture can provide support for comprehensive tobacco control policies by: using designated tobacco taxes to promote healthy lifestyles through sponsorship of sports and cultural events; insisting that events sponsored by them be smoke-free and free of tobacco promotion; protecting athletes from being used to endorse tobacco products; and from promoting prominent sports and cultural personalities as role models for healthy smoke-free lifestyles.

Business and industry can become involved as part of their obligation to protect the health and safety of workers by providing smoke-free workplaces. Many businesses have realized the benefits of smoke-free workplaces. In many cases, these policies have been in response to employee requests. Increasingly, businesses are finding that it makes good business sense to support smoke-free policies. For example, many life insurance companies have calculated the risks of smoking, and offer much lower premiums for life insurance to non-smokers.

Pharmaceutical companies, in their efforts to market aids to smoking cessation, such as nicotine replacement products, play an increasingly important role in supporting tobacco control measures. In 1996, a major manufacturer of the nicotine patch donated a large sum of money to the American Cancer Society (ACS) in exchange for the use of their logo on the product package. The funds have been used for a public information and health awareness campaign.

Some religious groups take a strong interest in tobacco control activities, and religious leaders have made important contributions by advocating a tobacco-free life.

EXERCISES

The purpose of the exercise is students to develop skills to work with HFA (Health for All) Data Base and HFA – MDB (Mortality Data Base): to select parameters, to make figures and tables, to export diagrams to other programs, to analyze data and make comparisons between countries.

Task 1: Compare the prevalence of regular daily smokers in the population, age 15+ (male and female separately) between selected European countries.

The students work individually with HFA Data Base, using computers. Several students present their figures and tables, discuss the analyses and the interpretation and draw conclusions.

Task 2: Compare the prevalence of standardised rate of malignant neoplasm of larynx, trachea, bronchus and lung, per 100000 (male and female separately for available age groups) between selected European countries.

Task 3: Compare the number of deaths of malignant neoplasm of larynx, trachea, bronchus and lung (male and female separately for available age groups) between selected European countries and draw conclusions.

Task 4: Develop a Health promotion program for antismoking campaign in schools.

The students work in small groups and present and discuss their programs.

Task 5: Analyse reasons showed by informant for changing their smoking behaviour using the data of Sofia Heart Study 1994 (table 2). Suggest best practice interventions for women in a local health promotion program.

Table 2. Ex-smokers: reasons showed by informant for changing their smoking behaviour by age

	Age					Total
	25-34	**35-44**	**45-54**	**55-64**	**65-74**	
Males						
Why did you stop smoking?						
Because of ill health	3	17	21	28	25	**94**
%	9.4	39.5	33.9	49.1	37.9	**36.2**
Because my health might be affected	8	6	19	15	21	**69**
%	25.0	14.0	30.6	26.3	31.8	**26.5**
Because of economical reasons	4	8	6	3	6	**27**
%	12.5	18.6	9.7	5.3	9.1	**10.4**
Other reasons	17	12	16	11	14	**70**
%	53.1	27.9	25.8	19.3	21.2	**26.9**
Total	32	43	62	57	66	**260**
Females						
Why did you stop smoking?						
Because of ill health	3	11	10	5	5	**34**
%	13.0	29.7	34.5	31.3	38.5	**28.8**
Because my health might be affected	5	16	4	4	2	**31**
%	21.7	43.2	13.8	25.0	15.4	**26.3**
Because of economical reasons	2	3	3	4	3	**15**
%	8.7	8.1	10.3	25.0	23.1	**12.7**
Other reasons	13	7	12	3	3	**38**
%	56.5	18.9	41.4	18.8	23.1	**32.2**
Total	23	37	29	16	13	**118**

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Alcohol Consumption in the Focus of New Public Health**
Module: 4.2	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Gencho Genchev, PhD** Associate Professor Medical Faculty, Medical University, Sofia, Bulgaria **Lidia Georgieva, MD, MPhil, PhD** Associate Professor Faculty of Public Health, Medical University, Sofia, Bulgaria **Genc Burazeri, MD, MPH** Department of Public Health, Faculty of Medicine, University of Tirana, Albania
Address for correspondence	Gencho Genchev Department of Social Medicine and Health Management Bialo More 8 Sofia, Bulgaria Tel: +359 887731964 Fax: + 359 29432159 E-mail: gen137@mail.bg
Keywords	Alcohol consumption, public health, risk factors
Learning objectives	After completing this module students and public health professionals should: • Be aware of harm and benefit of alcohol consumption; • Recognise alcohol as a risk factor; • Increase knowledge on alcohol policy; • Understand public health significance of alcohol consumption; and • Improve knowledge of prevention of alcohol consumption.

Abstract	The description of the problem focuses on dose-response relationship between alcohol consumption and a variety of physical effects, psychological and psychiatric disorders, and social damage. Hazardous alcohol consumption is a level of consumption or pattern of drinking that is likely to result in harm if it persists: 350 g (35 units) or more per week for men and 210 g (21 units) or more per week for women. Alcohol consumption is harmful when it damages the psychological or physical wellbeing of the individual. Methodology describes the variety of definitions used for population-based data on alcohol consumption in different countries. Public health significance of alcohol consumption is related to a number of social, demographic, economic and cultural factors. The social, physical and psychological problems related to heavy drinking, although by no means comprehensive, give some idea of the scale of the problem. Magnitude of the problem in the countries of South Eastern Europe (SEE) is explored. An evidence-based alcohol policy and dissemination of information, which enhance community healthy choices, are discussed as a prerequisite for effective responses to this public health problem.
Teaching methods	Lectures, exercises, individual work, interactive methods such as small group discussions, seminars.
Specific recommendations for teachers	Work under teacher supervision – 40%, individual students' work – 60%. Facilities, equipment and training materials: computers, HFA (Health For All) Data Base, WHO, Regional Office for Europe Target audience: lecturers and students in medicine, master and PhD students in public health
Assessment of students	Assessment could be based on multiple choice questionnaire (MCQ), structured essay, seminar paper, case problem presentations, oral exam, attitude test etc.

ALCOHOL CONSUMPTION IN THE FOCUS OF NEW PUBLIC HEALTH

Gencho Genchev, Lidia Georgieva, Genc Burazeri

Description of the problem

There is a dose-response relationship between alcohol consumption and a variety of physical effects, psychological and psychiatric disorders, and social damage (1).

Hazardous alcohol consumption is a level of consumption or pattern of drinking that is likely to result in harm if it persists: 350 g (35 units♣) or more per week for men and 210 g (21 units) or more per week for women. Alcohol consumption is harmful when it damages the psychological or physical well-being of the individual (2).

There appears to be a negative association between moderate alcohol consumption and risk of coronary heart disease (3), this protective effect can be achieved at a low consumption levels and is not important for men under 35 years of age and premenopausal women. Above these age cut-offs, weekly intakes of no more than five drinks for men or two drinks for women are associated with the lowest mortality (4).

In a 22 years follow-up of the Framingham study it was reported that frequent drinkers were less likely to die of CHD than abstainers (5). This protective affect of alcohol consumption for CHD was confirmed later from many ecological, cohort and case-control studies (6, 7, 8). Despite the consistency of the findings, some have argued that the association may be due, at least partly, to the use of reference group of non-drinkers, which may include heavy drinkers who deny their alcohol intake or people who have stopped because of illness (9, 10). Therefore E. Rimm et al examined prospectively, with control for diet and other risk factors the relation of alcohol consumption to risk of CHD and provide strong evidence for hypothesis that alcohol intake is inversely associated with CHD (3).

Many studies have examined the relation between drinking and stroke. Most cohort studies suggested that drinkers have a moderately-modestly elevated risk of total stroke compared to nondrinkers. Some studies reported evidence for a U-shaped association between level of alcohol intake and total stroke with reduced risk for men reported ≤ 2 drinks per day and for women ≤ 1 drink per day (11, 12).

♣ *One unit (8-10 g) of pure alcohol is equal to a half-pint of beer, a small glass of wine or a single measure of spirits such as whisky, brandy or vodka.*

Other studies (13) found alcohol consumption to be associated with increased risk of stroke and high blood pressure. Of the studies that specifically addressed ischaemic stroke, one found an independent U-shaped association (12), others found no significant association (14, 15, 16). By contrast most of the studies on haemorrhagic stroke found evidence for a positive dose – response association with alcohol intake (12, 14, 16, 17, 18, 19) and one reported no significant association (15).

As to physical harm, there are well-documented positive associations between alcohol consumption and cirrhosis and cancer of the liver, and cancer of the oral cavity, pharynx, larynx, and esophagus. The risk of cancer is multiplied in people who also smoke (20). The data are suggestive but inconclusive for an association between drinking and cancer of the stomach, large bowel and breast. Alcohol consumption is associated with increased risk of stroke, high blood pressure (13) and congestive cardiomyopathy.

Moderate (i.e., less than risky) use of alcohol may be beneficial, but what constitutes "moderate" depends on age, sex, genetic characteristics, coexisting illnesses, and other factors. Observational studies indicate that for men under the age of 34 years and women under the age of 45 years, those who report no alcohol intake have the lowest mortality. The balance of harm (an increased risk of liver disease, motor vehicle accident-crashes, hypertension, hemorrhagic stroke, and some cancers) and benefit (a reduced risk of ischemic heart disease and ischemic stroke) determines these amounts.

Methodology

The definitions used for population-based data on alcohol consumption vary widely from country to country. Many countries do not collect this information at all because alcohol consumption is not permitted in their societies for religious reasons. Other countries collect and report the information without a standard definition for heavy consumption. The country profiles display the definitions used by the survey source with the aim of providing the most specific definition possible for high alcohol consumers. Table 1 provides examples of the variety of definitions for high alcohol consumption that are routinely reported (21). The WHO STEPS survey instrument uses 7 day recall of the number of standard drinks to quantify proportion of adults engaged in "at risk levels" of drinking.

Similarly, definitions for alcohol abstainers differ from country to country. Many studies consider only those who report 'never drink alcohol', while others simply report 'abstainers'. Often, there is no way to differentiate between those who have tried alcohol but choose not to drink and those who have never had a drink. However, this distinction is unlikely to affect the overall risk profile at the population level.

According to the latest findings unhealthy alcohol use can and should be identified with the use of questions validated for this purpose (the AUDIT or CAGE questionnaires (22) or validated questions about alcohol consumption). Asking questions in a matter-of-fact way in the context of the general health history can facilitate discussion of what can be a sensitive topic (23).

Table 1. Selected examples of definitions and age groups included in surveys to collect prevalence of high alcohol consumption.

Definition	Age groups	Country of origin of the source
0ver 0.2 L of alcohol per day	26-62	Bosnia and Herzegovina
20+ g of alcohol daily intake	20-49	Czech Republic
Heavy alcohol consumption in the past year, more than 14 drinks per week for men and more than 7 drinks per week for women	20+	USA
The ingestion of 100 cc of absolute alcohol on one occasion-at one time (opportunity)	12-45	Paraguay
Alcohol consumption at least once per year	12-49	Mexico

Source: The SuRF report 1. Surveillance of risk factors related to noncommunicable diseases: current status of global data. World Health Organization 2003.

Public health significance

Alcohol consumption is related to a number of social, demographic, economic and cultural factors (24); drinking habits vary considerably between and within countries. More men (1 in every 3-4) than women (1 in every 10) drink alcohol, but women's consumption is growing towards male drinking patterns in some countries. In both sexes, consumption declines with age.

Both alcohol consumption and alcohol-related problems, although at a high level, are now stable or decreasing in a number of western countries of the European Region (25). In recent years, both have been increasing in the countries of Central and Eastern Europe and the former USSR. The population's average annual consumption per head is an important indicator of harmful consequences.

In most countries, a considerable portion of the population consumes alcohol at levels that put individuals at risk.

Measured adverse outcomes of exposure: The nature and scale of harm caused by alcohol is difficult to assess. In spite of a fairly large number of studies conducted in different countries, it is difficult to present a comprehensive picture – due to different definitions, age groups, and research methods. The following social, physical and psychological problems related to heavy drinking, although by no means comprehensive, give some idea of the scale of the problem (26).

1. Social problems: family problems, divorce, homelessness, work difficulties, unemployment, financial difficulties, fraud, debt, vagrancy, and habitual convictions for drunkenness.

2. Psychological problems: insomnia, depression, anxiety, attempted suicide, suicide, changes in personality, amnesia, delirium tremens, fits of withdrawal, hallucinations-hallucinosis, dementia, gambling, and misuse of other drugs.

3. Physical problems: fatty liver, hepatitis, cirrhosis, liver cancer, gastritis, pancreatitis, cancer of the mouth, larynx, esophagus, breast cancer, colon cancer, nutritional deficiencies, obesity, diabetes, cardiomyopathy, raised blood pressure, strokes, brain damage, neuropathy, myopathy, sexual dysfunction, infertility, fetal damage, hemopoietic toxicity, reactions with other drugs.

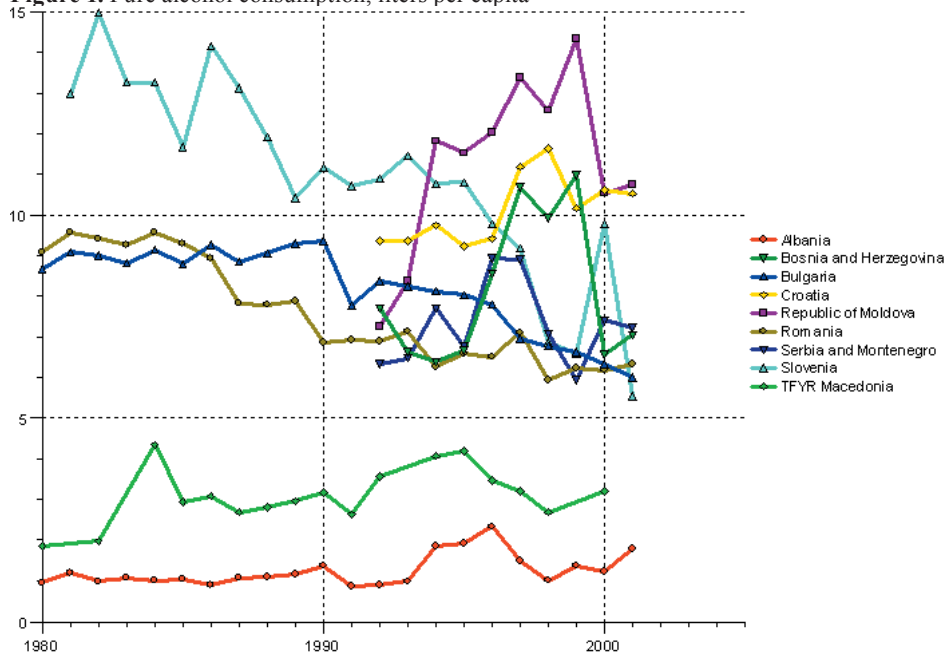
Magnitude of the problem in countries of South Eastern Europe (SEE)

The explored 9 countries of the SEE have varied substantially in their pure alcohol consumption (fig. 1) (27).

The lowest quantity of alcohol consumption shows Albania followed by Macedonia and the highest – Croatia and Moldova.

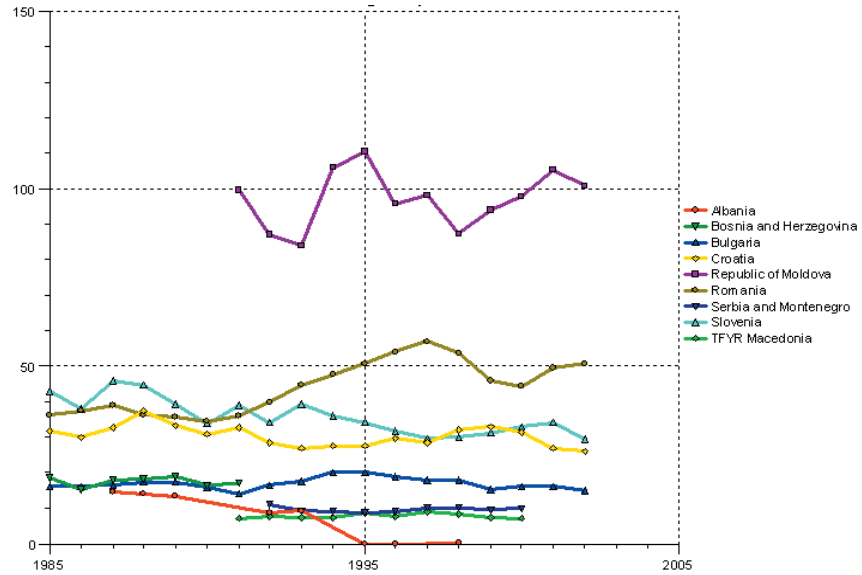
A comparative analysis of the following figures demonstrates significant correlation of alcohol consumption with mortality standardized rate of chronic liver disease and cirrhosis (fig. 2) road traffic accidents involving alcohol (fig. 3) and mortality standardized rate of selected alcohol related causes (fig. 4).

Figure 1. Pure alcohol consumption, liters per capita



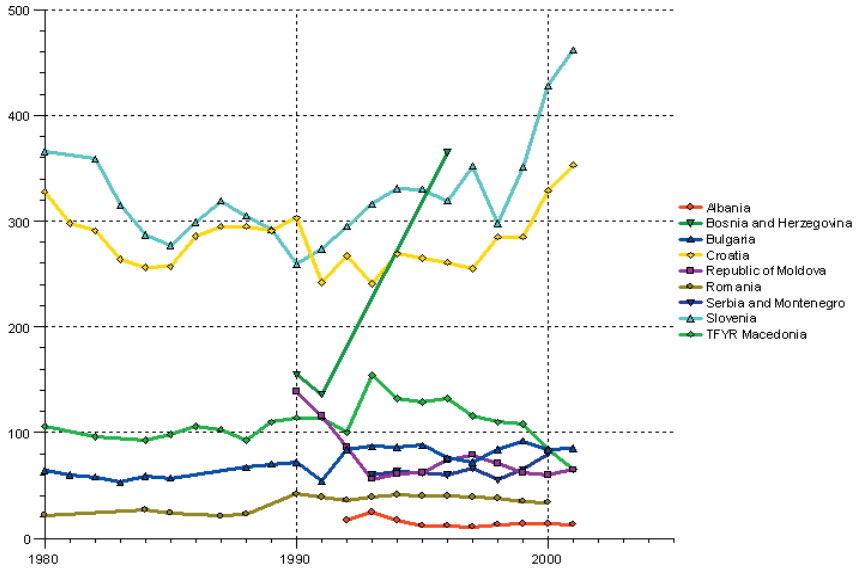
Source: HFA Data Base updated June 2004. WHO, Regional Office for Europe

Figure 2. Mortality standardized rate of chronic liver disease and cirrhosis, all ages per 100000



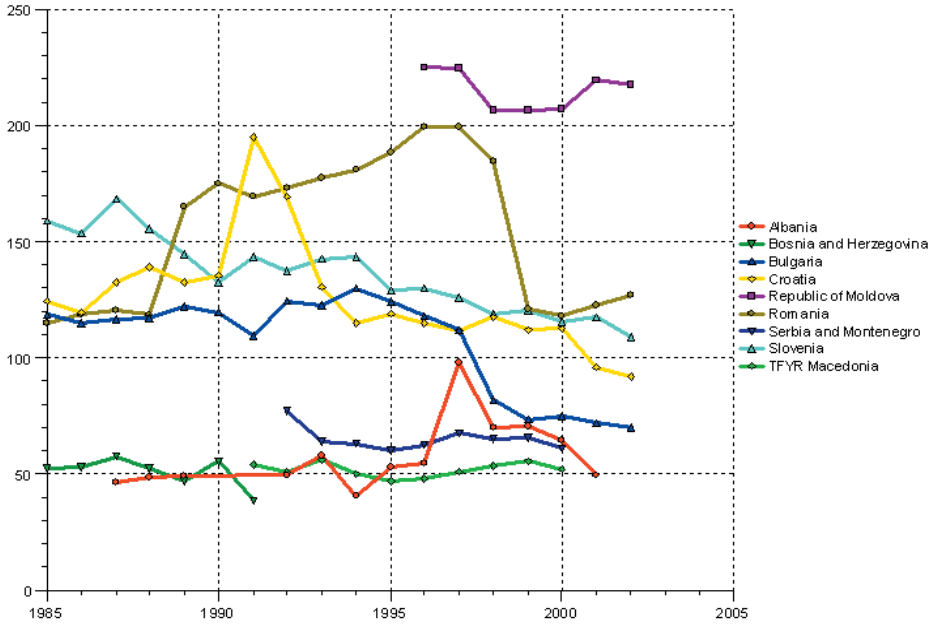
Source: HFA Data Base updated June 2004. WHO, Regional Office for Europe

Figure 3. Road traffic accidents involving alcohol per 100000



Source: HFA Data Base, updated June 2004. WHO, Regional Office for Europe

Figure 4. Mortality standardized rate, selected alcohol related causes, per 100000



Source: HFA Data Base, updated June 2004. WHO, Regional Office for Europe

Alcohol policy

The formation and implementation of alcohol policy must be accompanied by a strong and **continuing commitment** to disseminate the true and balanced facts on alcohol as a health issue. Alcohol policy that reduces general levels of consumption will have a net benefit for health. Given that the effect of a certain amount of alcohol varies from one society to another (28), there is good public health justification for national differences in alcohol policies.

Alcohol policy must take into account the total drinking population, in order to define the scope of public health action. It should deal with social and psychological problems, as well as physical ones. Policy must be concerned with the adverse impact of drinking on the family and, on other people, as well as on the drinker. Policy must address drunk–driving and other aspects of alcohol-related crime. Young people are especially vulnerable to alcohol-related accidents and violence, and it is vitally important that policy should be sensitive to the need to protect this age group (29).

The overall strategy for alcohol policy must be to create an **environment that helps people** to make healthy choices. Any measure that will potentially increase the availability of alcohol within a country, whether as a result of trade agreements, a reduction in the real price of alcoholic beverages, or reductions or eliminations of restrictions on retail access, should therefore be judged in terms of public health and public safety, in addition to any other perspectives. Measures that influence people's physical access to alcohol can make a significant contribution to the prevention of alcohol problems. Such measures include: justification of a minimum legal drinking age; restrictions on hours or days of sale; and policies on number, type or location of sales outlets (30).

Taxation of alcohol is an effective environmental mechanism for reducing alcohol problems. Population alcohol consumption is generally responsive to price, with increases in price leading to decreases in consumption and decreases in price leading to increases in consumption (30,31). The relationship between the price of alcohol and the level of alcohol consumption depends on the particular population, income variations, the beverage type and historical time period. As a rough generalization, a 10% increase in price leads to approximately a 5% decrease in beer consumption, and a 7.5% decrease in wine and a 10% decrease in spirits consumption.

Some evidence shows that **restrictions on advertisements** lead to reduced alcohol consumption and alcohol-related harm (30). Countries which have bans on spirits advertising have about 16% lower alcohol consumption than countries with no bans, while countries with bans on beer and wine advertising have about 11% lower alcohol consumption than countries with bans only on spirits advertising. Motor vehicle fatalities are about 10% lower when spirits advertising is

banned and about 23% lower in countries with bans on beer and wine advertising, as well as that for spirits. For young people, a five minute increase in exposure to alcohol advertising can be associated with an increase in alcohol consumption of 5 g a day.

Different levels and types of problems may require different types and degrees of interventions, and policies cannot be based on the assumption that there is any one treatment appropriate for every drinking problem. There is an evidence for the effectiveness of simple help given in general or primary care settings (32). Although screening for unhealthy alcohol use is routinely recommended, there are limited data that show improvements in clinical outcomes after implementation of screening. Despite good evidence to support brief intervention, some observers have questioned its effectiveness and value in practice (33). Brief interventions comprise an assessment of alcohol intake, information on hazardous and harmful drinking, and clear advice for the individual to reduce consumption. Information booklets and details of further available resources could accompany them locally. Data suggest that brief interventions have benefits beyond decreased consumption and are cost-effective (34, 35, 36, 37, 38, 39). Implementation of brief intervention in clinical practice remains a challenge. School and public education -based interventions are likely to be interactive with many other environmental influences, and if they have an impact, it is likely to be in the longer term. At the national level it seems likely that the community's acceptance is a prerequisite for the successful application of any public health policy as well as alcohol policies.

A public health policy on alcohol should be integrated with all other health planning, nationally and locally.

A prerequisite for effective responses to this public health problem is the formulation of an evidence-based policy and dissemination of information, which enhance community healthy choices.

EXERCISES

Task 1: Compare the prevalence of spirits, wine and beer consumption between selected European countries.

Task 2: Compare the mortality standardised rate of cardiovascular diseases, per 100000 among selected European countries.

Task 3: Compare the mortality standardised rate of alcohol consumption related cancers (male and female separately for available age groups) between selected European countries.

Students work individually with HFA Mortality Data Base, using computers. Several students present their figures and tables and discuss the analyses and the interpretation.

Task 4: List possible activities to be included in alcohol consumption community prevention program.

The students work in small groups and present and discuss their programs.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Public Health Significance of Diet and Physical Activity**
Module: 4.3	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Lidia Georgieva, MD, MPhil, PhD** Associate Professor Faculty of Public health, Medical University, Sofia, Bulgaria **Gencho Genchev, PhD** Associate Professor Medical Faculty, Medical University, Sofia, Bulgaria **John Powles, MB. BS, MA** University of Cambridge, UK
Address for correspondence	Lidia Georgieva Faculty of Public health Bialo more 8 Sofia, Bulgaria Tel: +359 888266431 Fax: + 359 29432216 E-mail: lidia@omega.bg
Keywords	Diet, physical activity, public health, risk factors
Learning objectives	After completing this module students and public health professionals should: • Be aware of diet the importance of diet as a determinant of health; • Recognise diet and physical inactivity as risk factors; • Increase knowledge on diet policy; and • Understand current public health issues related to diet and physical inactivity

Abstract	Diet has long been recognised as an important determinant of health. Over recent decades advances in epidemiological methods and in the relevant basic sciences have led to the identification of specific links between diet and the risk of important incommunicable diseases. Many constituents of diet are associated with health risk, but in general, it is their relative proportions that matter. Problems in measuring diet are reviewed in this paper and comparison of the main candidate methods is presented • 24 hour recall; • A diet diary (which may be closely supervised or left for return by mail after the survey); • Food frequency questionnaire; • Question dietary practices in selected area; • Biological markers. Magnitude of the problem in countries of South Eastern Europe (SEE) is analyzed. The importance of diet of the multicausal nature of leading chronic diseases is underlined. The nutrition policy recommend by WHO is presented, Physical activity is reviewed as a complex behaviour, defined as "bodily movement accomplished by muscle power and energy expenditure". Physical inactivity has been associated with increase risk of coronary heart disease, stroke, elevated blood pressure, and osteoporosis. Physical activity policy suggested by WHO is demonstrated.
Teaching methods	Lectures, exercises, individual work, interactive methods such as small group discussions, seminars.
Specific recommendations for teachers	ECTS – 0.50 Work under teacher supervision – 40%, individual students' work – 60%. Facilities, equipment and training materials: computers, HFA (Health For All) Data Base, WHO, Regional Office for Europe; WHO Comparative Risk Assessment Target audience: lecturers and students in medicine, master and PhD students in public health
Assessment of students	Assessment could be based on multiple choice questionnaire (MCQ), structured essay, seminar paper, case problem presentations, oral exam, attitude test etc.

PUBLIC HEALTH SIGNIFICANCE OF DIET AND PHYSICAL ACTIVITY

Lidia Georgieva, Gencho Genchev, John Powles

Diet

Description of the problem

Diet has long been recognised as an important determinant of health. Over recent decades advances in epidemiological methods and in the relevant basic sciences have led to the identification of specific links between diet and the risk of important incommunicable diseases. Many constituents of diet are associated with health risk, but in general, it is their relative proportions that matter. Increased risk has been associated with a high proportion of dietary fat (particularly certain saturated fats), excess energy intake (in relation to energy expenditure) and high salt intake; reduced risk has been associated with a high intake of complex carbohydrates and dietary fibre. Fruits and vegetables have been consistently observed to be associated with lower risk of a wide range of cancers and of major vascular disease (heart attack and stroke). However the results of large scale randomized controlled trials of vitamin supplementation now make it unlikely that the protective effect from these foods comes from constituent antioxidant vitamins such as vitamins A (from B-carotene and retinoids), C and E. Minerals such as selenium, iron, calcium and zinc are also important. The diet components mainly contributing to the burden of disease in middle and high income countries are: excess intake of total fat, saturated fats, cholesterol, refined sugar, salt, alcohol and total energy (relative to expenditure); and insufficient intake of polyunsaturated fats, complex carbohydrates and fibre, vitamins and minerals.

Methodology

Problems in measuring diet

The measurement of the diet of populations is an important adjunct to anthropometric, clinical, and biochemical assessments. It is however difficult to achieve acceptable levels of validity in large population samples. The main candidate methods are:

- *24 hour recall;*
- *A diet diary (which may be closely supervised or left for return by mail after the survey);*
- *Food frequency questionnaire;*
- *Question dietary practices in selected area;*
- *Biological markers.*

Advantages and disadvantages of each method are given in Table 1.

Dietary data may be analysed and reported as foods (frequency and quantity of consumption) or as nutrients (quantity consumed). Nutrient values may be obtained by chemical analysis or from national standard food tables. The most common method used in large-scale studies is the calculation of intake from standard food tables on the basis of data collected by an interview or from diaries. On the other hand as the food tables are the means of values obtain from chemical analyses, this method is particularly suitable for the processing of information on large number of individuals, especially when time, money and staff are limited. Food tables should be judged according to the nutrients of interest and the goals of the investigation. They should be prepared and supplemented where necessary by chemical analyses of samples of local foods and with data from commercial food processing forms and local recipes. It is important to ascertain what proportion of entries is based on analyses of local foods. Furthermore chemical analyses are helpful in securing compatibility of data from studies of different populations.

Fruits and vegetables are important components of a healthy diet designed to regulate weight and provide appropriate nutrients for growth and development. Low fruit and vegetable intake is causally linked to incidence of cancer and heart disease, but supplementation with antioxidant vitamins is not protective (1).

Health promotion programmes emphasize the importance of eating five or more servings of fruit and vegetables combined a day. Some developed countries collect this information in their national health surveys. Other surveys collect information on presumed average fruit and vegetable intake per capita. Still others find it easier to report ‘never eats fruit’ or ‘never eats vegetable’ as categories.

Table 1. The main candidate methods for dietary assessment in population health surveys

	Advantages	Disadvantages	Comments
24 hour recall	• Does not preselect foods for inclusion.	• Does not characterise the usual diet of individuals (due to day variability) • Need to conduct survey on all week days	• 30-40 min. to administrate + labour intensive + post coding • Readily adjusted to South Eastern Europe (SEE) conditions
Diet diary	• Does not preselect foods • Characterises current diet of individuals.	• Needs careful explanation to respondents • Substantial proportion of incomplete returns or non-returns (depending on how closely supervised	• Would need feasibility study for SEE populations • May use household measures or weighing for portion sizes
Food frequency questionnaire	• Labour efficiency (eliminates post-coding) • Can be designed for self-completion	• Preselects foods • Needs to be developed and tested for local populations	• Would need considerable developmental work within SEE
Questions dietary practices in selected areas	• Can be incorporated in main questionnaires	• Needs prior developmental study to establish which practices best predict food and nutrient intakes of interest.	
Biological markers	• Measurement error may be reduced • Objective measures can be compared with literature	• Only evidence for limited number of dietary constituents e.g. S. Ferritin, Plasma vit C (for fruit and vegetables), Urinary Na, K, Subcutaneous adipose -carotene	• Adaptable to SEE conditions

Definitions that designate the part of the population that is not eating enough fruit and vegetable are preferred because they relate directly to the risk category of low fruit and vegetable intake. Such definitions include “less than or equal to five fruit and vegetable servings per day”, “never eats vegetables”, and “never eats fruit”. The WHO STEPS survey instrument collects information on how many servings of fruit and vegetable are eaten on a typical day and uses this information to calculate the proportion of adults who are not eating 5 or more combined servings of fruit and vegetable.

Health risks attributed to dietary factors

Diet is believed to be a major factor in the aetiology of cardiovascular disease (2), but there is still considerable scientific uncertainty about the relationship between specific dietary components and cardiovascular disease risk and epidemiological doubts about the adequacy of the classic diet-heart hypotheses (3).

Increased risk has been associated with high proportion of dietary fat and particularly certain saturated fats, low energy turnover and high salt intake. Reduced risk has been associated with a high intake of fruit and vegetables (4). The main uncertainty is not about the presence of protective constituents in plant foods, but about which are most important.

High total fat, particularly saturated fat, and high total energy intake are associated with increased risk of cancer of the breast, colon and rectum, endometrium and ovaries. High salt consumption is implicated in gastric cancer, raised blood pressure and stroke; low intake of dietary fibre is linked to colorectal cancer (5).

Obesity is associated with an increased risk of several conditions, including non-insulin-dependent diabetes, high blood pressure, stroke and some types of cancer. The intake of iodine is crucial for the prevention of goitre and other syndromes resulting from deficiencies. Osteoporosis is affected by a low supply of dietary calcium and vitamin D, particularly during growth in adolescence. Finally, the intake of complex carbohydrates in food can prevent constipation and diverticular disease of the bowels.

Public health significance

In public health practice, the percentage of total dietary energy derived from fat is often used as a major indicator of the quality of the diet of a population (6). According to the data regularly published by the Food and Agricultural Organization of the United Nations (FAO), much of the population of Europe lives in countries in which this proportion is too high: over 35%. For the past 20 years, nearly all countries of the European Region have experienced a steady increase in fat intake. Only some southern countries have not exceeded the recommended level. Northern and western countries have reached a level of around 40%, although some have recently reversed their trends. The southern and particularly the central and eastern countries and the former USSR, which started with a lower level of average fat intake, seem to have experienced a rapid increase. Too little fibre, and too much sugar and salt in the diet are common problems in most countries.

In the Comparative Risk Assessment component of the Global Burden of Disease 2000 study, 7% of the burden of disease in Europe was attributed to obesity (in analyses which also included inactivity) and 2 to 3 % to low fruit and vegetable intake.) Burdens attributed to other diet related risk factors included 8 to 13% to raised blood pressure and 6% to sub-optimal blood cholesterol concentrations.

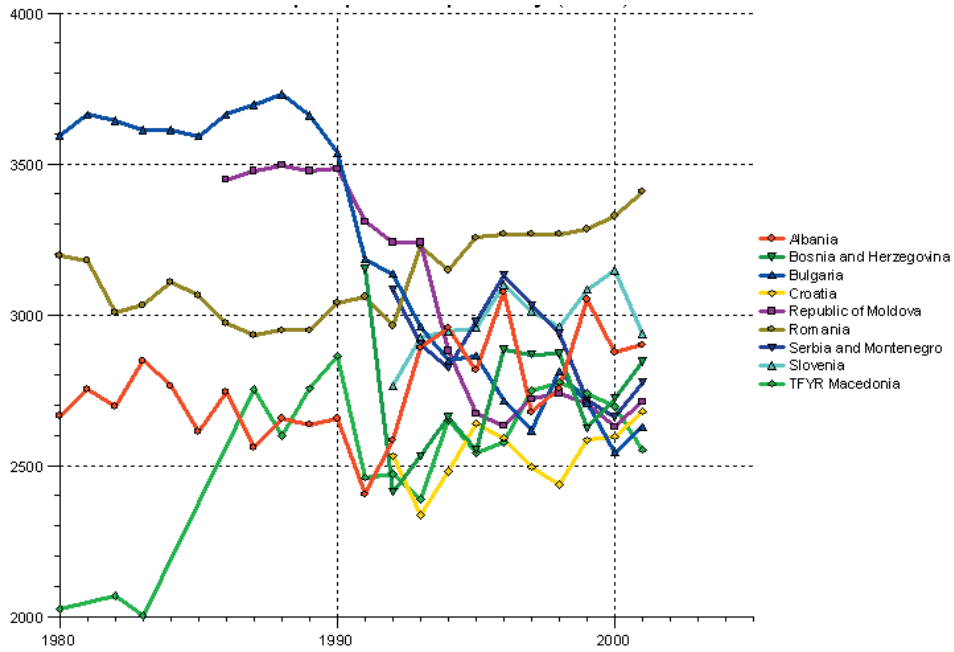
Magnitude of the problem in countries of South Eastern Europe (SEE)

The highest percent of total energy available from fat was shown in Serbia and Montenegro, Slovenia and Bulgaria. Particularly unfavourable is the situation in Bulgaria, where the consumption of calories is very low and over 30% of it is from fat (fig. 2).

The lowest percent of fat consumption for the last 5 years was observed in republic of Moldova - less than 20%.

Average amount of the SEE countries demonstrated a steady tendency of fruit and vegetables available per person per year of around 150-200 kg. Traditionally higher fruit and vegetables availability was observed in TFYR Macedonia. The most favourable tendency of constant increase of fruit and vegetables availability (from 100 to 300 kg) was shown in Albania (fig. 3).

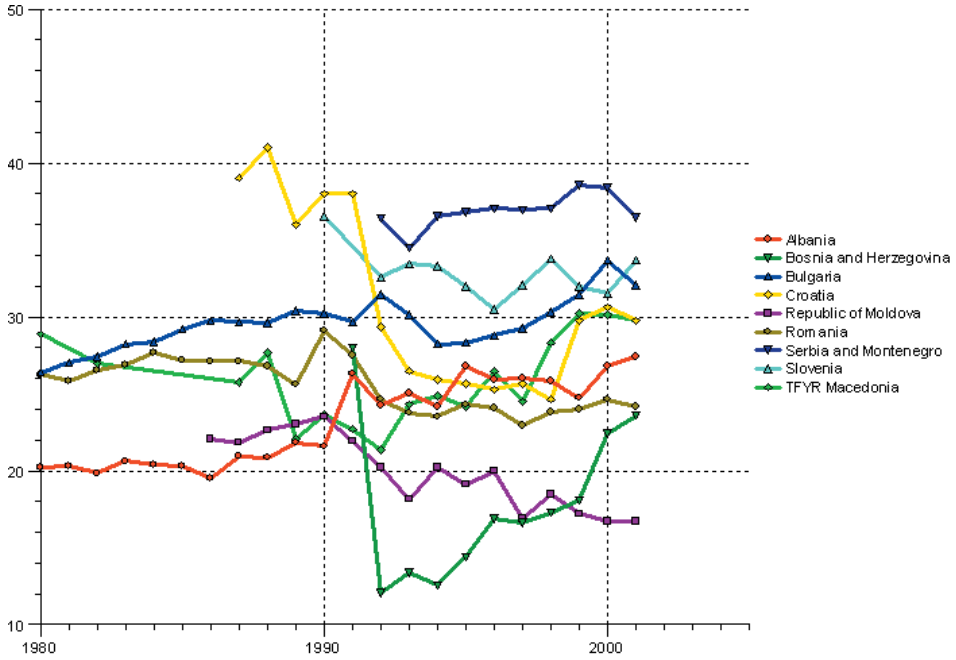
Figure 1. Average number of calories available per person per day (kcal).



Source: HFA Data Base, updated June 2004. WHO, Regional Office for Europe

These data are based on food disappearance; therefore they are not of great use for estimating energy turnover over time or between countries. As countries become richer a smaller proportion of the food available for consumption is actually consumed (8)

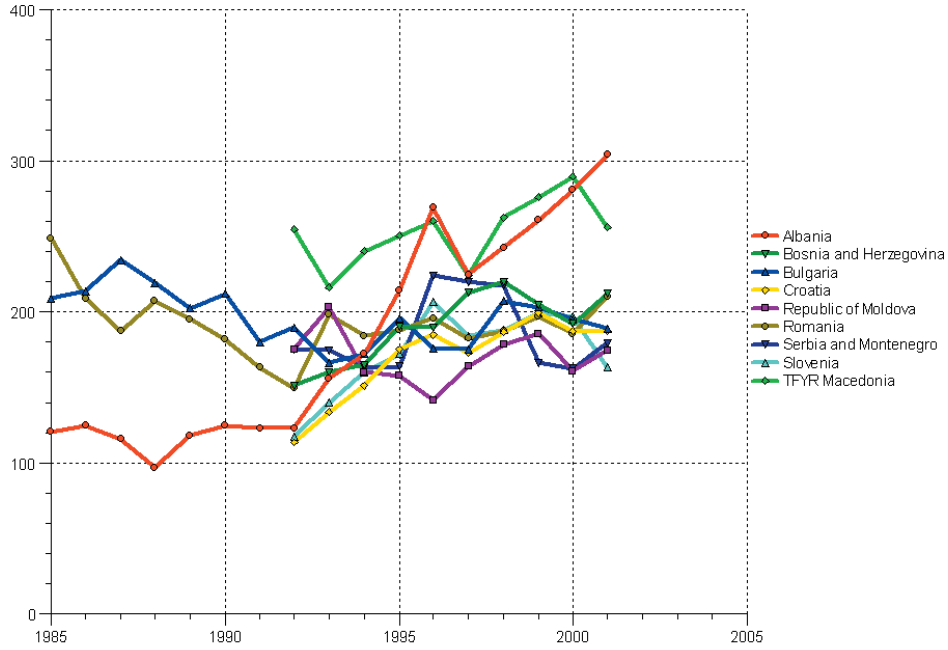
Figure 2. Percent of total energy available from fat



Source: HFA Data Base, updated June 2004. WHO, Regional Office for Europe.

Note that data such as these which are based on food balance sheets are subject to substantial error. However for many countries they provide the only available indication of dietary trends. Data will be more comparable within countries and can therefore provide suggestive evidence on trends within countries.

Figure 3. Average amount of fruit and vegetables available per person per year (in kg)



Source: HFA Data Base, updated June 2004. WHO, Regional Office for Europe.

Note that data such as these which are based on food balance sheets are subject to substantial error. However for many countries they provide the only available indication of dietary trends. Data will be more comparable within countries and can therefore provide suggestive evidence on trends within countries.

The importance of diet for the multicausal nature of leading chronic diseases

Major vascular diseases, principally ischemic heart disease and stroke are the leading contributors to high rates of premature death and of disease burden in the countries of this region. For these diseases the risks from the contributing causes — high blood pressure, sub-optimal blood cholesterol levels, adiposity, low intakes of fruit and vegetables, low physical activity levels — are believed to combine multiplicatively to determine the overall risk of these diseases. Dietary composition and physical activity levels are believed to be the most important determinants of these diseases.

The application of standard multiplicative models of attributable risk both to individuals and to populations shows that the absolute differences in risk associated with a health determinant depend on the other causes with which it is

interacting. For example, cigarette smoking roughly doubles the (non-smoking) risk of heart attack. So the absolute effect of smoking on the risk of heart attack is twice as big, on average, in populations where the risk of heart attack in non-smokers is twice as high. This same logic applies to the dietary causes of vascular disease. Thus the Comparative Risk Assessment component of the Global Burden of Disease 2000 estimated that the absolute burden of disease attributable to sub-optimal cholesterol levels (expressed as DALYs lost per 1000 total population) was 3 times higher in Russia than in Western Europe even though cholesterol levels are not higher in Russia. The implication of this is that where absolute risks are high, the absolute effect of all the causes contributing to that risk will be high and — most importantly — the benefits of lowering these risks will be bigger than in lower risk populations. The practical message of the 'absolute risk approach' – for both individuals and populations – is that where risks are higher, more effort needs to be made to lower all amenable risk factors, including dietary risk factors, irrespective of their current level.

The citizens of the states of South East Europe therefore have much more to gain from similar reductions in obesity, in blood pressure or cholesterol levels, or increases in fruit and vegetable intakes and physical activity than the citizens of countries where the risks of premature vascular disease are much lower (7).

The nutrition policy should recommend a healthy diet (WHO) (9), urging the population:

- to reduce fat consumption to no more than 30% but not less than 15% of total energy intake, by switching from saturated (maximum 10% of total energy) to polyunsaturated fats (maximum 7% of energy), with a ratio of polyunsaturated to saturated fats of 0.45, and reducing cholesterol intake to a maximum of 300 mg per day;
- to increase consumption of complex carbohydrates to a maximum of 70% and a minimum of 50% of total energy intake, and dietary fibre to a maximum of 40 g and a minimum 27 g per day, by adding vegetables and fruit to the diet with a daily average vegetable intake of at least 400 g;
- to reduce sugar consumption to a maximum of 10% of total energy (equivalent to 60 g per day);
- to reduce the consumption of salt to a maximum of 5 g per day;
- to reduce excess alcohol consumption; and to reduce excess weight (10).

Physical activity

Description of the problem

Physical activity is a complex behaviour, which is defined as "bodily movement accomplished by muscle power and energy expenditure" (11).

Physical inactivity has been associated with increase risk of coronary heart disease (12,13) stroke, elevated blood pressure, and osteoporosis. Physical inactive people are twice as likely to develop cardiovascular diseases as physically active people.

On the other hand physical activity has a well-documented protective effect. It can reduced the risk of coronary heart disease (14), stroke, lower blood pressure (15), improve the lipoprotein profile, that is, increase the level of HDL and decrease that of LDL (16), improve the balance between energy intake and expenditure and promote weight loss and thus preventing obesity (17), decrease fibrinogen and factor VII activity, increase fibrinolytic activity (18) improve psychological fitness, and coping with stress and fatigue (19). In addition, people in higher fitness categories have lower rates of mortality from all causes.

Methodology

Problems in measuring physical activity

Measuring the levels of activity or inactivity in a population has proved difficult. The Physical Activity Level (PAL), which is the total energy expenditure divided by the basal metabolic rate provides an objective indicator. The denominator is typically estimated using standard equations (20). Measurement of total energy expenditure in free living subjects is difficult. The doubly labelled water method is accurate but very expensive (21). Alternatively there is individually calibrated heart rate monitoring (22). Total world measurements using these objective methods is in the low thousands. The best questionnaire based methods have low validity (23). Mean PALs in high income countries are in the range 1.55 to 1.60. It has been suggested that levels of at least 1.75 are needed to prevent obesity and to achieve these the equivalent of an hour of moderately heavy labour would need to be added to average daily activities (24).

To add to the problem, physical activity exists in multiple domains of a person's life, from main occupation (especially if the job involves physical labour), to means of transport, domestic duties and leisure time. Physical activity can be broadly divided to activity associated with paid work and other, non-work activity. Non-work or leisure time physical activity is commonly regarded as taking three main forms: sports, games and keep-fit exercises; getting about (walking),

cycling, stair-climbing; home activities (25). These areas of physical activity should be covered in the questionnaire. Since physical activity may show considerable variation from week to week, the chances for mis-classifying individuals will be reduced if data are collected over a longer period, but this requirement must be balanced against the increasing problems of accurate recall as the reference period is extended. Development work for the U.K. National Fitness Survey indicated that four weeks was the longest period for which accurate information of the required details could be collected relying on respondents' memories and that this period providing a fairly stabile picture of individuals' current activity (26). Physical activity tends to show a great deal of seasonal variation. Studies addressing the lifestyle factors should take this into account and the questionnaires should be modified and standardised accordingly.

The SuRF report of WHO focuses on lack of activity as a risk factor for poor health outcomes, including overweight/obesity and cardiovascular disease. Again, definitions of physical inactivity vary in different country settings. Often high and middle income countries report activity or inactivity in "leisure" time, a concept that may not exist in low income situations. Most available data are for leisure-time activity while little data are available for activity relating to work, transport or domestic tasks.

The WHO STEPS survey instrument measures physical activity/inactivity across three domains of life: work, leisure time and transport. It uses an activity score based on intensity of activity and time spent in activity to calculate the proportion of inactive adults.

Public health significance

Inactive living is very common for modern societies, where intensive mechanization in almost all sectors of the economy has led to a rapid decrease in energy expenditure for most occupations (27, 28). Studies have shown that an estimated 70% or more of both men and women in all age groups were below an acceptable minimum level of activity that would confer significant health benefits. This leads to increased risk of coronary heart disease, stroke and diabetes.

In the Comparative Risk Assessment component of the Global Burden of Disease 2000 study, 3 to 5% of the burden of disease in Europe was attributed to inactivity (in analyses which also included obesity) (7).

The proportion of people classified as physically active in leisure time correlates with socioeconomic status and level of education. The people with higher socio-economical status and with higher education show a more favourable coro-

nary risk profile overall: a lower prevalence of smoking and obesity, and healthier nutritional patterns. People who do physical work are obviously much less interested in leisure-time physical exercise.

Recently, leisure-time physical activity has gained in popularity. Surveys indicate a significant increase in the adult population that is physically active in leisure time. A maximum of 20% of the population, however, exercises at a level recommended for cardiovascular benefit.

Physical activity policy

The major strategies behind the implementation of programmes to increase the physical activity level in individuals and in the population are (9):

- *The creation of supportive physical, social and cultural environments for the populations;*
- *Education of the public through the mass media;*
- *Direct education and counselling in primary care.*

Risk factor reduction attributed to physical activity appears to be proportional to the degree of the individual's exercise intensity and that of exposure to and participation in the programme. So far, only limited information is available on the ability of primary care professionals to influence people's exercise behaviour and long-term compliance. Experience shows, however, that most patients could benefit from encouragement to increase their level of physical activity.

Frequency. Exercises should not be done on consecutive days in order to avoid soreness, fatigue and possible injury.

Duration. For the purpose of cardiovascular endurance, people should exercise for a total of 25-60 minutes.

Intensity. For the general population (average, non-athletic adults), the optimal intensity should be 30-50% VO2SL during the warm-up and cool-down phases and 60-80% VO2SL during the overload period (equivalent to 70-90% of the maximal heart rate).

Types. Types of physical exercise to be recommended might include light, moderate or vigorous activities, such as walking (more and more often and briskly), cycling (instead of using the car), climbing stairs (instead of using the lift), gardening, running or jogging, swimming, rowing, skating, cross-country skiing, team sport and dancing. The better this activities fit in with the individual's current lifestyle, the more they are to be recommended.

Primary care professionals should include counselling on physical activity in their practice:

- Discuss physical activity with patients;
- Ask patients about their leisure-time physical activities while taking their histories;
- Identify those who need to change their behaviour and encourage them to increase their physical activity;
- Assist patients in developing personal plans for a physical activity programme, and advice them both on choosing the appropriate type and level of physical activity;
- Follow up patients who have been given advice, monitor their compliance with a recommended physical activity programme, and encourage and support those who return to the old pattern of inactivity;
- Refer those who have special health problems for specialist advice (9).

EXERCISES

Task 1: Prepare food frequency questionnaire for collecting dietary data and adapted for specific country.

The students work in small groups and present and discuss their questionnaires.

Task 2: Compare the number of calories available per person per day among selected European countries.

The students work individually with HFA Data Base, using computers. Several students present their figures and tables and discuss the analyses and the interpretation.

Task 3: Compare the percent of total energy available from fat among selected European countries.

The students work individually with HFA Data Base, using computers. Several students present their figures and tables and discuss the analyses and the interpretation.

Task 4: Compare the average amount of fruits and vegetables available per person per year among selected European countries.

The students work individually with HFA Data Base, using computers. Several students present their figures and tables and discuss the analyses and the interpretation.

Task 5: Compare fruit and vegetables intake by male and female using the data of Sofia Heart Study 1994 (table 2, 3).

The students work individually with the data of Sofia Heart Study 1994. Several students present their analyses and the interpretation.

Table 2. Reported dietary habits of SHS population: fruit and vegetables, males.

Products	One time per day	Almost every day	Several time per week	One day of the week	One or a few times per month	Rare or never	Mis-sing	Total
Fresh fruits	147	229	166	176	137	107	2	964
%	15.2	23.8	17.2	18.3	14.2	11.1	0.2	100
Canned fruits	30	109	147	204	148	324	2	964
%	3.1	11.3	15.2	21.2	15.4	33.6	0.2	100
Fresh vegetables	236	258	142	148	61	117	2	964
%	24.5	26.8	14.7	15.4	6.3	12.1	0.2	100
Potatoes	61	251	269	256	55	70	2	964
%	6.3	26.0	27.9	26.6	5.7	7.3	0.2	100
Green vegetables and salads	228	323	142	126	61	82	2	964
%	23.7	33.5	14.7	13.1	6.3	8.5	0.2	100
Carrots and tomatoes	219	254	130	170	83	106	2	964
%	22.7	26.3	13.5	17.6	8.6	11.0	0.2	100
Onion	231	320	144	122	55	90	2	964
%	24.0	33.2	14.9	12.7	5.7	9.3	0.2	100
Garlic	125	271	142	180	93	151	2	964
%	13.0	28.1	14.7	18.7	9.6	15.7	0.2	100
Beans, lentils, peas	16	78	174	416	170	108	2	964
%	1.7	8.1	18.0	43.2	17.6	11.2	0.2	100
Canned vegetables	27	125	149	247	184	230	2	964
%	2.8	13.0	15.5	25.6	19.1	23.9	0.2	100

Table 3. Reported dietary habits of SHS population: fruit and vegetables, females.

Products	One time per day	Almost every day	Several time per week	One day of the week	One or a few times per month	Rare or never	Mis-sing	Total
Fresh fruits	188	260	149	149	137	148	1	1032
%	18.2	25.2	14.4	14.4	13.3	14.3	0.1	100
Canned fruits	55	130	135	173	129	408	2	1032
%	5.3	12.6	13.1	16.8	12.5	39.5	0.2	100
Fresh vegetables	242	291	148	114	63	172	2	1032
%	23.4	28.2	14.3	11.0	6.1	16.7	0.2	100
Potatoes	69	276	271	292	45	77	2	1032
%	6.7	26.7	26.3	28.3	4.4	7.5	0.2	100
Green vegetables and salads	263	339	183	95	49	101	2	1032
%	25.5	32.8	17.7	9.2	4.7	9.8	0.2	100
Carrots and to-matoes	213	310	162	126	62	157	2	1032
%	20.6	30.0	15.7	12.2	6.0	15.2	0.2	100
Onion	273	353	156	85	45	118	2	1032
%	26.5	34.2	15.1	8.2	4.4	11.4	0.2	100
Garlic	138	226	162	150	101	253	2	1032
%	13.4	21.9	15.7	14.5	9.8	24.5	0.2	100
Beans, lentils, peas	23	57	105	395	251	199	2	1032
%	2.2	5.5	10.2	38.3	24.3	19.3	0.2	100
Canned vegetables	62	134	145	221	206	262	2	1032
%	6.0	13.0	14.1	21.4	20.0	25.4	0.2	100

Task 6: Analyse physical activity during paid work for male and female separately using the data of Sofia Heart Study 1994 (table 4).

The students work individually with the data of Sofia Heart Study 1994. Several students present their analyses and the interpretation.

Table 4. Reported physical activity during paid work by sex within age strata

	Age					Total
	25-34	**35-44**	**45-54**	**55-64**	**65-74**	
Males						
Almost nothing	39	34	39	41	54	207
%	20.0	16.3	20.0	22.8	34.6	22.1
Light	55	70	54	52	49	280
%	28.2	33.5	27.7	28.9	31.4	29.9
Moderate	87	84	73	71	44	359
%	44.6	40.2	37.4	39.4	28.2	38.4
Hard	14	21	29	16	9	89
%	7.2	10.0	14.9	8.9	5.8	9.5
Total	195	209	195	180	156	935
Females						
Almost nothing	44	41	50	46	59	240
%	23.8	18.8	21.6	24.1	33.5	24.0
Light	56	63	61	40	59	279
%	30.3	28.9	26.3	20.9	33.5	27.8
Moderate	80	109	106	90	55	440
%	43.2	50.0	45.7	47.1	31.3	43.9
Hard	5	5	15	15	3	43
%	2.7	2.3	6.5	7.9	1.7	4.3
Total	185	218	232	191	176	1002

Task 7: Analyse physical activity during leisure time of male and female using the data of Sofia Heart Study 1994 (table 5).

The students work individually with the data of Sofia Heart Study 1994. Several students present their analyses and the interpretation.

Table 5. Physical activity in leisure time by sex within age strata

	Age					Total
	25-34	**35-44**	**45-54**	**55-64**	**65-74**	
Males						
Every day	40	45	43	33	25	186
%	20.4	21.8	22.1	18.4	15.7	19.9
2-3 times weekly	55	63	49	38	29	234
%	28.1	30.6	25.1	21.2	18.2	25.0
At least once weekly	59	55	54	58	40	266
%	30.1	26.7	27.7	32.4	25.2	28.4
Less than once weekly	42	43	49	50	65	249
%	21.4	20.9	25.1	27.9	40.9	26.6
Total	196	206	195	179	159	935
Females						
Every day	39	66	56	61	35	257
%	21.5	30.7	24.6	31.6	19.7	25.8
2-3 times weekly	51	55	58	44	34	242
%	28.2	25.6	25.4	22.8	19.1	24.3
At least once weekly	38	58	66	35	46	243
%	21.0	27.0	28.9	18.1	25.8	24.4
Less than once weekly	53	36	48	53	63	253
%	29.3	16.7	21.1	27.5	35.4	25.4
Total	**181**	**215**	**228**	**193**	**178**	**995**

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title:	**Food and Human Health**
Module: 4.4	**ECTS (suggested): 0.25**
Author(s), degrees, institution(s)	**Enver Roshi, MD, Ph.D.** Department of Public Health, Faculty of Medicine, Tirana, Albania **Genc Burazeri, MD, MPH** Department of Public Health, Faculty of Medicine, Tirana, Albania **Lidia Georgieva, MD, Ph.D.** Department of Preventive Medicine and Epidemiology, Faculty of Public Health, Medical University, Sofia, Bulgaria
Address for Correspondence	Enver Roshi Faculty of Medicine, Rr. "Dibres", No.371 Tirana, Albania Tel: +355 4 262782 Fax: +355 4 257420 E-mail: e_roshi@yahoo.com
Keywords	Diet, food, nutrition, quality, safety
Learning objectives	At the end of the module, students should be able to: • Describe the ways in which food may influence human health; • Define underweight and overweight; • Describe the health effects of some important nutritional deficiencies; • Describe and illustrate some important diet-related diseases in industrialized countries; • Describe and illustrate the biological, chemical, and radioactive contaminants of foodstuffs; • Define and illustrate the difference between food poisoning and food borne infections; • Identify the potential hazards and risks at different levels between food production and consumption; and • Describe the main food quality criteria.

Abstract	Access to adequate and safe food is a fundamental human right. The number of daily calorie intake should be balanced with the energy expenditure. Otherwise, the consequence for the human organism will be the development of underweight, or overweight, both of which have adverse health effects. In most European countries diseases resulting from nutritional deficiencies have been largely eliminated as a public health problem. However, deficiencies still arise, particularly in vulnerable groups such as infants, children, pregnant women and the elderly. The most important nutritional deficiencies worldwide are iron deficiency, iodine deficiency, and vitamin A deficiency. Food borne diseases are a common and a serious health problem in both, the industrialized and developing countries. Hazards in food that concern public health include a wide range of biological, chemical, and radioactive contaminants. The quality and safety of the food supply is of great concern to the general public. Food quality is considered on the basis of different properties related to the organoleptic aspects, nutritional values, functional features, and hygienic properties of food items. To assess the hygienic properties of the food, various safety standards are employed. To achieve comparability across national borders, most of the countries have adapted standards proposed by the World Health Organization and the Food and the Agriculture Organization. Nevertheless governments, in all countries should be responsible for the establishments of standards and the reinforcement of laws and regulations.
Teaching methods	*Introductory lectures:* • Overview of nutrition and human health; • Nutritional deficiencies and other diet-related diseases; • Contaminants of foodstuffs; • Food safety standards and guidelines. *Case Studies:* • Standards and guidelines of food safety in SEE vis-à-vis EU countries; • Food safety and human health in SEE countries.
Specific recommendations for teachers	This module should be assigned 0.25 ECTS.
Assessment of Students	Take-home assignment: Case study – current situation regarding food safety legislation and regulations in students' own countries

FOOD AND HUMAN HEALTH

Enver Roshi, Genc Burazeri, Lidia Georgieva

Food and health

Food is indispensable for humans and also, a basic precondition to good health. Therefore, access to adequate and safe food is a fundamental human right (1). The daily activities of the human organism depend on the amount of energy intake and on its specific constituents namely proteins, vitamins, and minerals which are found in a variety of foods. Thus, various nutrients are required by humans to maintain healthy metabolic functions.

Since the early 1920s, it was shown that, in general, poor people were short, thin, and suffered from a whole range of diseases. Peoples' health seemed to improve if they had abundant food and a diet rich in protein and vitamins. Hence, "good" food was considered to be a balanced diet consisting of products from different sources such as animals, vegetables, and fruits (2).

The number of daily calories required varies among individuals, depending on their size and age (which influence the basal metabolic rate), as well as the level of physical activity, seasonality, sex, and different physiological conditions (such as puberty, or pregnancy) (3). Nevertheless, as a rule of thumb, the number of calorie intake should be balanced with the output (i.e. energy expenditure).

If energy intake and expenditure are not balanced, the consequence for the human organism will be the change of body mass (*underweight* – when energy intake is scarce, or *overweight* – when intake exceeds the energy expenditure). Both, underweight and overweight have adverse health effects (3).

Deficiencies in food intake can cause severe malnutrition which, in turn, causes a series of health problems. Nutritional deficiencies weaken the body's resistance to most of communicable diseases, and also have adverse effects on the growth and development, especially in children (4).

In most European countries there is a constant and abundant food supply. Diseases resulting from nutritional deficiencies have been largely eliminated as a public health problem. However, deficiencies still arise, particularly in vulnerable groups such as infants, children, pregnant women and the elderly. This is a particular concern in economically disadvantaged groups. Such nutritional deficiencies usually concern micronutrients (e.g. vitamins) and can be present even when macronutrients are well in excess of demand (5).

On the other hand, excessive food intake can cause obesity which is deemed as a state of undue body fat. Obesity is a common cause of many chronic diseases such as hypertension, diabetes, gall stones, and some types of cancer (such as breast cancer, or endometrial cancer) (6-8). Duly, obesity is considered as one of the worst contemporary pandemics posing a serious threat for human longevity and quality of life.

For Western Europe and the United States, excess intakes of energy and saturated fat are considered to be responsible for the major part of the burden of disease related to diet, with major implications in terms of disability, impaired quality of life and social and economic costs (6-10).

The table below summarizes some of the major issues in diet-related conditions and diseases (3):

Nutritional factor	Related health problems
Insufficient energy intake	• Impaired cognitive and physical development and performance; • Suppressed immune function.
Excess energy intake	• Obesity; • Type 2 diabetes mellitus.
High sugar intake	• Dental caries; • Obesity.
High saturated fat intake	• Increased risk of cardiovascular disease; • Type 2 diabetes mellitus.
Low fruit and vegetable intake	• Increased risk of cardiovascular disease; • Increased risk of certain types of cancers.
Iron deficiency	Anemia.
Vitamin D and calcium deficiency	Impaired bone development and structure.
Iodine deficiency	Hypothyroidism and goiter.
Low fatty fish intake	• Sudden cardiac death; • Myocardial reinfarction.

The relations between diet and cardiovascular risk factors are quite consistent. A reduced saturated fat intake and an increased fruit and vegetables intake favorably affect CVD risk factors, incidence of CHD and cerebro-vascular accidents. Early evidence for this has been derived from cross-cultural studies (Seven Countries Study) (9), and from studies in which the CHD disease patterns in immigrants changed to those of their new home countries (10).

Strongest evidence for the relation between diet and cardiovascular health is derived from intervention studies. Most of the evidence shows a beneficial effect of diets rich in plant-based foods and relatively poor in foods from animal origin. In a review of cholesterol lowering trials (including diet intervention), a 6% reduction in total mortality and 13% reduction in coronary heart disease was reported (11). Favorable effects on CHD and total mortality mainly occurred in secondary prevention trials in which diets low in saturated fats are supplemented with polyunsaturated fats (12). Furthermore, an expert panel of the World Cancer Research Fund concluded that eating the recommended five servings of fruits and vegetables each day could reduce cancer rates by more than 20%. Adherence to dietary recommendations and physical activity, and maintaining a healthy body weight, could reduce cancer risk by 30% to 40% (8).

Effects of micronutrient deficiencies on health

The WHO's Panel on Food and Agriculture has outlined a number of specific nutritional deficiencies which are briefly summarized below (13):

Iron deficiency. Anemia is a widespread condition in many countries in the world. Most iron-deficiency anemia in transitional countries is a result of iron loss from the body because of internal bleeding. Women are at much greater risk because they loose iron from blood loss during (normal) menstrual cycles. In some parts of the world, the iron intake is deficient and cannot replace the iron in women or provide sufficient iron stores in children. Certain parasites also "steal" iron from the human body. Most of the African and South-East Asian countries have remarkably high levels of iron-deficiency anemia due to a combination of low intake, poor absorption, and parasite diseases (13).

Vitamin A deficiency. The shortage of Vitamin A leads to a serious eye disease (called *xerophthalmia*) and sometimes to blindness. Furthermore, vitamin A deficiency decreases resistance of human's body to disease and infection leading to a particularly high level of child mortality. In certain geographical areas, vitamin A is not extensively available, which often is coupled with a diet poor in vegetables. For example, in many Asian countries there is a clear deficiency in vitamin A intake, as the huge population number exceeds the available resources of vitamin A in these countries (13). It must be noted that, even in industrialized societies, there maybe deficiencies in vitamin A intake due to very low-fat diets, which are promoted as a protective factor against coronary heart disease (5). While generally health risks to vitamin A are associated with deficiencies, the excessive intake, either through diet or through high supplementation, may result in toxic effects. Thus, while vitamin A deficiency may cause *xerophthalmia* or (night) blindness, high doses of vitamin A may result in adverse effects such as headache, vomiting, bone abnormalities, and liver damage. Though the natural content of the diet is not

likely to induce toxic effects, it is nevertheless important to regulate the standards for vitamin A supplementation.

Iodine deficiency disorders. Iodine deficiency is a serious problem in many parts of the world. The Andes, Great Lakes basin of North America, Alps, and the Himalayas are particularly deficient in iodine (13). Obvious negative effects of moderate iodine deficiency are goiter and, to a lesser degree, cretinism. Mild iodine deficiency, however, can delay mental development, reduce intelligence, and diminish the work capacity. Iodizing salt is very effective in controlling endemic goiter, but there are few other practical means of increasing iodine intake. There is some evidence that goiter is increasing in Europe where people tend to reduce their salt intake. Therefore, in countries where the intake of iodine from sources other than salt is limited, policies are needed in order to regulate the iodine intake in order tot avoid the issue of goiter. In South East Europe, Albania represents a remarkable example of an endemic goiter area, with almost ¾ parts of the country reflecting, to different extents, some form of iodine deficiency.

Other micronutrient deficiencies include *calcium* (which causes osteoporosis), *fluoride* (which causes dental caries), and *vitamin D* (which causes rickets and other bone abnormalities).

Food borne diseases an food poisoning

Food borne diseases are a common and a serious health problem worldwide. The situation is even more serious given the fact that many cases are not reported as they don't seek health care. Also, several cases of food borne diseases may note be documented because they are not recognized as such. In many developed countries, at least 50% of cases maybe caused by poor food handling techniques and by contaminated food service establishments (3). In the developing world, these problems are much more serious. Chemical food safety and microbiological food safety are similar but separate issues. Food borne biological toxins can originate from two sources: either they are naturally occurring constituents of the food, or they are produced by microorganisms present in the food (3). Toxins in food can be acutely toxic. When eaten by humans, toxins cause severe illnesses.

The illnesses which involve bacterial growth and toxin production in the food and not in the individual are called *food poisoning.* Thus, food poisoning is to be distinguished from other food borne diseases which employ bacterial growth and toxin production in the human organism (3). In the case of food poising, if the produced toxin is heat-resistant, food preparation will not affect the health risks involved. This explains the "paradox" of some cases of food poisoning, in which the individuals involved are more than sure to have consumed well-processed food.

In contrast to food poisoning, food borne infections depend on the transfer of

the viable microorganism to an individual and the subsequent distribution and multiplication within the human body (3). The risk of food poisoning as well as food borne infections is greatly reduced by the use of additives which aim to prevent the microbial spoilage. Nevertheless, such spoilage can be correctly prevented by storing foods at low temperatures.

Hazards in food that concern public health include a wide range of biological, chemical, and radioactive contaminants. These are briefly described below:

1. Biological contaminants. Biological hazards in food include several pathogenic bacteria, viruses, parasites, helminthes, protozoa, algae, and many toxic elements that these microorganisms may produce.

Bacterial contaminants. Among different bacteria which cause food poisoning and/or food borne infections, salmonellae and staphylococci are frequently and notoriously involved.

In the case of salmonellae, the bacteria may reach food either directly or indirectly through animal or human excreta, or water polluted by sewage. In any case, diseases caused by salmonellae constitute classical examples of food borne infections. In 1990s, the contamination of poultry has been a major source of salmonellosis. Other foods which bear the risk for carrying salmonellae include dairy products, shellfish, and vegetables (3).

On the other hand, illnesses caused by staphylococci constitute one of the most common examples of food poisoning. Therefore, food borne illnesses due to staphylococci depend on the presence of sufficient toxin in the food. The source of staphylococci is often food handlers with skin infections. Incriminated foods include ham, poultry, egg salads, and cheese (3).

Viral and parasitic contaminants. Viral food borne diseases are believed to be more prevalent than is documented. Even if a microbiological examination of food and/or water does not reveal a high number of bacteria, the food may still contain pathogenic viruses. The hepatitis A virus is one of the most notorious examples of food borne diseases involving viruses. The epidemiological evidence has conclusively shown that the hepatitis A virus is spread primarily through food. Water, fruits, and vegetables, contaminated by feces have all been involved in outbreaks of food borne diseases due to hepatitis A virus (3).

On the other hand, two of the most widespread parasitic food borne diseases are Giardiasis and Trichinellosis. Giardiasis occurs most often in areas with poor sanitation and a lack of clean drinking water. Trichinellosis occurs through the consumption of raw or undercooked meat, particularly pork. Therefore, the best protection from parasitic diseases is a safe water supply and adequate cooking as well as refrigeration temperatures (3).

Mycotoxins: mycotoxins are secondary metabolites of fungi that can cause various negative health effects for the human organism. So far, hundreds of mycotoxins have been documented, many of which are produced by Penicillium, Aspergilus, and Fusarium. Mycotoxin contamination of food depends on the environmental conditions that may allow mold growth and production of toxins. Mycotoxins are also involved in adverse health effects such as teratogenicity, carcinogenicity, or mutagenicity (3).

2. Chemical contaminants. There are many sources of chemical contaminants. Vehicle emissions are a common cause of air pollution and hazardous airborne elements can be deposited and absorbed in various crops. However, due to the complex interrelation between air, water, soil, and plants, the contamination of any of these elements will inevitably involve all the other elements (14). Chemical contaminants are often found in animals, particularly as result of modern farming methods. Nevertheless, chemical contamination can also occur during food storage. Some common chemical contaminants involved in food borne diseases are briefly summarized below:

Polychlorinated biphenyls (PCBs). PCBs are fluids which have been widely used in hydraulic systems, heat exchange fluids, or electrical transformers. However, since 1970, the production of PCBs was restricted in some industrialized countries where the evidence clearly determined their negative health effects. The PCBs suppress the immune system and induce neuro-toxic effects. Also, PCBs have been accused for a potential carcinogenic effect in humans. PCBs can be present in vegetables, oils, fruits, eggs, or cereals (3). However, of all types of foods, fish contains the highest levels of PCBs. Therefore, diets with high levels of fish consumption may result in a high PCBs intake, such as the case of Japan where large amounts of fish are consumed.

Lead. Lead is involved in adverse effects on blood forming tissues, the digestive and nervous systems, and also the kidneys. Naturally present in the soil, lead is emitted into environment through industrial activities and through the exhaust fumes of leaded gas used in vehicles. Lead may be present in drinking water where lead pipes are used for domestic plumbing. With regard to the food items, fish and shellfish generally have the highest concentration of lead (15). Nonetheless, in countries with extensive industrial and mining activities, vegetables and fruits also show a high lead concentration.

Cadmium. Cadmium affects the kidneys even at low levels of exposure. Furthermore, cadmium affects the liver function, the testes, and the formation of bone tissue. The main sources of cadmium in foodstuffs are industrial emissions and the use of fertilizers (16).

Mercury. Mercury is found in thermometers, batteries, fluorescent lights, and in the industrially produced paints. Mercury manifests severe toxic effects in

humans (17-19). Children and pregnant women are particularly sensible to mercury poisoning. The most toxic form of mercury is *methylmercury* which is often found in fish because of industrial discharges into rivers or seas (18). In the Mediterranean area, the level of mercury in fish is remarkably high (19).

3. Radioactive contaminants. Radioactive elements involve carcinogenic, mutagenic, and teratogenic effects in humans (20). It must be pointed out that, radioactive contaminants are deemed to cause adverse health effects in humans even at very low levels – this is called the *non-threshold* concept, on the basis of which radioactive elements must be absolutely absent in foods and drinking water (20).

Regarding food safety issues, the radioactive contaminants of concern are those elements that enter the human body by ingestion. Some elements that contribute to the total radioactive dose in the diet are the following: potassium-40, uranium-228, radium-226, carbon-l4, lead-210, and rubidium-87 (3).

In the notorious event of Chernobyl in 1986, the radioactive contamination was spread over many countries (21).

Food quality criteria

The quality and safety of the food supply is of great concern to the general public. New developments in food supply require scientific evidence for safety and use of suitable control measures to assure both qualitative and safe foodstuffs.

In broad terms, *food quality* is considered on the basis of different properties pertinent to four main categories:

- *Organoleptic aspects*, such as the taste and smell (22).
- *Nutritional values*, which are based on *dietary standards* and *dietary guidelines*. Dietary standards determine the amount of nutrients that is appropriate for the majority of the population. On the other hand, dietary guidelines are recommendations for an optimally balanced diet with the aim to reduce chronic diseases (3). The dietary guidelines are largely based on epidemiological studies that aim to identify dietary patterns associated with low levels of disease in humans.
- *Functional properties*, which relate to the quantity and frequency of intake of different foodstuffs in order to keep an optimal function of the human body in accordance with its daily activities.
- *Hygienic properties*, which relate to the safety of food. Food is considered safe when, after being consumed, does not cause adverse health effects. From this point of view, *safety* relates to the toxicological properties of the food (23). Nevertheless, a clear distinction should be made between the toxicity of

natural toxins, food additives, or new food ingredients, as they involve quite different kinds of health risks.

To assess the hygienic properties of the food, various *safety standards* are employed. Thus, a whole range of safety standards are formulated for natural toxins, food contaminants, food additives, and new food components (3).

In all countries, national regulatory authorities are responsible for standards of food safety. However, to achieve comparability across national borders, most of the countries have adapted values proposed by the World Health Organization and the Food and the Agriculture Organization.

To ensure high quality of the food supply, in each country different stakeholders should be involved, such as the government, consumers, and the food industry. Governments should be responsible for the establishments of standards and the reinforcement of laws and regulations. Consumers, in turn, should adapt appropriate practices for the purchase, preparation, and storage of food items at home (3). The food industry should establish effective systems of safety and quality assurance by involving actors at different levels, such as the *production of raw materials* (e.g. agricultural sector), *food processing*, and *food preservation and storage* (24).

EXERCISES

Task 1: Students are asked to prepare a list of food borne diseases based on a comprehensive literature review.

Task 2: Many different actions can be taken to improve the safety and quality of the food. Students are asked to prepare a summary of these actions, indicating the level at which each action should be taken and the type of contaminant (biological or chemical) involved.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Environmental Epidemiology**
Module: 5.1	**ECTS (suggested): 1.0**
Author(s), degrees, institution(s)	**Tatjana Pekmezovic, MD, PhD** Associate Professor Institute of Epidemiology, School of Medicine Belgrade, Serbia & Montenegro
Address for correspondence	Tatjana Pekmezovic Institute of Epidemiology, School of Medicine Visegrdska 26A Belgrade 11000 Serbia & Montenegro Tel: +381 11 3615768 Fax: +381 11 3615768 E-mail: pekmezovic@sezampro.yu
Keywords	Environmental epidemiology, environmental health, environmental factors, surveillance
Learning objectives	After completing this module students and public health professionals should be able to: • Understand the special features of Environmental Epidemiology; • Understand the concepts of *exposure and dose* as applied in Environmental Epidemiology; • Understand how epidemiology can be used to identify associations between environmental factors and health status; • Recognize safety standards; • Recognize the basic concepts of environmental health research; • Identify environmental factors that may affect health, as well as individual characteristics that modify the effect of environmental factors; and • Improve knowledge in prevention of environmental-induced diseases.

Abstract	Environmental health includes factors, circumstances and conditions in humans' surroundings that influence health and well-being. Environmental Epidemiology is defined as the discipline of the effect of physical, chemical, and biological factors on human health. Environmental factors are divided into two groups: natural and human-made factors. Natural environmental influences include extremes of weather, locally circulating infectious agents, physical disasters, and local micronutrient deficiencies in soil. Human-made environmental influences arise from the disruption of the Earth's ecological and geophysical systems. Global environmental changes include global climate change, stratospheric ozone depletion, biodiversity loss, invasive species, and impairment of food-producing ecosystems. Health effects attributed to environmental exposure comprise a wide range of conditions which can be acute or long term. As the adverse impacts of different agents found in environment are potentially preventable, the primary task of environmental epidemiological research is to elucidate relationships between environmental exposures and impaired health status. The next steps include quantification of populations' risks, appropriate interventions to reduce environmental risks, and evaluation of the effectiveness of interventions performed. The assessment of exposure is one of the essential steps in environmental epidemiological studies. Exposure has two dimensions, namely the *dose and duration*. Dose-effect relationship is defined as a relation between dose and severity of effect. According to recent analysis, environmental risk factors are responsible for 25-33% of the global burden of diseases. A good surveillance system for environmentally-linked disorders has a great potential for improving the health of the populations.
Teaching methods	• Introductory lectures related to basic definitions and concepts; • Distribution of relevant literature to small groups (3-4 students); • Guided discussion within each group and additional explanations; • Distribution of topics for seminar papers to each group; and • Presentation and evaluation of seminar papers.
Specific recommendations for teachers	• 1 ECTS or 30 working hours (35% supervised work and 65% students' work). • Facilities, equipment: laptop, overhead-projector, Internet access. • Training materials: handouts, textbooks, papers.
Assessment of students	Multiple choice questionnaires (MCQ) and a seminar paper.

ENVIRONMENTAL EPIDEMIOLOGY

Tatjana Pekmezovic

Introduction

The term "*environment*" refers to the various external factors which influence the health status of populations through different types of exposure. Physical, chemical and biological agents pertinent to the environment are able to induce pathological effects in humans and animals. Mainly, environmental exposures are not under the control of individuals. Indeed, the role of housing quality, material circumstances, social, economic, cultural and other similar factors in the determination of disease patterns are well-documented. This comprehensive view of the environment includes interactive combinations of environmental influences, as well as most of the health problems arising from the interplay of several aspects of environment (1).

In their *Basic Epidemiology* textbook, Beaglehole et al. gave one of the best illustrations of human environment: *"The human environment consists of very basic elements: the air we breathe, the water we drink, the food we eat, the climate surrounding our bodies, and the space available for our movements. In addition, we exist in a social and spiritual environment, which is of great importance for our mental and physical health" (2).*

Environmental Epidemiology

According to Last's Dictionary of Epidemiology, *Environmental Epidemiology* is defined as a study of the effect of physical, chemical, and biological factors on human health in the external environment (3). The health effects associated with different hazards are the domain of Environmental Epidemiology. In other words, Environmental Epidemiology is about identifying and measuring the influence of environmental factors on human diseases in different communities or residential environments. The special aim of Environmental Epidemiology is to provide a scientific base for studying and interpreting the relationships between environment and health in populations, as well providing evidence, based on epidemiological research, for environmental and health policies and practice (4).

Due to enormous social, health and economic development during the last decades, environmental health hazards have become a concern not only for epidemiologists, but also for the whole society. On the other hand, the adverse

impacts of different agents found in environment are *potentially preventable*. Through epidemiological studies it can be possible to identify exposures to environmental hazards and consequently, to find ways for prevention and control of these disorders.

Environmental Epidemiology employs a wide range of study designs, including mainly observational studies, although experimental approach can also be carried out in situations where health benefit is anticipated from interventions that reduce environmental exposure (5). Additionally, epidemiological analyses help to find an acceptable balance between health risks and economic costs of prevention.

The methods and basic concepts of Environmental Epidemiology are very similar to those encountered in *Occupational Epidemiology*, where the later deals specifically with environmental factors in the workplace. However, there are several important differences, such as different levels of exposures in work and residential environment, groups of individuals in a community (children, elderly, sick persons) who are more susceptible to certain exposures, difficulties in collection of individual data on health status, as well as data on individual exposure, and mobility of people in residential environments (6).

The increasing urgency to assess and prevent health effects from potential environmental pollution sources in a given community leads to the mobilization of existing and rapid development of new epidemiological resources and techniques involved in these problems in the future (6). There are still many open questions, such as integration of biological indicators into exposure assessment, integration of experimental and epidemiological evidence, improvement of exposure-assessment in general, and elucidation of the problem of combined effects of multiple exposures.

Environmental factors

Environmental factors are frequently divided into three groups, *physical, chemical and biological* (7).

Some authors consider five groups of environmental factors that can affect health both in the workplace and in the general environment. These groups include the following factors: a) *physical* (noise, climate, workload, lighting, radiation, ergonomics); b) *chemical* (chemicals, dust, drugs, tobacco, skin irritants, food additives); c) *biological* (bacteria, viruses, parasites); d) *accidental* (hazard situations, speed, influence of alcohol, drugs), and; e) *psychological* (stress, shiftwork, pay, human relationships). Combined exposures can be special challenges in epidemiological analysis, particularly in situations when socio-economic and lifestyle factors interact with environmental factors mentioned above (2).

McMichael notes that environmental exposures can be classified as *natural or human-made* phenomena (1).

• *Natural* environmental influences include extremes of weather, locally circulating infectious agents, physical disasters, and local micronutrient deficiencies that reflect soil composition (1). For example, almost 20% of the world population lives on ancient, leached and mountainous soils which are deficient in iodine. This involves a higher risk of iodine deficiency disorders for people in these areas, such as goitre, cretinism, deafness, and neuromuscular disorders (8). Another example is related to El Nino phenomenon. This event occurs every 5-7 years and entails perturbation of climatic patterns that originate in natural oceanic-atmospheric fluctuations in the Eastern Pacific region. These changes lead to environmental disasters and disturbances which cause various physical, biological and other types of hazards to human health (9).

• *Human-made* environmental influences arise from disruption of the Earth's ecological and geophysical systems and processes. The disruption of systems such as climatic stability, food yields, the supply of clean and fresh water and the healthy functioning of biotically diverse natural ecosystems that recycle nutrients, can affect population health (1).

Types of global environmental changes

Global environmental changes entail disruptions of complex ecological and geophysical systems, and include global climate change, stratospheric ozone depletion, biodiversity loss and invasive species, and impairment of food-producing ecosystems.

There is evidence that global warming (increase in the average world temperature of approximately 2 to 3ºC over the 20th Century) has been due to emissions of greenhouse gases. The increasing proportion of carbon dioxide in the atmosphere also leads to an increase in the global temperature. This *climate change* has begun to alter many physical systems (glaciers, sea ice, rainfall patterns), and biotic processes (flowering time, bird nesting, insect hatching, crop-growing seasons). Additionally, acid rain is another important factor. All these changes implicate different health effects, which can be direct (changes in morbidity and mortality during thermal extremes), or indirect (alteration in the activity of vector-borne infectious diseases), immediate and delayed (10).

The *depletion of stratospheric ozone* is occurring due to human-made gases. The destruction of ozone layer in stratosphere has consequently increased ultraviolet ray flux and made excess in skin cancer incidence in many parts of the world (11).

The disruption of ecosystems causes extinguishing of many species of plants and animals. *Biodiversity* loss also means losses of a large number of natural chemicals and other important "natural goods". In the opposite, intensive food production, commerce and mobility made by humans, can urge ''*invasive spe-*

cies" for spreading into new non-natural environment. These processes change regional composition of species and consequently affect human health (9).

A special attention has been paid on the *impairment of food-producing ecosystems* as a potential adverse effect of global warming on agriculture. There is evidence that one-third of the world's previously productive land has been seriously damaged by erosion, compaction and salination which destroy its organic content. This means that many food-insecure regions (especially in Africa, or South Asia) are potentially threatened by malnutrition (12). The special problem in food-processing systems is the use of additives and genetic engineered products.

Some other *global environmental changes* can be caused by difficulties in fresh water supply, by changes of the cycle of major elements through biosphere (for example, nitrogen that has been converted from inert form to biologically active nitrate and ammonium ions) (1).

Health effects attributed to environmental exposure comprise a wide range of conditions which can be *acute* (for example, outbreaks of respiratory diseases brought about by air pollution or food-poisoning epidemics), or *long term* (for example, different types of cancer, or congenital anomalies). However, long term effects are often unknown (5, 7).

Keeping in mind all potential threats caused by global environmental changes, prompt action is required with the aim to reduce the use of fossil fuels, to stop deforestation and to protect environment (7).

Environmental health research

The primary task of environmental epidemiological research is to elucidate *causal relationships* between environmental exposures and impaired health status. The next steps include the quantification populations' risks, interventions to reduce environmental risks to health, and evaluation of the effectiveness of the interventions performed (1).

Epidemiology is the basic quantitative science of environmental health research. In light of complexity of this science, there is an emerging need for *interdisciplinary team work*. Frequently, investigation of some environmental health problems requires consideration of the results of epidemiological studies, experimental animal models, patho-physiological, toxicological and molecular studies. The development of molecular biological markers during the past several decades has made possible the measurement of internal exposure, especially in the field of carcinogenesis (1).

Specific characteristics of environmental epidemiological research

There are several specific characteristics of environmental epidemiological research: a) *Unit of exposures* are either large proportions, or all members of a community; this makes difficult the assessment of impact at individual-level; b) The *time-lag* between exposure and outcome, especially in relation to chronic diseases; the current health events can be primarily a consequence of earlier exposure; c) Some pollutants can affect individuals through *different routes*; this fact requires consideration of all ways in estimating the health risks associated with environmental exposure; d) There is e need for both, *spatial analysis and time trend analysis* in investigations about relationships in environmental epidemiology; e) Some agents can develop *specific effects in specific organs*, however the other ones can produce *generic organ system effects* by multiple exposures over time; f) Environmental Epidemiology is engaged in *research-policy interface* through a summarized range of published research findings, to derive dose-response relationships and to identify critical levels of exposure; these data can help governments in risk assessment methods, standards' prescription and environmental risk management (1, 15).

Exposure and dose concepts. The assessment of exposure is one of the essential steps in environmental epidemiology due to the quality of exposure measurement that determines the validity of the studies. *Instruments* for exposure assessment include: a) interviews, questionnaires, structured diaries; b) measurements in external environment either from existing records or through conducted epidemiologic investigation (e.g. levels of bio-products of chlorination measured in water at the supply reservoir); c) concentration in individuals and in the microenvironment (e.g. indoor carbon monoxide at home); d) individual doses (e.g. using personal air monitors); e) measurements of concentrations in human tissues or metabolic products (e.g. dymethylarsinic acid in urine after arsenic exposure); f) markers of physiologic effects (e.g. protein adducts induced by beta-naphthylamine in cigarette smoke) (15).

Exposure has two dimensions: *level (dose) and duration*. It is well known that many environmental factors affect health after a long period of exposure (especially, those which accumulate in the body or have cumulative effect). In these situations, the past exposure levels and duration of exposure are more important in comparison with the current exposure level. The total exposure level is often approximated as the product of exposure duration and the level (2).

Biological monitoring. Biologic *markers* (on cellular, biochemical or molecular level) provide clues on exposure in the past. They indicate target-tissue doses (15). Blood and urine are frequently used for biological monitoring, but other body fluids and tissues can also be used for the estimation of concentration of different chemicals (2).

Dose-effect relationships. Dose-effect relationship is defined as the relation between dose and severity of effect. Commonly, higher doses produce more severe or intense effects. Dose-effect relationships can be established for individuals or groups. Since all individuals do not react in the same way to a given exposure, there is a difference between individual and group levels. This relationship provides useful information for establishment of safety standards, for effects that can be prevented, as well as for planning of epidemiological studies (2).

Dose-response relationships. Response is defined as the proportion of exposed persons who develop a specific effect (2). The dose-response curve is used to assess the effect of exposure (to a chemical, toxic or other agents) upon an organism. The dose-response relationship can be modified by different factors (for example, age) (2, 5).

Risk assessment. There are several situations when risk assessment is crucial, for example when it is impossible to directly observe or measure risk (if the risk is too low, the population too small, or the exposure is combined), or in situations where the necessary latency period since exposure has not "maturated" (2, 15). Through risk assessment epidemiologists provide guidance to agencies and health policy makers. There are four steps in risk assessment: a) identification of hazards; b) assessment of exposure (Who has been exposed? Through what medium? For how long?); c) dose-response (observed response, predictive response at lower levels); d) risk characterization (likely health risk in the population examined) (15).

Environmentally-induced disorders

The assessment of contribution of environmental exposures as a cause of disorders and untimely deaths is very difficult due to: a) the incomplete knowledge about the aetiology of diseases; b) possibilities that environmental exposures affect not only the occurrence of diseases, but also clinical management and health outcomes, and; c) the fact that environmental exposures are often a moving target (1).

Depending on the source used, it is estimated that about 25% of the global burden of disease (GBD) and premature death (measured in DALY - disability adjusted life years) is caused by environmental hazards (1). According to recent analysis, environmental risk factors are responsible for 25-33% of the GBD (13). Murray and Lopez made estimations based on the published dose-response data for major exposure-disease relationships in all ages and concluded that around one-quarter of the GBD is due to "environmental exposures" (14).

There are three groups of events which can affect the environment on varying degrees, such as: a) events that are prolonged in time and are geographically widespread; b) events that are limited in geography but prolonged in time, c) events that are limited in time and geography (4).

Events prolonged in time and of widespread geography. This group comprises events which are consequences of air pollution, food pollution, ionizing radiation, lead exposure, electromagnetic fields, or microwave frequencies (mobile phones). This group of events is the most difficult to identify and control.

Events prolonged in time and of limited geography. This group includes events occurring after exposure to metals, industrial toxic waste, or nuclear power plants.

Events limited in time and geography. These events consist of industrial accidents, or technological disasters often caused by explosions or other catastrophes. They damage health seriously and can be consequences of mechanical, technical or human errors. The disaster may be acute, for example at Seveso (Italy, 1976) when a chemical explosion released highly toxic dioxins. In Bhopal (India, 1984), during an accident in a chemical factory, methyl-isocyanate was released which killed several thousand of people and several thousand more were blinded or permanently maimed. The explosion and meltdown at the Chernobyl nuclear power plant (Ukraine, 1986) caused about 30 immediate deaths, and many cases of severe exposure to ionizing radiation.

Surveillance for environmental hazards

Kenneth Rothman argues that *the ideal surveillance system* for environmentally-linked diseases should have the following *elements* (15):

- High-quality morbidity and mortality data;
- Updated population data;
- Precise information of exposures based on monitoring of air, water, soil, food, and other media;
- Geographic linkage of these three types of data sources;
- Possibility for observation of effects of localized exposures in small areas.

It is well accepted that a *good surveillance system for environmentally-linked disorders* bears several *benefits* such as: an early warning capability, appropriate information on long-term trends, ability to detect an unusual increasing of the incidence of diseases under surveillance, avoidance of public anxiety, as well as increasing public confidence in health and scientific authorities. On the other hand, such a surveillance system is very expensive. In this situation, surveillance models should be established in accordance to the needs and possibilities of each area.

EXERCISES

Teaching methods for working groups should include distribution of several published papers. In small groups, students should discuss environmentally-linked diseases and disorders, the possibilities of their identification and control, as well as designs of epidemiological studies which would be appropriate for the purposes mentioned (Exercises adapted from ref. 16, 17).

Task 1:

London smog. A dramatic example of acute effects of air pollution happened in London in December 1952 when the fog was responsible for the death of 3500-4000 people. Weather conditions can produce episodes of *severe smog* (smoke and fog) when warm, moist air loaded with pollutants is trapped below a layer of cold air. This combination produces acute, sub-acute and chronic lower respiratory tract diseases. This epidemic led directly to the passing of the Clean Air Act in 1956 and the establishment of smoke-control areas. The beneficial effect of these measures was evident in December 1962, when London experienced again fog and atmospheric conditions similar to those in 1952, but this time the excess number of deaths was only 700 (16).

Try to find the original description of this epidemic in the literature, read carefully and discuss the following questions:

1. What are the possible health effects under these conditions?

2. Explain the relationship between atmospheric pollution and respiratory diseases.

3. Are elderly more sensitive than people in other age categories? Why?

4. Identify challenges and possibilities for Environmental Epidemiology in your country for the following: weather conditions, air pollution, and hazard waste sites.

5. What is the role of epidemiologists in designing research studies for investigation and control of exposures to air pollutants?

Task 2:

Some effects of accident in nuclear power plant in Chernobyl (Ukraine, 1986). The Chernobyl accident was a major public health disaster that produced massive exposure to ionizing radiation. Radioactive materials, primarily iodine and cesium, were dispersed over the Eastern part of the former Soviet Union, Sweden, Austria, Switzerland, and parts of Germany and Northern Italy. It will

take some more years so as to observe the carcinogenic effects of the accident in geographic areas not only near the nuclear power plant but also in areas far away from Chernobyl. In Gomel region (Belarus), the number of thyroid cancer cases increased from 1-2 per year during 1986-1989 to 38 in 1991 (17).

Try to find published data regarding health effects of Chernobyl accident in the literature, read carefully and discuss the following questions:

1. What are the long-term effects of ionizing radiations?
2. Explain the role of ionizing radiation in carcinogenesis.
3. Other than cancer, what diseases can be caused by exposure to radiation?
4. How much radiation is required to produce adverse effects?
5. Are children more or less sensitive than adults? Why?
6. What should be the objectives of epidemiological investigations in this situation?
7. Describe and discuss potential study designs.
8. Specify the main hypothesis, the main outcome and the main exposure.

Task 3:

Case problem. A hypothetical community located near a large military base is suspected to have a toxic chemical agent present in the ground water. Propose a study design (cross-sectional, case-control, or cohort) to investigate the human impact of exposures to this chemical (5).

Task 4:

The distribution of topics for seminar papers. Each student should choose one of the suggested topics, find and read appropriate literature and write a paper. After consultations with the tutors, students should prepare a Power Point presentation. During this session the quality of the papers and presentations should be evaluated and discussed.

List of potential topics for seminar papers:

- The high temperature and mortality;
- The sick building syndrome;
- The Gulf War Syndrome;
- Acute effects of accident in nuclear power plant in Chernobyl (Ukraine, 1986);
- Exposure to pesticides in childhood.

Assessment of students (multiple-choice test):

1. Environmental factors that may affect health include the following items, *except one:*

a) noise

b) climate

c) dust

d) radiation

e) genes.

2. The global environmental changes include the following items, *except one:*

a) climate change

b) depletion of stratospheric ozone

c) impairment of food-producing ecosystems

d) spreading ‘’invasive’’ species

e) quality of data.

3. A good surveillance system produces the following benefits, *except one:*

a) ability to detect an unusual increase in the incidence of a disease

b) provision of appropriate information in the long-term

c) high expenses

d) avoidance of public anxiety

e) early warning capability.

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RECOMMENDED READINGS

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title:	**Air Pollution and Health Effects in Humans**
Module: 5.2	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Enver Roshi, MD, Ph.D.** Department of Public Health, Faculty of Medicine, Tirana, Albania **Genc Burazeri, MD, MPH** Department of Public Health, Faculty of Medicine, Tirana, Albania **Lidia Georgieva, MD, Ph.D.** Department of Preventive Medicine and Epidemiology, Faculty of Public Health, Medical University, Sofia, Bulgaria
Address for Correspondence	Enver Roshi Faculty of Medicine Rr. "Dibres", No.371 Tirana, Albania Tel: +355 4 262782 Fax: +355 4 257420 E-mail: e_roshi@yahoo.com
Keywords	Air quality, emission, environmental health, indoor pollution, outdoor pollution.
Learning objectives	At the end of the module, students should be able to: • Define the *outdoor* and *indoor* air pollution; • Identify the main air pollutants, their sources of emission, and their effects in human, animals and plants; and • Describe the air quality *standards* and *guidelines*.

Abstract	Air pollution is the result of emissions of hazardous substances at rates that exceed the capacity of natural processes in the atmosphere to alter, deposit, or dilute them. Air pollution is a global problem with negative effects on humans, animals, and plants. Air pollutants consist of *gases* and *particles* which are dissolved or suspended in air. The most common health effects of air pollution concern the respiratory system, the eyes, the cardiovascular system, and the central nervous system. Effective control of air pollution requires both, the identification and measurement of the most problematic pollutants, and reduction or prevention of their emission. An important precondition for a successful policy in the control of air pollution is the degree of authority that can be exerted by government agencies that hold this responsibility. Emissions' standards require periodic inspection and regular monitoring in order to be effective. Also, administrative mechanisms must be set up including trained inspectors capable to operate the complex equipment needed for monitoring the standards of air quality. Before 1990s, SEE countries did not engage in effective international policies to control air quality. After 1990s, the decline in industrial production brought a slight improvement in air quality, which was nevertheless canceled out by the increasing number of motor vehicles. Environmental policies in SEE are slow in controlling traffic-related air pollution. Consequently, respiratory diseases are a serious environmental health problem in these countries.
Teaching methods	*Introductory lectures*: • Overview of air pollution; • Main air pollutants: sources of emission, and effects in humans, animals and plants; • Standards and guidelines of air quality; *Case Studies*: • Air quality in SEE countries; • Standards and guidelines of air quality in SEE vis-à-vis EU countries; • Common health problems related to air pollution in SEE countries.
Specific recommendations for teachers	This module should be assigned 0.50 ECTS.
Assessment of Students	*Take-home assignment*: Case study – air quality monitoring in students' own countries.

AIR POLLUTION AND HEALTH EFFECTS IN HUMANS

Enver Roshi, Genc Burazeri, Lidia Georgieva

Overview of air pollution

Air pollution is the result of emission (into the air) of hazardous substances at a rate that exceeds the capacity of natural processes in the atmosphere to alter, deposit, or dilute them. Natural processes, such as rain or wind, play an important role in the vanishing and/or alteration of chemical substances discharged into the atmosphere (1).

The definition above relates to the chemical outdoor pollution. Microbiological pollution, on the other hand, is primarily an indoor problem.

Chemical air pollution is a global problem affecting virtually all countries, with negative effects on human health, animals, and plants (1).

Air pollution affects human health most obviously when compounds mount up to fairly high concentrations. Nevertheless, recent studies have shown that even low levels of exposure to fine particles lead to illnesses and deaths, particularly in susceptible population subgroups (2). Often, these effects are not visible and get obscured by other more proximate causes of illness and death. This poses a serious challenge for evidence-based advocacy and sound policymaking regarding air pollution matters. Beside direct effects on health, chemical air pollution affects visibility and the quality of life in general.

It must be noted that humans have caused air pollution ever since they learned how to use fire. Nonetheless, anthropogenic (manmade) air pollution has augmented hastily since industrialization began. Since then, common air pollutants, many volatile organic and inorganic compounds, as well as trace metals have been emitted into the atmosphere by daily human activities (3).

The amassing of chemical compounds in the atmosphere is affected, to a great extent, by land characteristics and atmospheric movements. Valleys, nearby mountain ranges, and the lack of open space (parks, forests, or bodies of water) strongly increase the severity of air pollution (1). These land features hold the air mass like a container and prevent dilution and mixing. Particularly problematic is a special atmospheric condition called *inversion*, where the temperature rises with increasing altitude rather than falling (which is normally the case) (4). The

worst episodes of air pollution usually occur when such temperature inversions stay in place for days with no possibility for winds to dilute or mix air pollutants (4).

Air pollutants consist of gases and particles which are dissolved or suspended in air. It must be pointed out that many air pollutants interact with each-other to generate their effects.

However, for a given geographical area, the composition of air pollution is not constant every day. Among other things, the severity of air pollution changes with season, daylight, industrial activity, traffic, prevailing winds, and precipitations (rain or snow). Yet, in all regions, air pollution tends to cycle, with average levels going up and down rather consistently depending on the season (1).

Health effects of outdoor air pollution

The most common health effects of outdoor air pollution concern the respiratory system (5). Common symptoms include cough (which may produce sputum), nose and throat irritation, and mild shortness of breath. The respiratory symptoms are often associated with eye irritation and a sense of fatigue. Particularly remarkable are the effects on susceptible subjects, such as allergic or hypersensitive individuals (6). E.g. asthmatic and patients with chronic obstructive pulmonary disease often experience worsening of their symptoms during air pollution episodes. Furthermore, recent studies suggest a close link between frequency and severity of asthma attacks and atmospheric levels of pollution (7). Subjects with bronchitis may also experience more coughing due to an increased irritation of the bronchial mucosa. Also, acute upper and lower respiratory infections appear to occur more frequently in residents of areas with higher pollution levels.

To a lesser degree, air pollutants affect directly the cardiovascular system, primarily through the hemoglobin-binding effect of carbon monoxide, which reduces oxygen delivery to the myocardium and aggravates the process of atherosclerosis. These effects are particularly notable among subjects with existing heart disease (6-7).

It must be noted that, respiratory effects of air pollution in subjects who suffer from chronic bronchitis may place an additional strain on the heart as well. From this point of view, air pollution is associated with increased risk of death from heart diseases and lung disease, even at levels below those known to be acutely toxic to the lungs or heart (6). The mechanism involved is believed to be the following: the compromise in lung function places an additional burden on the heart, which cannot tolerate. Also, the stimulation of nerve reflexes connecting the heart and the lung may cause additional problems in subjects with heart disease.

High levels of air pollution cause mucosal irritation such as acute or chronic bronchitis, or conjunctivitis (8). Eye irritation is particularly severe when there

are high levels of particulates or high levels of photochemical oxidants (particularly, aldehydes) (8).

The link between cancer and the organic components of air pollution has always been a concern, but an association has not been definitely confirmed. Thus, there is little evidence to suggest that community air pollution is a significant cause of cancer, except in unusual and extreme cases (1). However, several notorious examples of cancer associated with community air pollution include point-source emissions from inadequately controlled smelters that release arsenic, which can cause cancer (1). There are also important examples of indoor air pollution in homes (radon) and workplaces (asbestos) that are linked to lung cancer. Nonetheless, it must be pointed out that cigarette smoking is more carcinogenic than arsenic, radon, or asbestos in the air, and interacts with these pollutants in a multiplicative scale.

Effects on central nervous system may result from accumulated body burdens of lead. These effects are usually associated with learning disabilities in schoolchildren (9).

There are several documented occurrences in which severe mortality from many causes is associated with short-term exposure to fine particles. Hence, air pollution has been associated in several severe episodes of high mortality, usually among persons with pulmonary or cardiovascular disorders (6-7).

Table 1 summarizes some common health conditions related to outdoor air pollution (1):

Table 1. Common diseases related to air pollution

Disease	Description
Acute bronchitis	Direct irritative effect of dust, sulfur dioxide, and petrochemical agents. Cigarette smoking has a significant synergic effect.
Acute respiratory infections	Particularly problematic for children and the very olds. Poverty, malnutrition and exposure to infectious agents are some fertile conditions for installation of acute respiratory infections in vulnerable population subgroups.
Chronic bronchitis	Air pollutants increase both the frequency and the severity of cough and/or sputum. Cigarette smoking plays a significant role as well.

Disease	Description
Asthma	Air pollutants provoke asthmatic crisis possibly on a reflex basis in subjects prone to respiratory allergy or hypersensitivity.
Headache	Especially relevant for carbon monoxide which has a strong hemoglobin-binding capacity.
Toxicity	Remarkable toxic effects of lead are well-documented.
Irritation	Susceptible subjects suffer different forms of skin irritation, and eye irritation.
Cancer	Virtually all air pollutants bear an inherent carcinogenic effect, though the evidence is scarce, and mechanisms involved need further and more robust investigation.

Environmental respiratory health in Eastern Europe

A few epidemiological studies carried out in Eastern Europe have documented an association between air pollution and adverse health effects in the respiratory tract (10). Short-term exposure to ambient air pollution in East Europe has been related to an increase in mortality and hospital admissions for diseases of respiratory tract (11). On the other hand, effects of long-term exposure in these countries are reported to be implicated in the rising trends of lower respiratory tract diseases, such as asthma and bronchitis, in both children and adults (12). Recent evidence indicates that the prevalence of allergic sensitization in Eastern European countries is higher in urban than in rural areas (11-12); however, it is not clear to what extent ambient air pollution has contributed to this difference. It is difficult to estimate the toll of adverse health effects caused by air pollution in these countries because of insufficient data on exposure (10). However, it is evident that significant positive effects would occur if air pollution concentrations in this region were reduced along with the WHO guidelines.

Air pollution and bronchial asthma in former communist countries

The role air pollution plays in asthma in Eastern Europe remains an open question. Asthmatic patients have been found to increase their bronchodilator use in association with air pollution. Cross-sectional studies showed the prevalence of respiratory symptoms to be elevated in the more highly polluted East German cities, such as Leipzig (13) and Erfurt (14) compared with less polluted cities in West Germany, such as Munich and Hamburg. Air pollution has not

been shown to be of primary importance in affecting the prevalence of asthma in these studies. Similar results have been found comparing an urban region in Poland with rural and urban regions in Sweden (15). These findings indicated that air pollution was not a primary risk factor for the development of asthma. Additional studies should be conducted to understand the acute and chronic effects of air pollution in Eastern Europe.

Air pollution and allergy in Eastern Europe

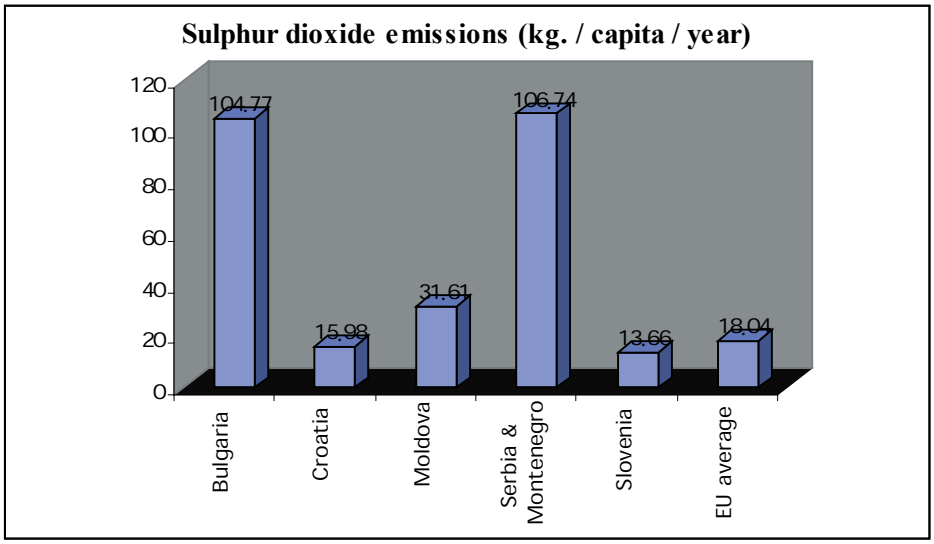
Epidemiological studies have found a recent increase in the prevalence of allergic diseases, in Eastern European countries, along the same lines with the industrialized countries (11-12). A change in environmental factors may be considered as one of the causes of this increase (10). It has been reported that the prevalence of allergic diseases is higher in polluted areas than in unpolluted ones (16). Some studies have focused on the effect of one air pollutant, suspended particulate matter (SPM), on allergic responses. It has been shown that SPM has an enhancing effect on the IgE antibody production in mice (16). In many Eastern Europe countries the number of cars with diesel engines has increased rapidly, and it has been pointed out that the percentage of SPM in large cities consisting of diesel exhaust particulates (DEP) is increasing (10). It has been demonstrated that DEP had an adjuvant effect on the IgE antibody production in mice when administered intra-peritoneally or intra-nasally (16). In humans, it has been shown that nasal challenge with DEP enhanced total IgE and specific IgE production in nasal lavages. Furthermore, it has been demonstrated that DEP had an enhancing effect on Th2-type cytokine synthesis in both mice and humans. It cannot be excluded that DEP may be related to the increase in prevalence of allergic diseases through the effect on the IgE antibody production and Th2-cytokine synthesis (16).

Emission rates of sulfur dioxide in countries of Eastern Europe

Sulfur dioxide has been a serious problem in air pollution since the earliest days of industrialization. It was one of the major components of the so-called London fog, which had serious health effects (4). The main effect of sulfur dioxide is broncho-constriction which is dose-dependent (2). Persons with asthma are particularly susceptible and suffer more the effects of sulfur dioxide than does the general public (2).

Graph 1 provides the emission rates of sulfur dioxide by selected Eastern European countries (for which data were available) in year 2000:

Graph 1. Sulfur dioxide emissions by selected Eastern European countries in 2000



Source: WHO – HFA, 2004

As indicated in the graph above, rates of sulfur dioxide emissions in 2000 were particularly high in Bulgaria and Serbia and Montenegro (about 105 kg/capita), as opposed to Croatia and Slovenia with emission rates comparable with the European Europe average (which was about 18 kg/capita).

Air quality standards and guidelines

Industrial and urban air pollution is a rather complicated issue and requires the implementation of a whole array of administrative mechanisms. Effective control of indoor air pollution requires both, the identification and measurement of the most problematic pollutants, and reduction or prevention of their emission. To improve the air quality in a community, it is necessary to control all the potential sources of emission.

To set targets for the control of air pollution, it is necessary to set *standards* and *guidelines*. *Standard* implies a set of laws or regulations that limit permissible emissions or that do not allow degradation of air quality beyond a certain limit (1). Standards are defined as: a) *concentration standards* (*air quality standards*) which are levels of certain pollutants that are not allowed (by the responsible jurisdiction) to be exceeded, or b) *emission standards*, which set the amount of pollution that is acceptable to be discharged from a given source.

Guideline implies a set of recommended levels which allow comparison of air quality between regions and/or within regions over time (1). Guidelines are usually defined for concentration levels only (air quality).

Table 2 provides the air quality guidelines for Europe recommended by WHO for classical air pollutants:

Table 2. WHO air quality guidelines for Europe

Compound	Guideline value		Averaging time
Carbon monoxide	100 mg/m^3	90 ppm	15 min.
	60 mg/m^3	50 ppm	30 min.
	30 mg/m^3	25 ppm	1 h
	10 mg/m^3	10 ppm	8 h
Lead	0.5 µg/m^3	n.a.	1 year
Ozone	120 µg/m^3	0.06 ppm	8 h
Particulate matter	n.a.	n.a.	n.a.
Nitrogen dioxide	200 µg/m^3	0.11 ppm	1 h
	40 µg/m^3	0.021 ppm	Annual
Sulfur dioxide	500 µg/m^3	0.175 ppm	10 min.
	125 µg/m^3	0.044 ppm	24 h
	50 µg/m^3	0.017 ppm	Annual

Note: no guidelines were set for particulate matter because there is no evident threshold for effects on morbidity and mortality.

(Source: WHO, 1999)

Control of air pollution

The key issue in the control of air pollution is the control of emissions at each source. From this point of view, the most important prerequisite for a successful policy in the control of air pollution is the degree of authority that can be exerted by government agencies that hold this responsibility (*liability*).

Emissions standards (regulations about the amount of pollution that is allowed to be discharged from a given source) require periodic inspection and regular monitoring in order to be effective.

To effectively manage air quality in urban areas, administrative mechanisms must be set up including trained inspectors and technical staff capable to operate the complex equipment needed for monitoring the standards of air quality.

Due to growing public concern, many countries initiated air quality monitoring in the 1960s. In 1973, WHO set up a global program to assist countries in monitoring air quality (17). However, before 1990s countries of Eastern Europe, whose economies where mostly based on the principle of "self-reliance", did not engage in effective international policies to control air quality. After 1990s, the decline in industrial production brought a slight improvement in air quality (10). Nonetheless, the intensity of vehicular traffic has practically nullified this improvement. Furthermore, the increasing number of motor vehicles is coupled with the use of leaded petrol and a lack of catalytic converters (18). Regrettably, environmental policies in East Europe are slow in controlling traffic-related air pollution. As the economies in these countries try to develop rapidly, resources are rarely invested in air quality control. For this reason, many experts consider respiratory damage as the most serious environmental health problem in countries of Eastern Europe (11).

Indoor air pollution

Indoor air pollution has been identified as a global environmental problem (19). Indoor pollution probably exposes more people worldwide than outdoor pollution (19). The most important sources which contribute to a substantial discharge of indoor pollutants include the smoky fuels which are used for cooking and heating. Furthermore, smoking is another important contributor which interacts in a multiplicative scale with other indoor pollutants (1, 19). This is particularly the case of many countries of South East Europe, where smoking rates are increasing rapidly. Beside tobacco smoke, the most important indoor pollutants include radon decay products, formaldehyde, asbestos fibers, combustion products (such as NO_x, SO_x, CO, CO_2, and polycyclic aromatic hydrocarbons), as well as other chemicals used in households (1, 19).

Indoor air pollution contributes to acute respiratory infections in young children, exacerbation of asthma, and chronic lung disease and lung cancer in adults (1, 19).

EXERCISES

Task 1: Students are required to describe the situation of air quality in their own countries, with a particular focus on the main air pollutants, their sources of emission, and the current evidence of their effects on human health.

Task 2: Control measures of air quality are employed at three levels: at the source of emission, along the path, and at the level of the person. Students are required to describe the control measures at each level which are used in their own countries to improve air quality.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Disposal and Recycling of Industrial Waste**
Module: 5.3	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Gorica Sbutega-Milošević, MD, PhD** Professor Institute of Hygiene and Medical Ecology, School of Medicine, University of Belgrade, Serbia & Montenegro **Jelena Ilić, MD** Postgraduate student Institute of Hygiene and Medical Ecology, School of Medicine, University of Belgrade, Serbia & Montenegro
Address for correspondence	Gorica Sbutega-Milošević Institute of Hygiene and Medical Ecology Pasterova 2 Belgrade Serbia and Montenegro Tel: +381 11 2432 833 Fax: +381 11 3612762 E-mail: sbutege@drenik.net
Keywords	Industrial waste, waste disposal, recycling, surveillance, hazardous wastes
Learning objectives	After completing this module students and public health professionals should (for example): • Define the industrial waste; • Recognise the types of waste; • Understand methods of safe disposal; • Aware of importance of recycling; and • Improve knowledge in prevention of safety disposal and recycling

Abstract	The disposal of garbage in the world is a problem that continues to grow with the development of industrialized nations and the growth of population. Commercial and industrial wastes are wastes generated by industry that pose low hazard to the environment. They arise from commercial, industrial or trade activities and include construction and demolition wastes. There are many different methods of disposing of waste like: landfill, incinerators, deep wells, composting. All material collected for recycling is transported to a site to be processed and made into new product. It takes time, energy, labour, and money to make new products from recycled ones. The best method of reducing waste disposals negative effect on society is simply to prevent its generation. If the consumers of our country were to make a firm stand against the production of useless waste and the furtherance of recycled products, the producers would have no choice but to conform to our wishes.
Teaching methods	The introduction lecture relating to basic definitions and concepts; The guided discussion in small groups; Exercises with assistant on field (deponija); The distribution of topics for seminar papers to each student; The presentation and evaluation of seminar papers.
Specific recommendations for teachers	0,5 ECTS or 15 working hours: 40% work under teacher supervision; 60% individual students' work. Facilities, equipment: laptop, over-projector, Internet access. Training materials: handouts, textbooks, papers.
Assessment of students	Multiple choice questionnaire (MCQ) and seminar paper.

DISPOSAL AND RECYCLING OF INDUSTRIAL WASTE

Gorica Sbutega-Milošević

Introduction

The disposal of garbage in the world is a problem that continues to grow with the development of industrialized nations and the growth of population. Since the beginning of time people have needed to find a way of disposing of their trash. In 18th century England and France, carters were paid by individuals to carry trash and discard it on the outskirts of town. Disposal in open pits became routine and Benjamin Franklin initiated the first municipal cleaning program in Philadelphia in 1757. Since then we have come a long way and have developed types of waste that cannot simply be dumped into a hole.

Americans generate almost 208 million tons of solid waste each year. By the year 2000, that number is expected to increase 20%. Today, each one of us generates about 4.3 pounds of waste per day. Although many different methods of disposing of garbage have come up, there is really no absolutely safe way to do the job.

Now that illegal waste disposal problem such as illegal dumping is becoming more and more serious, achievement of appropriate disposal is beyond the reach of a single local government.

As our social economic activities become mere and more characterized by mass-production, mass-consumption and mass-disposal, the increased volume and diversification of wastes being disposed of raised the nation's concern about the burden they exert on the environment and the environmental pollution relating to landfill wastes.

In the past, profit was the only measure of success for a company. Although profit is still one of the most important measures of company success, there are other important factors that companies must consider when measuring success. Companies must now look beyond the walls of their company to the world and realize their position in the world and the effect they have on it, especially how they handle the waste they produce as a by-product of their manufacturing process. Companies also must spend resources on technological innovations so the company can continue to be successful in the future. In Industrial Waste, the players

are the owners/managers of companies that are competing in this new world where profit, innovation, and environment must be balanced to be considered successful.

What is waste?

Waste is something that is left over or that it is no longer needed. Waste can cause pollution and impact upon our environment if not properly managed. Disposing of waste that cannot be otherwise avoided, reused or recycled also represents a waste of resources, a lost opportunity and is a waste of money (1).

EPA works in partnership with all levels of government, industry and the community to facilitate sustainable solutions for waste management.

All industries, businesses and consumers generate waste. A baby wearing disposable nappies, manufacturing of a motor car, a child throwing away the packaging from a muesli bar, demolishing a building and using plastic supermarket shopping bags are all examples of activities that generate waste.

Waste is defined by the Environment Protection Act 1970 as any matter prescribed to be waste and any matter, whether liquid, solid, gaseous, or radioactive, which is discharged, emitted, or deposited in the environment in such volume or manner as to cause an alteration of the environment (2).

Types of waste

Waste can be divided into many different types. The most common methods of classification is by their *physical, chemical* and *biological* characteristics. One important classification is by their *consistency. Solid* wastes are waste materials that contain less than 70% water. This class includes such materials as household garbage, some industrial wastes, some mining wastes, and oilfield wastes such as drill cuttings. *Liquid* wastes are usually wastewater's that contain less than 1% solids. Such wastes may contain high concentrations of dissolved salts and metals. *Sludge* is a class of waste between liquid and solid. They usually contain between 3% and 25% solids, while the rest of the material is water dissolved materials (3).

Federal regulations classify wastes into three different categories. *Non-hazardous* are those that pose no immediate threat to human health and the environment. Household garbage is included into this category. *Hazardous* wastes are of two types: those that have common hazardous properties such as ignitability or reactivity and those that contain liquid toxic components. The last type of waste is entitled *Special Wastes* and is very specific in nature. They are regulated with specific guidelines. Some examples would be radioactive wastes and medical wastes (4).

EPA is responsible for the development and implementation of Victoria's statutory framework for waste. The framework provides for a range of solid wastes, such as municipal (household) wastes, commercial and industrial wastes, and prescribed wastes.

Municipal wastes are generated from household or local council sources. Municipal wastes are typically collected by local councils through kerbside collections, where some of the waste is recycled and some disposed of to landfill.

Commercial and industrial wastes are wastes generated by industry that pose low hazard to the environment. They arise from commercial, industrial or trade activities and include construction and demolition wastes. It consists of variety of non-hazardous materials that result from the production of the goods and products that make all of our lives easier (5).

Prescribed wastes include hazardous wastes, and wastes that can effect amenity (e.g. odour). Prescribed wastes are listed in the Environment Protection (Prescribed Waste) Regulations. The majority of these wastes are from industrial sources and are referred to as Prescribed Industrial Wastes.

What are we doing about waste?

Resource efficiency is a principle element to waste management in Victoria, embodied by the waste hierarchy. The Environment Protection Act 1970 establishes the waste hierarchy for Victoria and provides a list of management options in order of preference:

Avoidance	Treatment
Re-use	Containment
Recycling	Disposal (2)
Recovery of energy	

Methods of disposal

There are many different methods of disposing of waste. *Landfill* is the most common and probably accounts for more than 90 percent of the nation's municipal refuse even though Landfills have been proven contaminates of drinking water in certain areas. It is the most cost affective method of disposal, with collection and transportation accounting for 75 percent of the total cost. In a modern landfill, refuse is spread thin, compacted layers covered by a layer of clean earth. Pollution of surface water and groundwater is minimized by lining and contouring the fill, compacting and planting the uppermost cover layer, diverting drainage, and selecting proper soil in sites not subject to flooding or high groundwater levels. The best soil for a landfill is clay because clay is less permeable than other

types of soil. Materials disposed of in a landfill can be further secured from leakage by solidifying them in materials such as cement, fly ash from power plants, asphalt, or organic polymers.

Existing public solid waste disposal facilities such as landfill sites or sewage lagoons must be specifically zoned for their use. Land filling of hazardous wastes shall be carried out at cities that are isolated from public waters and groundwater. Measures shall be taken to prevent offensive odours from leaking out of the landfill sites and to prevent breeding of rats, mosquitoes and other vermin (6).

Refuse is also burned in *incinerators***.** That is the destruction of wastes by fire, which is most acceptable way. It is more expensive but a safer method of disposal than landfills. Modern incinerators are designed to destroy at least 99.9% of the organic waste material they handle. Numerous thermal processes recover energy from solid waste. Companies burn in-plant wastes in conventional incinerators to produce steam. Pyrolysis, a process of chemical decomposition, produces a variety of gases and inert ash. Garbage burned in incinerators has poisoned air, soil, and water. Communities near incinerators have objected to them because of fears about possible emissions (7).

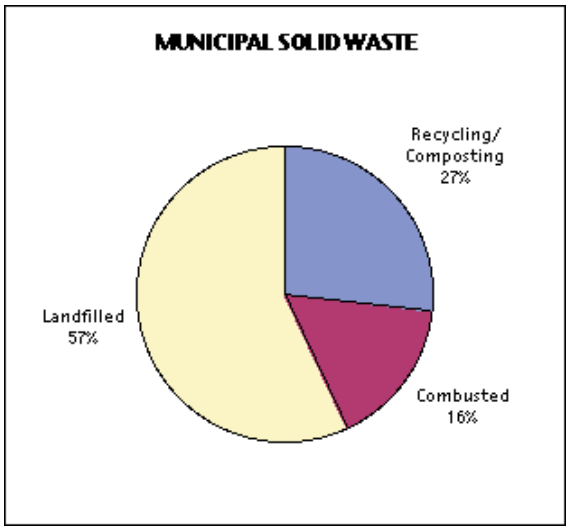
Yet another method is the pumping of hazardous wastes into *deep wells*. There is a strong opposition to this method because of the apparent explosions and even earthquakes that have resulted from waste injection techniques.

Organic materials that have little or no heavy metals can be *detoxified biologically. Composting* and land farming, in which materials are spread out over a large land area so that microbes can decompose them, are examples of biological treatment of hazardous waste. If the materials are not detoxified before they percolate into groundwater than obvious repercussions may occur. The practice of recycling solid waste is an old one. Metal implements were melted down and recast in prehistoric times. Today, recyclable materials are recovered from municipal refuse by a number of methods, including shredding, magnetic separation of metals, screening, and washing. Composting includes preparing refuse and breakdown of organic matter by aerobic micro organisms. Increasingly, municipalities and private refuse collection organizations are requiring those who generate solid waste to keep recyclable items separate from other waste.

Hazardous wastes pose a danger to humans or other living organisms. Management of radioactive and other hazardous wastes is subject to federal and state regulation. No satisfactory method has yet been demonstrated for disposing permanently of radioactive wastes.

The EPA

The Environmental Protection Agency (EPA) is a government agency established to enforce the proper disposal of wastes and conduct research in related areas. They reported that 208 million tons of municipal solid waste was generated in the United States. Of the municipal solid waste generated, 56 million tons (27 percent) were recovered by recycling or composting, 33.5 million tons (16 percent) were combusted at high temperatures, and 118.5 million tons (57 percent) were land filled.



Recycling

All material collected for recycling is transported to a site to be processed and made into new product. It takes time, energy, labour, and money to make new products from recycled ones. Right now it's often easier or cheaper for manufacturers to use virgin rather than recycled materials to make things. For recycling to be worthwhile, manufacturers need the technology to make new products from recycled materials, high quality recovered materials that meet manufacturers' specifications, a steady supply of recovered materials, affordable materials, and customers to buy products that contain recycled materials. Separating glass jars, aluminium cans, and newspapers and setting them by the curb or taking them to a recycling centre is only part of the recycling process. To complete the recycling loop, those cans, papers, and bottles must be remade into new products that you buy and use.

What are the commonly recycled materials?

Plastic

With a little bit of care much plastic can be recycled, and collection of plastics for recycling is increasing rapidly. Plastic recycling faces one huge problem: plastic types must not be mixed for recycling, yet it is impossible to tell one type from another by sight or touch. Even a small amount of the wrong type of plastic can ruin the melt (plastic containers like milk, soap, juice, fresh pasta, water, etc. and grocery sacks, produce bags, and other packaging).

Glass, Steel, Aluminium Cans and Foil

Glass, steel (or "tin") and aluminium are easy to recognize and recycle. For clarity, a recycling symbol should be present, but most people have little trouble sorting these materials. Glass bottles must not be mixed with other types of glass such as windows, light bulbs, mirrors, glass tableware, Pyrex or auto glass. Ceramics contaminate glass and are difficult to sort out. Clear glass is the most valuable. Mixed colour glass is near worthless, and broken glass is hard to sort.

Paper

Most types of paper can be recycled. Newspapers have been recycled profitably for decades, and recycling of other paper is growing. Virgin paper pulp prices have soared in recent years prompting construction of more plants capable of using waste paper. They key to recycling is collecting large quantities of clean, well-sorted, uncontaminated and dry paper.

Old refrigerators, Heat Pumps & Air Conditioners

Older refrigeration equipment contains Freon, a chemical know as a Chlorinated Fluorocarbon or "CFC" for short. Each molecule of a CFC can destroy over 100,000 molecules of the earth's protective ozone coating, leading to increased risk of sunburn, cataracts and skin cancer for the entire population of the planet (human AND animal). If you are throwing away an old refrigerator, heat pump or air conditioner please be sure the CFC's are drained out and recycled first.

Rechargeable Batteries (other than car batteries)

Rechargeable batteries are commonly used in portable telephones, computers, power tools, shavers, electric toothbrushes, radios, video tape recorders and other consumer products. There are a variety of different battery types, some of which contain quite toxic materials.

Motor Oil, Tires and Car Batteries

All three of these products are big environmental problems, but all three are easily recycled.

Computer Printers

Most printer cartridges are easily recycled, refilled or re-built. But printer vendors sell the printer cheap, and make their real money selling supplies. They don't want you be environmental.

The "right" environmental solution is to sell new cartridges with a postage paid mailer for returning the old one. Some forward-thinking companies, such as Hewlett-Packard, have been known to do this, especially for laser printers.

Household toxics

Individuals tend to be very sloppy when it comes to handling toxic materials in the home. Individuals often handle toxic chemicals in ways businesses would be fined for. The heaviest application of agricultural chemicals in the USA comes not from agribusiness, but rather from home gardeners. Indoor air pollution from household products is often found to exceed allowable federal outdoor quality rules.

Items such as poisons, paints, oil, solvents, automotive fluids, cleaners, herbicides and many others must not be dumped into the regular garbage. Water seeps through landfills and toxics end up in the water table. In areas that burn garbage, your toxics may end up in the air you breathe. The best thing to do is use what you buy, buy only what you need.

If you have accumulated toxics, check with your Garbage Company or local recycling agency - almost all areas have **household toxics drop-off days** or locations.

Good to recycle	Bad to recycle
Unbroken glass containers. Clear is the most valuable. Lids can go with metal.	Ceramics, pyrex, tableware, windows, light bulbs, mirrors. Broken glass is hard to sort.
Clean dry newspapers	Rubber bands, plastic bags, product samples, water, dirt, mould or other contamination.
Empty metal cans, caps, lids, bands and foil	Full cans, spray cans unless instructed, cans with paint or hazardous waste.
Plastic stamped #1 or #2 on the bottom Some areas only accept clear plastic or certain shapes.	Plastic types #3, #4, #5, #6 or especially #7. Caps are usually a *different* type from the bottle - toss if unmarked.
Mixed paper: junk mail, magazines, photocopies., computer printouts	Stickers, napkins, tissues, waxed paper, milk cartons, carbon paper, laminated paper (fast food wraps, some food bags, drink boxes, foil), neon paper, thermal fax paper. Any wet or food stained paper.
Scrap aluminium such as lawn chairs, window frames and pots	Metal parts attracted to magnets. Non-metal parts (8).

The best method of reducing waste disposals negative effect on society is simply to prevent its generation. If the consumers of our country were to make a firm stand against the production of useless waste and the furtherance of recycled products, the producers would have no choice but to conform to our wishes. If it means a price increase, so what? Any price increase we pay now will be worth the extra healthy years we will be able to inhabit this planet; it will be worth it for our children and their children. In a capitalistic society where politicians see no further than their next election and everything that's produced is for a profit, we are almost surely doomed to make decisions that will hurt us in the future. It is obvious we have to be our own leaders in the battle versus waste disposal, because we are the only ones who care about our future on this earth.

EXERCISES

Task 1: Students are required to describe the situation in their own countries (towns) about industrial waste disposal and to propose the preventive measures for healthy environment.

Task 2: Students are required to describe the situation in their own countries (towns) about recycling of waste materials.

Task 3: The distribution of topics for seminar papers. Each student should choose one of the suggested topics, find and read appropriate paper. After consultations with tutor and corrections, if any, students should prepare Power Point presentation for final discussion. During this session the quality of the paper and presentation will be evaluated and discussed.

- List of potential topics for seminar papers:
- Commercial and industrial wastes.
- Industrial waste – the best way for disposal.
- Industrial waste, environmental pollution - preventive measures.
- Recycling of metal cans and glass bottles.
- Recycling of mixed papers and plastic materials.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Case study: Lead Pollution in a Municipality of Veles and Early Health Effects in School Children**
Module: 5.4	**ECTS (suggested): 0.25**
Author(s), degrees, institution(s)	**Mihail Kochubovski, MD, PhD, Assoc. prof.** Specialist of hygiene and environmental health Republic Institute for Health Protection Republic of Macedonia
Address for correspondence	Mihail Kochubovski Republic Institute for Health Protection 50 Divizija 6, 1000 Skopje Republic of Macedonia Tel: +389 2 3125 044 ext.119 Fax: +389 2 3223 354 E-mail: kocubov58@yahoo.com
Keywords:	Attention deficit disorder, cognitive abilities, environmental risk assessment, lead, pollution, psycho-physiological assessment, schoolchildren.
Learning objectives	After completing this module, students and public health professionals should have an increased knowledge and understanding of: • Environmental impact of lead pollution; • Methods for assessing the lead-related health impact on vulnerable population subgroups; • Lead distribution in the environment; and • Systematic literature review.

Abstract	This module gives a short overview on a case-study based on the relationship between lead-polluted environments and early health effects. Lead Smelter Plant was built in Veles in 1973. Ever since, evaluations of environmental health impact from the emission of pollutants from the stationary source have been conducted (Lead Smelter Plant is located in the North of the city, 200-300 m. away from the nearest households). According to the wind rose, North wind is dominant and dispersion of pollutants goes directly to the city. Environmental measuring (in 2001-2002) of lead and blood-lead levels in children at age of 10 years living in Veles with a stationary source of lead is compared with those living in village Ivankovci without a stationary source of lead. Blood-lead levels in children living in clean areas in the village Ivankovci (with lead concentration in uncultivated soil of 36.32 mg/kg - 36% of MAC) were registered in the range ξ= 18.2 μg/dl, ± 7.935. Lead levels at 5 cm. depth of uncultivated soil close to the stationary source of lead were higher compared to the control area (191 mg/kg, almost 2 fold above MAC), as well the average blood-lead level: ξ= 37.27 μg/dl, ± 11.56 ($p < 0.05$). Similar dependence was for the ratio of lead levels in cultivated soil and blood-lead levels of the examinees. Thus, there is a possible relation between lead levels in the soil and blood-lead levels in the exposed children. Also, there was a low inverse correlation between the blood-lead levels in the examinees and the distance from the Lead Smelter Plant in meters ($r = -0.15$; $p < 0.05$). The evidence suggests a high exposure risk from the Lead Smelter Plant. The autonomous nervous system of children appeared to function normally, reacting adequately in stress situations. However, the EEG results showed that only in two children the theta/beta ratio was normal, in two other children there were pathological ADHD findings correlated with high blood-lead levels (> 20 μg/dl), while in the other 27 children there was evidence for a moderate attention deficit.
Teaching methods	After an introductory lecture, students should work in small groups, in order to discuss efficiency as a prerequisite for an appropriate environmental health impact assessment regarding the lead pollution and health of school children. Basic skills like health risk estimation and assessment have to be enhanced. To do so, several statistical exercises have to be conducted. Students should be introduced some techniques of computer modelling. Also, students should be trained to review the relevant literature on this field.
Specific recommendations for teachers	Stress the importance of specific skills that public health expert need to posses in order to be able to assess the environmental health impact. The topic allows a good combination of theoretical knowledge with practical skills.
Assessment of students	Multiple-choice questionnaire and a written report.

CASE STUDY: LEAD POLLUTION IN A MUNICIPALITY OF VELES AND EARLY HEALTH EFFECTS IN SCHOOL CHILDREN

Mihail Kochubovski

Introduction

Health Impact Assessment is a thoroughly inter-sector activity since it focuses on the so-called determinants of health. It includes housing, agriculture and food production, education, work-environment, air pollution, water and sanitation, noise, ionizing and non-ionizing radiation.

A widely used definition describes health impact assessment (HIA) as "Any combination of procedures or methods by which a proposed policy or program may be judged as to the effects it may have on the health of a population" (1).

There are three ways in which HIA might influence the decision making process:

- Raising awareness among decision makers;
- Helping decision makers identify and assess possible health consequences;
- Helping those affected to contribute in decision making.

Lead is a cumulative common poison, and a cause of adverse health effects in vulnerable groups of populations - pregnant women, foetuses, infant and children up to 6 years, and other groups. Lead toxicity can be explained to a certain level by its interaction with several enzyme systems: lead is deactivating these enzymes by connecting to SH-groups, or by exchange of other essential metal ions. Almost all organs and systems can be potential targets, primarily for anaemia and adverse effects to the central nervous system, kidneys, reproductive and immune system, as well cardiovascular, liver, endocrine and gastro-intestine effects. Under low levels and long-term exposure, as it is for urban populations, most critical effects are those on blood and nervous system.

In children, lead causes adverse effects on nervous system by slowing the nervous conductivity, behavioural changes, as well weak slope of cognitive function, to mental retardation (80 μg/dl), acute encephalopathy and death (80-100 μg/dl). Encephalopathy and the other effects on nervous system are developing more under lower blood lead level in children than in adults. There is evidence

that cognitive capability can be also influenced under levels <15 μg/dl (2).

Lead appears naturally in earth crust with average concentration of 13 mg/kg and it is mostly present in heavy metals. Most commonly, lead is present in galenite (lead sulfide). Lead in the environment exists, almost completely, as inorganic lead (3).

Material and methods

In this case-study it has been investigated the content of lead in the soil in a polluted and a control area, particularly to cultivated and uncultivated soil (on 5 and 20 cm. depth), as well as the blood-lead level in a representative sample of 234 schoolchildren of 9-10 years age, during a prospective environmental study from January 2001 - January 2002. The investigated group of children from the community of Veles consisted of the Primary School "Vasil Glavinov" – a polluted central area of the city near to the Lead Smelter Plant (1 km. distance) and the Primary School "Stojan Burcevski - Buridan" in the village of Ivankovci – a control, non-polluted area (14.27 km. Northeast from Veles). Lead in the soil has been analyzed by AAS (Atomic Absorption Spectrometer) with graphite furnace, type PERKIN ELMER 4100, HGA 700 with Auto sampler AS-70.

Lead in PM from the ambient air in municipality of Veles, and the village Ivankovci (one year monitoring/every day measurement by High Volume Sampler) has been analyzed by AAS with graphite furnace, type PERKIN ELMER 4100, HGA 700 with Auto sampler AS-70.

For the health impact assessment of lead it was investigated a representative sample of schoolchildren from Veles - polluted area, and a control group - unpolluted area, by analyzing blood-lead level, by taking venous blood-2 ml in sterile vacutainers with 1,5 mg K_2EDTA/ml blood, stored and transported during the same day, in portable refrigerator at $+4^0$C and analyzing of lead by AAS (Atomic Absorption Spectrometer) with graphite furnace, type PERKIN ELMER 4100, HGA 700 with Auto sampler AS-70. Samples have been mineralized in mixture of nitric (HNO_3) and hydrochloric acid (HCl) under pressure with microwave digestion. A microwave furnace PAAR PHYSICA - PERKIN ELMER, designed for laboratory practice, was used.

We got the approval from the Ministry of Education and parents of the examined children in order to conduct the study. Parents were introduced the aim of the study after which they gave their full consent. After completing the examination, parents were communicated the findings and were given an explanation note for their children.

Data from the State Statistical Annual of Republic of Macedonia, as well internal data from the Republic Institute for Health Protection were used.

Results and discussion

In central part of the Republic of Macedonia at 41^0 and $43^/$ north geographic latitude and 21^0 and $46^/$ east geographic width is found Veles' valley, spreading in the mid-Povardarie with a length of 6 km. The city of Veles is 175 m. above the sea level, surrounded in north by the mountain of Gradiska, northeast by Ovce Pole (valley), in the south by the hill Klepa, and in the west by the mountain Golesnica. Veles is an industrial and trade centre. There are 15 industrial plants situated in the northwest and southeast of the city. There is an influence from Mediterranean climate, with hot summer and moderate cold winter, accompanied by fogs and temperature inversions. Dominant wind direction, according to wind rose, is northwest (4).

The village Ivankovci is situated 14.27 km. northeast from Veles and was chosen as a control area for the purpose of comparison. According to the estimates of 2001, this village has about 874 inhabitants (135 children aged 7-14 years).

For the same year, Veles counted 67,178 inhabitants, among whom 4,906 preschool children (0-6 years old), and 5,972 schoolchildren (7-14 years old).

Veles with its geographic status, atmospheric specifics and urbanization, industrial and traffic density, multiplied with unfavourable climate-meteorological conditions, has a significant predisposition for enormous and continuous air pollution with common pollutants - black smoke and sulphur dioxide, as well as lead (5).

In dry climatic conditions where there are not enough plants, particularly grass, it is possible to have high amounts of deposited lead-dust around the households. Lead is entering at home through soil-dust under dry climatic conditions and by sludge during wet weather.

Lead Smelter Plant was built in Veles in 1973, and ever since, evaluations of environmental health impact from the emission of pollutants from the stationary source have been conducted (Lead Smelter Plant is located in the North of the city, 200-300 m. away from the nearest households). According to the wind rose, North wind is dominant and dispersion of pollutants goes directly to the city.

The total emission level of lead in Veles is 85 folds above the MAC (maximum allowed concentrations), which means that, on a daily base, it releases about 55.85 kg. lead in the atmosphere; also, the total emission quantity of dust in the air is 10.6 folds higher than MAC, (2.6 tones of dust per day). These data apply for the last 5 years, respectively from 1997 to 2002 (6).

Using a prospective ecological study from January 2001 till January 2002, it was investigated the relation between the quantity of lead in the environment around the Lead Smelter Plant in Veles and blood-lead levels in children living nearby. Environmental measuring of lead and blood-lead levels in children aged 10 years living in Veles with a stationary source of lead was compared with

children living in the village of Ivankovci (without a stationary source of lead). Blood-lead levels in children living in environmental clean areas in the village of Ivankovci (with lead concentrations in uncultivated soil of 36.32 mg/kg - 36% of MAC) were registered in the range ξ= 18.2 μg/dl, ± 7.935. Lead levels at 5 cm. depth of uncultivated soil close to the stationary source of lead were higher compared to the control area (191 mg/kg almost 2 fold above MAC), as well as the average blood lead level (ξ= 37.27 μg/dl, ± 11.56). Employment of Student's t-test revealed a significant statistical difference ($t = 5.74$; $p < 0.05$) in blood lead levels of children from Veles ($n = 203$) and village Ivankovci ($n = 31$). Similar relationship was evident for the ratio of lead levels in cultivated soil and blood-lead levels of the examinees. Therefore, the evidence suggests a possible relationship between lead levels in the soil and blood-lead levels in the exposed children.

The content of lead in polluted areas was 2-3 times higher than in cultivated and uncultivated soils. Phyto-toxicity in most polluted areas was 10 times higher compared to the control area, as well for cultivated and uncultivated soils.

Results from the investigations of lead content in the soil, conducted in the region of Veles and the control area (village of Ivankovci), are shown in Table 1:

Table 1. Lead content (mg/kg) in the soil of region of Veles, 27.09.2001

Settlement	Cultivated soil		Uncultivated soil	
	at 5 cm depth	at 20 cm depth	at 5 cm depth	at 20 cm depth
village Drenjevica	217.71	239.0	191.0	233.75
village Recani	202.0	160.0	99.0	100.6
village Basino	141.0	115.0	135.0	134.0
settlement – Unka	130.0	182.0	132.0	112.0
village Ivankovci	42.6	40.4	36.32	38.57

*MAC - lead = 100.0 mg/kg

MAC - lead (EU) = 100.0 mg/kg

Note: Distance from the Lead Smelter Plant "Zletovo": v.Drenjevica 700 m. (southern), v.Recani 1,000 m. (southern), v.Basino 2,000 m. (northern), v.Ivankovci 14,270 m. (north-eastern), settlement - Unka 1,000 m. (north-western-uncultivated soil)

Source: Book of Rules for maximum allowed content of some metals in agricultural soil (Official Gazette No.11/90)

Our data suggest a clear relationship between the level of lead in the soil and blood-lead levels in the exposed children. Thus, there is an emergent need for comprehensive monitoring of the level of environmental pollution and assessment of daily intake of lead (7).

The distribution of registered concentrations of lead in the soil from the region of Veles and in the control area, according to Weber et al. (1984) is in the range 2-3000 mg/kg. for the content of lead in agricultural soil (common values are 1-30 mg/kg for rural areas and 30-100 mg/kg for urban areas) (8).

In 1978, it was performed a biological investigation in 293 examinees in Veles and in the same control area (village Ivankovci). Investigations performed by the Institute for Health Protection-Veles and the Institute for Occupational Medicine-Belgrade from 1976-77 and 1982-85 showed that areas either near the Lead Smelter Plant or upon the influence of wind rose are at high risk (9). Lead in soil in "Nova Naselba" (very close to the Lead Smelter Plant) had the highest levels of pollution. In the polluted areas, lead in soil was higher than MAC: 2-3 folds for cultivated soils (163-273 mg/kg) and 2-5 folds in uncultivated soils (185-510 mg/kg). Phyto-toxicity in most polluted areas compared to the control area was higher 10 folds for cultivated soils (28 mg/kg) and 20 folds for uncultivated soils (27 mg/kg).

In Bulgaria, Balabanov (2000) has performed an investigation of soil for the standardization of lead, copper and zinc level. He found the lowest limit values for lead as 70 mg/kg in air-dry soils, whereas phyto-toxicity index was < 110 mg/kg. This author stressed the importance of pH of soils, and therefore, the above-mentioned values are applicable for the neutral and alkali soils (10).

The table below displays the ambient air lead level measured in Veles and in the control area (Ivankovci):

Table 2. Ambient air lead level in particulate matters, μg/m3, 2001

Month	Veles	v. Ivankovci
January	1.48	0.0143
February	1.94	0.0233
March	1.677	0.00446
April	1.044	0.02113
May	0.776	0.07716
June	0.536	0.024
July	0.59	0.02433
August	0.711	0.02633
September	0.579	0.0175

October	0.7608	0.03383
November	0.8114	0.04766
December	0.4426	0.012
Average annual level	**0.94565**	**0.031189**
SD	**0.489585**	**0.038118**
Minimum	**0.4426**	**0.0**
Maximum	**1.94**	**0.288**
Recommended value	**0.5**	

The increased concentration of lead in the ambient air, represent a serious risk factor for the health of the exposed children in the city of Veles. Therefore, there is an emergent need for interventions aiming to reduce the negative impact of lead in this highly polluted community.

Furthermore, we examined the blood-lead levels in children living in Veles and in the control area. Results from this examination are presented in the table below:

Table 3. Distribution of blood-lead level in the examinees, μg/dl

Settlement	Number	ξ	min	max	SD
Veles	203	37,27774	2,57	92,55	17,93559
v.Ivankovci	31	18,20290	0,03	36,4	11,56369
WHO recommended value		10			

Employment of Student's t-test revealed a significant difference between the two areas ($t = 5.74$; $p < 0.001$): blood-lead levels were significantly lower among children from the control area ($\xi = 18.20$ μg/dl) as compared to Veles ($\xi = 37.27$ μg/dl) (Table3).

In June 2003 we performed a case study with a goal to find out the relation between the blood-lead level and psycho physiological functions in 31 schoolchildren at the age of 12.8 years old, living in the vicinity of the Lead Smelter Plant in Veles, Macedonia. We registered increased blood-lead levels in the examinees, as a result of the lead exposure from the Lead Smelter Plant ($n = 31$, $\xi = 16.51$ μg/dl). Most of the tested children have shown slightly increased blood lead levels ($\xi = 16.51$ μg/dl), being between the recommended value by WHO (10 μg/dl) and the critical level (25 μg/dl). This is correspondingly reflected in the measured levels of intelligence and graph motor ability (Table 4).

Table 4. Blood-lead levels distribution (in μg/dl.) in the examinees according to the graph motor ability

Level of graph motor ability	**number** 31	**ξ** 16.51	**min** 8.1	**max** 32.9	**SD** 6.74
Bed	3	18.76667	12.3	31.4	10.94182
Average	19	16.09895	8.4	32.1	5.847546
Above the average	9	16.62444	8.1	32.9	7.838009

Employment of Student's t-test did not reveal a significant difference between the blood-lead levels among the examinees with "bad" and "average" level of graph motor ability ($t = 0.65$; $p > 0.05$, between "bad" and "above average" level ($t = 0.37$; $p > 0.05$), and between "average" and "above average" level ($t = -0.19$; $p > 0.05$).

Otherwise, the autonomous nervous system of children appeared to function normally, reacting adequately in stress situations. However, the EEG results have shown that only in two children the theta/beta ratio had normal values, in other two children showed pathological ADHD findings correlated with high blood lead levels (> 20 μg/dl), whereas the other 27 children had a slightly increased attention deficit.

Pearson test for correlation, however, indicated a low correlation between the registered EEG values and lead-blood levels ($r = 0,12$; $p<0,05$). The findings suggested a normal activity of the autonomous nervous system in the examined children, and an adequate answer to stress situations.

Therefore, it can be concluded that the registered values in the examined children could be assessed as reversible.

Lessons learnt and recommended actions

Veles is one of the most highly polluted towns in Europe due to the emission of lead and zinc by the local smelter plant.

Implementation of a continuous and comprehensive community prevention program namely, environmental health impact assessment, is a high priority for Veles. So far, all activities have been limited only to the central government agencies without direct involvement of citizens and nongovernmental agencies. The poor economy of the whole country and of Veles in particular, has been opposing the closure of the Smelter Plant. However, in 2003 the Plant was closed down. Ever since, it has been reported a significant reduction of SO_2 emission, as well as of lead and zinc.

Currently, there are some attempts to re-open the Smelter Plant, but the Government is very cautious in this regard. The new licensing procedure requires the fulfilment of BAT (Best Available Techniques). The attempts to reopen the Plant require a joint financial program between the Central Government and foreign agencies, such as the World Bank. Yet, the greatest financial impact has to be covered by the smelter operator, since the supply of the new ecological equipment and the low toxic repro-materials involve high costs. However, the sustainable managerial running of the smelter industry is expected to afford the new technology.

In any case, a closed monitoring of the health indicators in the local population and levels of blood-lead in children will be crucial for the local and central authorities to issue or withdraw the license for a smelter operator.

Implementation of a community prevention program besides reducing the blood-lead will enhance the public and provide strong support and evidence to close the smelter plant if the smelter operator does not introduce the new emission reduction technology (BAT).

EXCERSISES

1. Environmental health risk assessment regarding the lead pollution and health

The purpose of this exercise is to provide students with basic information about the environmental health risk assessment and modelling.

Task: Estimate the dispersion effect of the lead particles in the urban ambient air on blood-lead levels.

Students read the two files containing the blood-lead levels in school children (living at different distances from the emission source) and concentration of lead in the ambient air. After that, they should calculate:

- Descriptive statistics for blood-lead levels reported data in school children and concentration of lead in the ambient air
- The relationship between the distance from the source of ambient air lead levels and blood-lead levels using Pearson test of correlation.

2. Systematic literature review

The purpose of this exercise is to provide students with basic information about relevant literature as a solid basis for health impact assessment.

Students should be divided into three groups and should prepare essays according to the Tasks 1-3 (see below).

Task 1: Determine the scope of the literature review

Scope:

• Inclusion criteria;

• Exclusion criteria;

• Types of literature;

• Inclusion criteria;

• Exclusion criteria (such as excluding newspaper articles or non-peer reviewed materials).

Task 2: Determine the sources of relevant literature

- Primary sources (such as original peer-reviewed articles);
- Secondary and tertiary sources (also called "grey literature") such as review articles, reports, citations in journal articles, books, literature directories, Internet databases, newspapers, personal communications and unpublished data;

Task 3: Review and evaluate the literature

- Develop evaluation criteria;
- Evaluate each paper in relation to:

• Methods used;

• Relevance to local area;

• Validity of findings.

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RECOMMENDED WEBSITES

1. http://www.who.int/en/
2. http://epa.gov/
3. www.ihia.org.uk/document/ephia.pdf

RECOMMENDED READINGS

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Ionizing Radiation and the Living Environment**
Module: 5.5	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Vlatka Brumen, MD, PhD** Assistant professor Occupational Medicine Specialist Medical College University of Zagreb
Address for correspondence	Vlatka Brumen Medical College University of Zagreb 3 Šalata 10000 Zagreb Croatia E-mail: vlatka.brumen@snz.hr
Keywords	Ionizing radiation, environmental exposure, occupational exposure, radiation effects, threshold limit values
Learning objectives	After completing this module students and public health professionals should : · Become aware of the nature of ionizing radiation; · Be able to recognise potential ionizing radiation sources in working and living environment; · Increase knowledge on the use of ionizing radiation sources in modern society; · Be able to understand what a possible health impact of ionizing radiation might be; · Be able to differentiate circumstances of ambient from circumstances of occupational exposure; · Be able to identify potential threats imposed by (ab)use of nuclear energy; and · Improve their knowledge on radiation protection principles and codes of practice

Abstract	This paper is aimed at describing physical nature, sources and health impact of ionising radiation. Within the "Definition and distinction" section, physical nature of ionizing radiation, representing the outermost part of the electromagnetic spectrum, was described. Physical entities falling into that category (alpha- and beta-particles, X- and gamma-rays) were listed and briefly characterized. The distinction between the terms "radioactivity" and "ionizing radiation" was brought to reader's attention as well. Within the section "Natural sources of ionizing radiation", sources of natural "background" radiation (cosmic rays and radionuclides) were briefly specified. This was followed by the "Man-made sources" section, within which an attempt to point out major anthropogenic sources and the average distribution of exposure within world population was made. In the section termed "Ambient exposure to ionizing radiation", radiation exposure arising from radiation pollution of the main constituents of the living environment and lifestyle habits and needs was discussed. The readers were reminded on the most tragic ambient exposure to ionizing radiation ever – the atomic bombing of Hiroshima and Nagasaki. This was followed by the "Occupational exposure to ionizing radiation" section, devoted to radiation exposure incurred by a worker, which is attributable to occupation and dependent on the length of the working period. Within this frame, a number of professional activities, comprising utilization and handling of ionizing radiation sources, were listed. The section entitled "Health impact of ionizing radiation" briefly dealt with major mechanisms underlying both acute and delayed radio-effects. In conclusion, in "Exposure limitations and codes of practice" reading audience was provided with major principles of ionizing radiation protection and well-established codes of practice, currently adopted worldwide.
Teaching methods	Teaching should begin with introductory lectures, followed by small group discussions and seminars.
Specific recommendations for teachers	0.50 ECTS: 2 hours introductory lectures, 8 hours of interactive teaching/ work under teacher supervision, 5 hours of individual students' work. A classroom equipped with PC and LCD would be needed. Field work (field visits to workplaces utilizing radiation sources) could also be arranged. Training materials could be prepared according to the audience. Internet data sources could be used as well. Teaching should be targeted to MDs and medical physicists.
Assessment of students	Oral exam, preceded by a seminar paper or a case problem presentation prepared by the student.

IONIZING RADIATION AND THE LIVING ENVIRONMENT

Vlatka Brumen

Definition and distinction

Ionizing radiation represents the outermost frequency band of the electromagnetic spectrum, capable of ionizing molecules of the irradiated substance, including biological media. During the interaction, ionising radiation delivers a certain amount of energy to the irradiated substance, which results in changes of baseline characteristics of both radiation and the irradiated medium (1).

The term *ionizing radiation* should be discerned from the term *radioactivity*. Radioactivity represents a phenomenon of occurrence of ionizing radiation, in a form of rapid particles and/or high-energy photons, which follows the decay of instable atomic nuclei (radionuclides). However, the term radioactivity has also been commonly used to describe a feature of a substance or a medium in which this phenomenon takes place (1).

Major types of radiation emitted as a result of spontaneous decay are alpha and beta particles, and gamma rays. X-rays, another major type of radiation, arise from processes outside the nucleus.

Alpha particles are energetic, positively charged particles (helium nuclei) that rapidly lose energy when passing through matter. Even though not penetrable, they can cause damage over their short path. These particles are usually fully absorbed by the outer layer of the human skin and can be completely stopped by a sheet of paper (Figure 1).

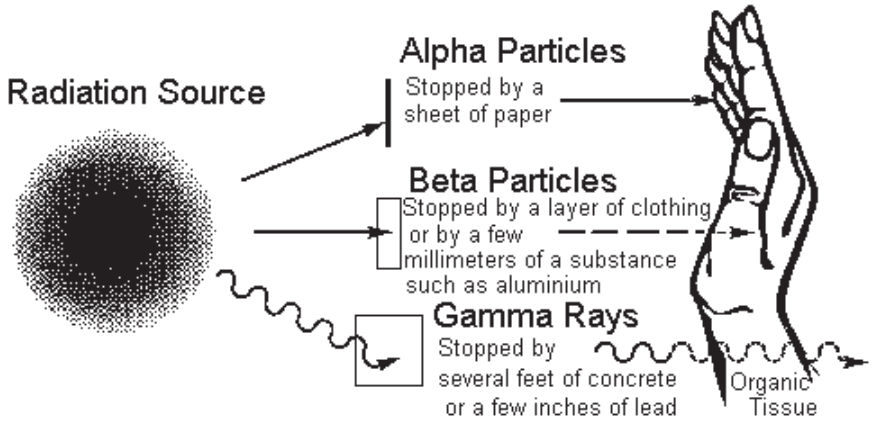
Beta particles are fast moving, positively or negatively charged electrons emitted from the nucleus during radioactive decay. They are more penetrating than alpha particles, but are less damaging over equally travelled distances. Some beta particles are capable of penetrating the skin and causing radiation damage. Although the distances they travel in the air are appreciable, beta particles can be reduced or stopped by a layer of clothing or by a few millimetres of a substance such as aluminium (Figure 1).

Like visible light and X-rays, *gamma-rays* are weightless packages of energy called *photons*. They often accompany the emission of alpha or beta particles. They have neither a charge nor a mass and are very penetrating. Gamma-rays

can easily pass through the human body or be absorbed by tissue, thus posing as a health hazard. With more energetic gamma-rays, several feet of concrete or a few inches of lead may be required to stop them (Figure 1).

X-rays are high-energy photons produced by the interaction of charged particles with matter. X-rays and gamma-rays have essentially the same properties, but differ in origin; X- rays emanate from processes outside the nucleus, while gamma- rays originate from the inside. X-rays are generally lower in energy and therefore less penetrating than gamma-rays. Literally thousands of X-ray machines are used daily in medicine and industry for examinations, inspections, and process controls. Because of their many uses, X- rays are the single largest source of man-made radiation exposure. Medical X-rays can be stopped by a few millimetres of lead thus incorporated in the bulkheads of the facilities hosting X-ray machinery.

Figure 1. Penetrating powers of alpha and beta particles and gamma rays



Data source: EPA Ionizing Radiation Fact Sheet Series (http://www.epa.gov/radiation/docs/ionize/402-f-98-009.htm)(Accessed April 10, 2005)

Natural sources of ionizing radiation

In each and every living environment there is a certain level of radioactivity originating from natural sources, and therefore called *naturally-occurring radioactivity.* Natural sources of radiation comprise cosmic rays and radionuclides.

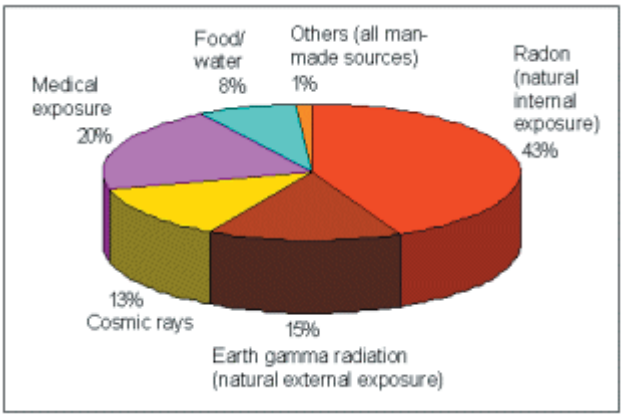
Cosmic rays are high-energy rays coming from the outer space. They are divided into primary and secondary ones. *Primary cosmic rays* consist of atomic nuclei, mostly high-energy protons and helium nuclei. Their energy can be as high as 10^{18} electron-Volts (eV). Secondary cosmic rays result from collision of primary cosmic rays and nuclei already present in the Earth's atmosphere, which leads to the creation of elementary particles and various nuclear fragments. Subsequently, charged π-mesons, also called pions, transform into more stable μ-mesons, which represent the vast majority of the secondary cosmic radiation noted on the planet Earth. Neutral μ-mesons transform into high-energy photons, capable of producing ionic pairs (electron-positron). The latter act as a source of further high-energy photons which again induce the formation of ionic pairs, complying with the pattern of *cascade-reaction*.

Radionuclides can be divided into cosmogenic and primordial. The significance of cosmogenic radionuclides, such as tritium (^{3}H), beryllium (^{7}Be), carbon (^{14}C) and sodium (^{22}Na), is minor. Primordial radionuclides worth to be mentioned are potassium (^{40}K) and so called *radioactive chains or radioactive families.* The latter were first discovered by Lord Ernest Rutherford (1871-1937), a physicist by profession, and Frederick Soddy (1877-1956), English chemist working under Lord Rutherford at the McGill University. They were particularly interested in gas (radon)-emanation subsequent to radioactive chain decay (2).Three radioactive chains are of notice: uranium chains, with ^{235}U and ^{238}U posing as stem-elements, and thorium chain, with ^{232}Th posing as the stem-element. The ultimate products of any chain decay are stable lead isotopes (^{206}Pb, ^{207}Pb and ^{208}Pb).

Man-made sources

Along with natural radioactive sources present in the Earth's crust and atmosphere, our continuous exposure to ionizing radiation is also significantly contributed by *man-made sources.* Therefore, nowadays we speak about technologically-increased naturally-occurring radiation. Throughout years, environmental radioactive pollution has been created, resulting from nuclear weapons testing, nuclear waste disposal, accidents at nuclear power plants, as well as from transportation, storage, loss, and misuse of radioactive sources. Sources of ionizing radiation and the average distribution of exposure within world population are illustrated on Figure 2.

Figure 2. Sources of ionizing radiation and the average distribution of exposure within world population



Data source: WHO Ionizing Radiation Homepage (http://www.who.int/ionizing_radiation/en/). (Accessed April 10, 2005)

Ambient exposure to ionizing radiation

There are, basically, two types of radiation exposure: *ambient and occupational.*

Ambient exposure is defined as a radiation exposure arising from radiation pollution of the main constituents of the living environment –air, soil, food and water – and from lifestyle habits and needs (smoking, household-devices and iatrogenic exposures).

According to the data provided by the WHO, exposure to ionizing radiation that occurs due to food and water represents an 8%- portion of the entire human exposure worldwide (3). First of all, one should be aware of the fact that most of the food we eat nowadays has been treated with ionizing radiation, in order to be kept fresh and sterile. Food irradiation is a method of food preservation that has been in development since the early part of the twentieth century. If applied properly, irradiation can be an effective way to reduce the incidence of food-borne diseases, improve safety and quality of many foods, and extend their shelf-life. However, it is not a cure-all process and doesn't necessarily have to be suitable for every food. Importantly, it can not reverse spoilage that had already been started. Foods permitted to be irradiated under U.S. Food and Drug Administration (FDA)'s regulations are listed in Table 1

Table 1. Foods permitted to be irradiated under FDA's regulations

Food	Purpose	Dose
Fresh pork	Control Trichinella spiralis	0.3 kGy min. to 1 kGy max.
Fresh foods	Growth and maturation inhibition	1 kGy max.
Foods	Arthropod disinfection	1 kGy max.
Dry Enzyme preparations	Microbial disinfection	10 kGy max.
Dry spices/seasonings	Microbial disinfection	30 kGy max.
Poultry	Pathogen control	3 kGy max.
Frozen meats (NASA)	Sterilization	44 kGy min.
Refrigerated meat	Pathogen control	4.5 kGy max.
Frozen meat	Pathogen control	7 kGy max.

Data source: Web-page of the U. S. Food and Drug Administration Centre for Food Safety & Applied Nutrition Office of Pre-market Approval
(http://www.cfsan.fda.gov/~dms/opa-fdir.html) (Accessed April 11, 2005)

Food is commonly treated by two types of radiation sources: machine or radionuclide. Machine sources of ionizing radiation include electron accelerators and X-ray generators. Radionuclides, radioactive materials that give off ionizing gamma-rays, include ^{60}cobalt and ^{137}caesium. Irradiated food does not become radioactive. The radiation energies used in food processing cause chemical changes in the food, but not the nuclear changes that would make the food radioactive. Whereas many foods consist mainly of water, the radiation is typically absorbed by it, forming water radiolysis products (direct radiolysis products) in terms of ions and free radicals, which then react with other constituents in food to form stable products. The major constituents of food include lipids, proteins, and carbohydrates. Food irradiation opponents have put forward several major concerns in this regard, discrediting what they call ″a nuclear lunch″: some of the radiolytic products, such as formaldehyde, benzene, formic acid, and quinines, are harmful to human health. Irradiation destroys essential vitamins, including vitamin A, thiamin, B2, B3, B6, B12, folic acid, C, E, and K; amino acid and essential polyunsaturated fatty acid content may also be affected. A 20% to 80% loss of any of these is not uncommon. Although it kills most bacteria, irradiation does not destroy toxins created in early stages of food contamination. Acting non-selectively, it also kills beneficial bacteria which produce odours indicating

food spoilage, therefore interfering with the natural role of these bacteria which is to counter-balance the growth of harmful bacteria. Irradiation also stimulates aflatoxin production. Aflatoxin occurs naturally in humid areas and tropical countries in fungus spores and on grains and vegetables. The World Health Organization (WHO) considers aflatoxin to be a significant public health risk and a major contributor to liver and kidney cancer (4). In addition, irradiation will likely have a mutagenic effect on bacteria and viruses that survive exposure. Mutated survivors could be resistant to antibiotics and could evolve into more virulent strains. They could also become radiation-resistant, rendering the radiation process ineffective. To ensure that the consumer is fully aware of the fact that irradiation has been used, the FDA requires that irradiated foods bear both logo (the Radura logo) and statement that the food has been irradiated (Figure 3). Additional labelling may be included by the manufacturer to inform the consumer why the food has been irradiated, and how to store the food to best maintain quality of the product, provided such statements are truthful and not misleading.

Figure 3. The Radura logo, required by the FDA

Source: Web-page of the U. S. Food and Drug Administration Centre for Food Safety & Applied Nutrition Office of Pre-market Approval (http://www.cfsan.fda.gov/~dms/opa-fdir.html) (Accessed April 11, 2005)

Radioactivity in drinking water comes from two sources, naturally-occurring and man- made (anthropogenic). Man-made radioactivity is usually found in surface waters, while naturally occurring radioactivity comes from bedrock. Public water supply companies are required to routinely monitor for radioactivity and residents served by public water should not have further concern. Water from older shallow "dug" wells are unlikely to have significant radioactivity, but water from wells drilled into bedrock may show levels of naturally occurring radioactivity. Radioactivity in water supplies can occur mainly due to alpha radiation, radium, radon and uranium. Gross Alpha Radioactivity (GAR) is a measure of radioactivity in the water. Its presence

indicates contamination by radium, radon, uranium, or other naturally occurring radioactive substances. These substances are known human carcinogens. Radium-226 and -228 is another measure of radioactivity in water. Radium, a by-product of uranium decay, is a naturally-occurring radioactive metal. It is a human carcinogen. Radium-226 is associated with bone sarcomas and head carcinomas, while radium-228 is associated with bone sarcomas. According to the estimation made by the EPA in 1991, over a lifetime, 15,750 people get cancer from exposure to radioactive drinking water. Recommended water-treatment techniques include lime softening, cationic exchange, and reverse osmosis (5). In addition, members of general public are exposed to radiation from consumer products, such as tobacco (release of ^{210}polonium), building materials, combustible fuels (gas, coal, etc.), ophthalmic glass, televisions, luminous watches and dials (tritium,^{3}H), airport X-ray systems, smoke detectors (containing ^{241}americium), road construction materials, electron tubes, fluorescent lamp starters, lantern mantles.

Figure 4. Smoke detector

Source: National Safety Council web-site: Understanding Radiation. (http://www.nsc.org/issues/rad/ionize.htm). (Accessed April 12, 2005)

However, the most considerable part of ambient exposure is due to medical (iatrogenic) exposure. About 20 % of our total average exposure to ionizing radiation is from medical X-rays (15%) and nuclear medicine procedures (4%). According to the data provided by the National Safety Council, Americans, for instance, receive about 200 million medical X-rays every year (3). We have been facing two major problems in this regard. One is the problem of unwarranted medical procedures that could be avoided by using other diagnostic tools, able

to ensure equally reliable diagnostic information. Secondly, patients undergoing X ray-procedures are often discharged from hospitals or outpatient clinics immediately after the procedure, being completely unaware of physical nature of the procedure they have been subjected to and possible sustained activity of the radiation sources (especially unsealed) they have been exposed to. In order to promote practices which protect both the patient and persons in his/her proximity, the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) published radiation protection criteria for the discharge of patients exposed to medical radiation sources (6). The effective dose to any member of the general public should not exceed 1 milliSievert (mSv) a year, excluding exposure originating from natural background and medical procedures. This dose limit applies to adults and children, including the unborn. In this context, this dose limit applies to members of general public who might make contact with such patient, for example, through work, travel, social or domestic activities. The effective dose to an appropriately informed guardian, who knowingly and willingly provides care to the patient, should not exceed a dose constraint of 5 mSv per treatment. This criterion should not be applied rigidly in all cases, for instance when a parent is assisting with the care of a sick child. Following treatment with a radioactive substance, patients may be discharged from the hospital or may leave an outpatient clinic when an estimate of the effective dose to family members and to members of the general public has been shown to fully comply with the dose limits and dose constraints cited above. Such an estimate should be based on measurements of the external ambient dose equivalent rate from the patient, physical half-life of the unsealed source, biological clearance of the radioactive substance, patient's clinical condition and the proximity to other family members, especially children, and to other persons. Dose estimates, and measurements on which they are based, should be entered into the patient's medical record (6).

It is the author's wish to conclude this section by a brief reminder on the most tragic ambient exposure to ionizing radiation ever – August the 6th, 1945. On that day, the atomic bomb a.k.a. the ″Little Boy" was dropped on Hiroshima, Japan. The ″Little Boy″ was dropped from the ″Enola Gay″, one of the B-29 bombers that flew over Hiroshima that morning. The people who saw the Little Boy exploding often claim that they ″saw another sun in the sky." The bomb generated an enormous amount of energy in terms of air pressure and heat. In addition, it generated a significant amount of radiation (gamma-rays and neutrons) that subsequently caused devastating human injuries. It is believed that more than 140,000 people died by the end of the year. They were mostly civilians, including students of the international origin and Koreans who worked in factories within the city. The total number of people who have died due to the bombing is estimated at 200,000. Just three days after, the second atomic bomb, called the "Fat Man", was dropped on the Japanese town Nagasaki. Though the amount of en-

ergy generated by this very bomb was significantly larger than that of the ″Little Boy″, the damage given to the city was slighter than that given to Hiroshima due to the geographic structure of the city. It is estimated that the bombing caused death of approximately 70,000 people, both promptly and in 1-year aftermath.

Occupational exposure to ionizing radiation

The term *occupational exposure* refers to the radiation exposure incurred by a worker, which is attributable to occupation and committed during a period of work. Occupational exposure to ionizing radiation can occur in a range of industries, mining and milling; medical institutions, educational and research establishments and nuclear fuel cycle facilities. According to the latest report of the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), issued in 2000, an estimated 11 million workers are monitored for exposure to ionizing radiation (7). They incur radiation doses attributable to their occupation, which range from a small fraction of the average global background exposure, up to several times that value. It should be noted that the UNSCEAR 2000 Report describes a general downward trend in the severity of exposure of several professional categories, medical personnel being among them, but it also indicates that the number of people affected by ionizing radiation exposure in the occupational settings is constantly increasing worldwide (7). Less than half of the occupationally exposed workers are exposed to artificial radiation sources. The remainder is exposed to elevated levels of natural radionuclides. Notably, the latter has been receiving a higher average annual dose than workers exposed to artificial sources. The principal natural sources of radiation exposure, other than mining and processing of uranium ores, are radon in buildings; non-uranium or thorium ores that contain significant traces of natural radionuclides, other underground workplaces and cosmic rays at aircraft altitudes. The following examples, that are far from covering all scenarios, show the diversity of occupations in which ionizing radiation exposure is likely to occur: aircrew and military personnel, atomic energy plant workers, medical staff, research staff of various background, refinery workers, pipeline oil flow testers and pipeline weld testers, drug makers and drug sterilizers, food preservers and food sterilizers, ore assayers, industrial radiographers, thorium-aluminium and thorium-magnesium alloy workers, uranium miners and uranium-mill workers, luminous dial painters and many more. Such an exposure is usually limited to a small area of the body, predominantly hands, resulting in reddening of the skin or dermatitis. Whole body irradiation and subsequent acute radiation sickness occur extremely rarely in occupational settings, mostly in connection to accidents.

Health impact of ionizing radiation

Ionizing radiation affects people by depositing energy in body tissue, which can cause cell damage or cell death. In some cases there may be no effect. In other cases, the cell may survive but become abnormal, either temporarily or permanently, eventually transforming into a malignant one. High doses of ionizing radiation can cause extensive cellular damage and result in fatalities. With smaller doses, the person on the whole and the irradiated target tissue may survive, but the cells are still damaged, increasing the chance of cancer development. The extent of damage depends upon the amount of energy absorbed, length of exposure and the dose rate, as well as on the features of the target. Regarding damage expectations, the oldest and perhaps the best "rule of thumb" was set by two French radiobiologists, Bergonie and Tribondeau, in 1906 (8). It offers a prediction of radiosensitivity of the irradiated cells and/or tissues and holds the position that cells tend to be radiosensitive if they have a high division rate, long dividing future and are of an unspecialized type. Even though set almost 100 years ago, this rule still represents the baseline philosophy of modern radiotherapy. Following chronic exposure to ionizing radiation, genetic effects and other effects such as cancer, precancerous lesions, benign tumours, cataracts, skin changes, and congenital defects might occur (9). *Acute exposure* may result from accidental or emergency exposures or from special medical procedures (radiotherapy). In most cases, it can cause both immediate and delayed effects. High-level whole-body irradiation may result in rapid onset of radiation sickness, evidenced by gastrointestinal disorders, bacterial infections, haemorrhaging, anaemia, loss of body fluids, and electrolyte imbalance. Delayed biological effects can include cataracts, temporary sterility, cancer, and genetic effects. Extremely high-level acute irradiation can result in death within a few hours, days or weeks. This syndrome was observed in many atomic bomb survivors and emergency workers responding to the 1986 Chernobyl nuclear power plant accident. Approximately 134 plant workers and fire-fighters, battling fire at the Chernobyl power plant , received high radiation doses (70,000 to 1,340,000 mrem, which equals to 700 to 13,400 mSv) and suffered from acute radiation sickness. Of these, 28 died from radiation injuries (10)

Exposure limitations and codes of practice

As a general policy, the majority of competent bodies and organizations are in agreement that ambient exposure of individual members of the general public, arising from anthropogenic sources, should be limited to 100 mrem (1 mSv) per year, while occupational exposure should not exceed 5,000 mrem (50 mSv) per year. The exposure for an average person is about 360 mrems (3.6 mSv) per year, out of which 81% percent is due to natural sources. Basically, policies and government regulations are grounded on three radiation protection principles:

Occupational exposure should only take place when the benefit to society warrants the risk. There is little doubt that medically-related research falls into this category;

Exposure to workers should be *As Low As is Reasonably Achievable (the ALARA principle).* This has been characterized as the "optimization" of radiation protection by the International Commission on Radiological Protection;

A "maximum allowable individual dose" must be established to set an upper limit on the risk to individual workers.

In other words, radiation protection operates on three main principles:

· *Justification* - the process of showing that a particular use of ionising radiation produces a sufficient benefit to the exposed individuals or society in general, to offset the radiation detriment it causes;

· *Optimisation* - the process of keeping all exposures as low as reasonably achievable, economic and social factors being taken into account; and

· *Dose limitation* - the process of keeping the sum total of all relevant doses received whether by workers or members of the general public within specified limits.

Although exposure to ionizing radiation carries a risk, it is impossible to be completely avoided. Radiation has always been present in the living environment. What we can avoid, however, is an unnecessary and undue exposure. Although, with an exception of optical spectrum, human senses cannot detect ionizing radiation in any way, there is a range of sensitive instruments capable of detecting minute amounts of radiation from natural and man-made sources. Dosimeters resembling pens can be clipped to one's clothing. They measure an absolute dose received over a period of time. They must be periodically recharged, and the results need to be logged. Geiger counters and scintillo- metres measure the dose rate of ionizing radiation directly. In addition, there are four means of self-protection at disposal: time-limitation of exposure, increased distance from the source, shielding (lead, concrete, or water barriers - this is the reason why certain radioactive materials are stored or handled under water) and automation of the operative procedures (e.g. remote control operations) and containment in special containers/facilities. The air pressure in the operating rooms is usually reduced, so that any leaks occur into the room and not out of it.

The largest threat to the general public today is a possibility of a nuclear war. Gamma rays from the fallout of nuclear weapons would probably cause the largest number of casualties. Immediately downwind of targets, doses would exceed 30,000 roentgens (R) per hour (2.2 mC/(kg·s)), while 450 R (32 μC/(kg·s)) (more than a thousand times the background rate) is fatal to the half of normal popula-

tion. No survivors have been documented from doses above 600 R (43 μC/(kg·s) or 0.15 coulomb per kilogram-hour).

From the author's standpoint

Every year, in Hiroshima, Japan, people from all over the world float lanterns with prayers, thoughts, and messages of peace down the rivers in commemoration of the atomic bombing of Hiroshima and Nagasaki. History of mankind represents a classroom in which we have been given a chance to learn both about and from our past. What we really need to learn are not names, facts or numbers; it is the incalculable value of a human life.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Public Health Aspects of Non-ionizing Radiation**
Module: 5.6	**ECTS (suggested): 0.25**
Author(s), degrees, institution(s)	**Elisaveta Stikova, MD, PhD** Professor University "St. Cyril and Methodius" Medical Faculty
Address for correspondence	Elisaveta Stikova University "St. Cyril and Methodius" Medical Faculty Ul. 50 Divizija bb 1000 Skopje Macedonia Tel: + 389 (2) 3147-052 E-mail: estikova@ukim.edu.mk estikova@gmail.com
Keywords	Electromagnetic fields, non-ionizing radiation, infrared rays, light, radio waves, ultraviolet rays, adverse health effects, environmental and occupational risk assessment, cautionary policies.
Learning objectives	After completing this module students and public health professionals should: • Increase knowledge for sources and possible adverse health effects from non-ionizing radiation; • Recognise and describe the risk from environmental and occupational exposure; • Define the public health priorities; • Increase the level of public awareness; and • Propose appropriate evidence based intervention strategy.

Abstract	Non-ionizing radiations (NIR) is a term for the part of the electromagnetic spectrum which the waves and their electric and magnetic fields have not enough energies to break atomic bonds and to produce the ionisation of the matters. It includes static electric and magnetic fields, extremely low frequency (ELF) fields, radio frequency and microwave fields, infrared radiation, visible light and ultraviolet (UV) radiation. The main human-made electromagnetic field sources are all appliances using electricity, television and radio transmitters, mobile phones and their base stations, radars, lasers… Electromagnetic waves produce biological effects that may lead to adverse health effects. Over the past decades the public health concerns was focused on the possible long-term adverse health effects caused by exposure to low levels of electromagnetic fields. Despite extensive research and more than 25,000 published articles, there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health. To date, scientific evidence does not support a link between headaches, anxiety, suicide and depression, nausea, fatigue and loss of libido and exposure to electromagnetic fields. An exposure to fields at typical environmental levels does not increase the risk of any adverse reproductive outcome such as spontaneous abortions, malformations, low birth weight, and congenital diseases. The results contain many inconsistencies, but no large increases in risk have been found for any cancer in children or adults. Using criteria established by the International Agency for Research on Cancer (IARC), that ELF fields should be considered as a "possible" and UV-radiation as a "probably" human carcinogen.
Teaching methods	After introductory lecture, students will work in small groups. They will discuss about environmental and occupational risk assessment regarding non-ionizing radiation, possible adverse health effects and cautionary policies. Basic skills like risk estimation and assessment have to be trained. Students will be learned how to judge the review of the relevant literature.
Specific recommendations for teachers	It is recommended that the module will organize within 0, 25 ECTS credits, out of which two third will be under teacher supervision, and the rest is individual data processing and presentation preparing. It is very important to improve a theoretical knowledge and practical skills of public health experts. They have to be able to prepare an environmental and occupational risk assessment and to be the part of evidence based decision making process. Standard equipment and material will be need (standard room, video presentation equipment, guidelines and recommended standards).
Assessment of students	The final assessment will be based on multiple choice questionnaire (MCQ) and seminar paper or case problem presentations.

PUBLIC HEALTH ASPECTS OF NON-IONIZING RADIATION

Elisaveta Stikova

Introduction

Exposure to electromagnetic fields is not a new phenomenon. However, during the 20th century, numerous man-made electromagnetic field sources used for individual, industrial and commercial purposes and in medicine have become the focus of the public health interest. All those new and advancing technologies, including power lines, microwave ovens, computer and TV screens, security devices, radars, mobile cellular phones and their base stations, have made our life richer and easier. At the same time, they have brought with them concerns about possible health risks associated with their use, such as cancer, reduced fertility, memory loss, changes in the behaviour and development of children etc.

In response to growing public health concerns over possible health effects from exposure to the electromagnetic field sources, in 1996 the World Health Organization (WHO) launched a large, multidisciplinary International Electromagnetic Field (EMF) Project. This project brings together current knowledge and available resources of key international and national agencies and scientific institutions (1).

Despite the feeling of some people that more research needs to be done, the WHO and many other experts concluded that the current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields. There are some gaps in knowledge about the biological effects from long-time exposure and exposure to high levels, so more research is needed in these areas (2).

The conflict between concerns about possible health effects from exposure to EMF and the development of electricity supply and telecommunications facilities has led to considerable economic consequences. But, the lack of knowledge about the health consequences of technological advances may not be the sole reason for social opposition to innovations and further progress.

Main characteristics of electromagnetic waves in the spectrum

Electromagnetic waves can be characterized by three interrelated parameters:

- *frequency,*
- *wavelength,*
- *electromagnetic energy.*

The frequency simply describes the number of wave oscillations or cycles per second, while the term wavelength describes the distance between two peaks of the wave.

Wavelength and frequency determine the energy of electromagnetic waves.

According to their frequency and energy, the electromagnetic waves in the electromagnetic spectrum can be classified as:

- *non-ionizing,*
- *ionizing radiation.*

Here, the term radiation refers to the electromagnetic energy transmitted by the waves.

Non-ionizing radiation (NIR) is a general term for those electromagnetic waves, which do not have sufficient energy to break the bonds between molecules and to produce ions (positive and negative electrically charged atoms or parts of molecules).

Ionizing radiation has more energy than NIR and therefore has the ability to break bonds between molecules, create ions and to produce ionisation o the matter.

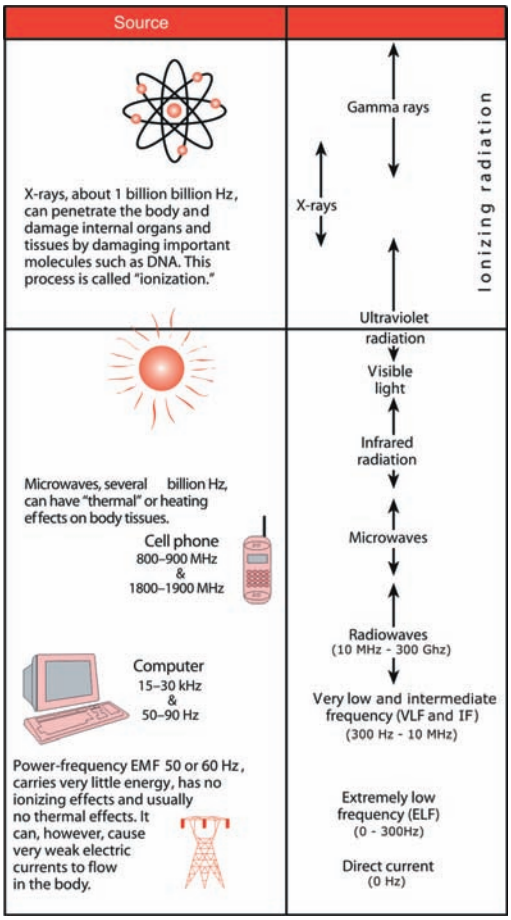
This chapter is only concerned with non-ionizing radiation and its effects. Even though NIR does not ionize matter, it has been shown that it produces other biological effects, which may sometimes, but not always, lead to adverse health effects.

Non-ionising radiation covers two main regions in the non-ionasing part of the electromagnetic spectrum:

- *electromagnetic fields (EMFs)* - static electric and magnetic fields, extremely low frequency fields (ELF) as well as microwave and radiofrequency fields;
- *optical radiation* - ultraviolet (UV) radiation, visible light and infrared radiation.

The following figure and table give the data for the sources and the physical properties of waves in the whole electromagnetic spectrum (3).

Figure 1. The sources of waves in the electromagnetic spectrum



Source: NIEHS-NIH,2002

Table 1. Physical properties of waves in the electromagnetic spectrum

Region	Wavelength (centimetres)	Energy eV
Radio	> 10	$< 10^{-5}$
Micro-wave	10 - 0.01	10^{-5} - 0.01
Infrared	0.01 - 7 x 10^{-5}	0.01 - 2
Visible	7 x 10^{-5} - 4 x 10^{-5}	2 - 3
Ultra-violet	4 x 10^{-5} - 10^{-7}	3 - 10^{3}
X-Rays	10^{-7} - 10^{-9}	10^{3} - 10^{5}
Gamma Rays	$< 10^{-9}$	$> 10^{5}$

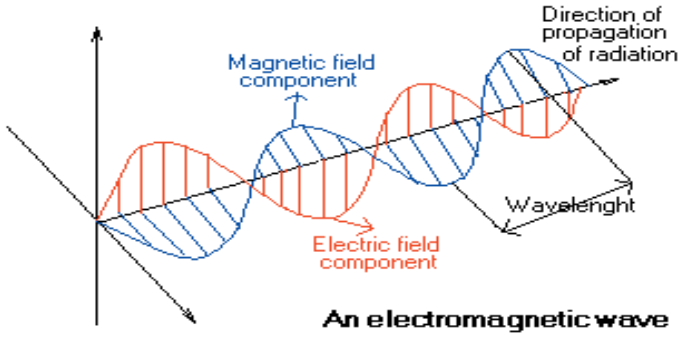
Electromagnetic waves and electromagnetic fields

The electromagnetic waves generate electromagnetic energy in the form of:

- *electric (E) field,*
- *magnetic (H) field.*

Electric and magnetic fields (EMFs) are travelling together at the speed of light. Electromagnetic waves with higher frequency (shorter wavelength) carry more energy than lower frequency (longer wavelength) waves.

Figure 2. Electric and magnetic fields and their propagation



Electric fields arise from electric charges. They are created by differences in voltage. Any device connected to an electrical outlet, even if the device is not switched on, will have an associated electric field. Electric fields are strongest close to the device and diminish with distance. Common materials, such as wood and metal, shield against them. The strength of electric fields is measured in units of volts per meter (V/m).

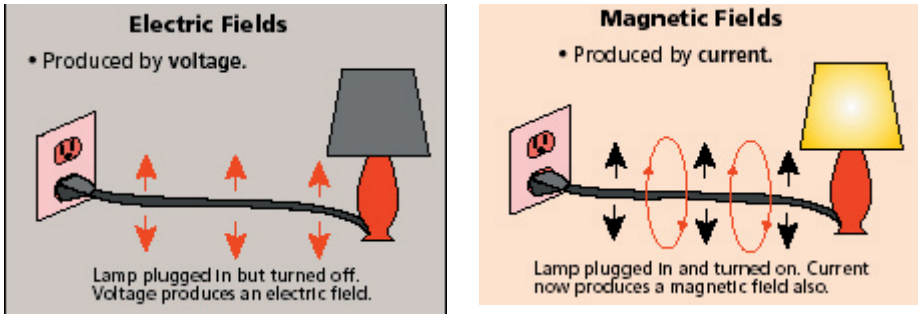
Magnetic fields arise from the motion of electric charges, i.e. only when electric current flows. Any device connected to an electrical outlet, when the device is switched on and current is flowing, will have an associated magnetic field. Magnetic fields are also strongest close to the device and diminish with distance, but they are not shielded by most common materials, and pass easily through them (4). Their strength is measured in units of ampere per meter, (A/m) but is usually expressed in terms of the corresponding magnetic induction measured in units of tesla, (T), militesla (mT) or microtesla (μT).

Table 2. The differences between electric and magnetic fields

Electric fields	**Magnetic fields**
• Electric fields arise from voltage. • Their strength is measured in Volts per meter (V/m) • An electric field can be present even when a device is switched off. • Field strength decreases with distance from the source. • Most building materials shield electric fields to some extent.	• Magnetic fields arise from current flow. • Their strength is measured in Amperes per meter (A/m) or flux density - in Tesla (T) • Magnetic fields exist as soon as a device is switched on and current flows. • Field strength decreases with distance from the source. • Most materials do not attenuate magnetic fields.

Source: WHO – What are electromagnetic fields, Definition and sources

Figure 3. The nature of electric and magnetic fields



Source: Adaptation from NIEHS-NIH, 2002

Classification of electric and magnetic fields

Regarding their physical properties, the electromagnetic fields are divided in two main groups:

- *static electric and magnetic fields,*
- *time varying electric and magnetic fields*.

The static fields are time-independent fields and they do not vary over time. In any battery-powered appliance the current flows in one direction only, from the battery to the appliance and then back to the battery. The static fields have constant strength.

Time-varying fields are produced by alternating currents (AC). Alternating currents reverse their direction at regular intervals. In most European countries the electric field changes direction with a frequency of 50 cycles per second or 50 Hertz. Equally, the associated electromagnetic field changes its orientation 50 times every second. North American electricity has a frequency of 60 Hz.

In order to arrive at a scientifically sound recommendation for health assessment of exposure, the International EMF Project of the World Health Organization classifies the electromagnetic fields from the non-ionising part of the electromagnetic spectrum as follows:

- *static electric and magnetic field (O Hz),*
- *electric and magnetic fields with extremely low frequency*

(ELF 0 - 300 Hz),

- *electric and magnetic field with intermediate frequencies (300 Hz - 10 MHz)*
- *radio-frequency and microwave fields (RF 10 MHz - 300 GHz).*

The main characteristic of the classification above is the frequency of the waves. Waves in different frequency ranges have different physical properties, come from different sources and have different possible adverse and health effects (5).

Electromagnetic fields from the non-ionizing part of the electromagnetic spectrum

Static and oscillating electromagnetic fields with extremely low frequency

Electromagnetic fields are present everywhere in our environment but are invisible to the human eye. There are natural and human-made sources of electromagnetic fields.

For example, natural electric fields are produced by local build-up of electric charges in the atmosphere associated with thunderstorms. A natural magnetic field is the earth's magnetic field, which causes a compass needle to orient in the north-south direction, and is used by birds and fish for navigation.

Besides natural sources, human-made sources can be found in:

- *Community:* power generation, high voltage distribution lines, transformers, radars, security systems, electric trains and trams, TV and radio antennas, mobile phones and their base stations etc;
- *Home:* electric appliances in the household, TV sets and computer screens, microwaves ovens, portable telephones etc;
- *Workplace:* melting, refining, aluminium production, electrolytic processes, nuclear magnetic resonance, induction heating, visual display units, medical applications etc.

Tables 3 and 4 list the main sources of static and extremely low frequency electric and magnetic fields, along with their strengths.

Table 3. Typical sources of exposure to static fields

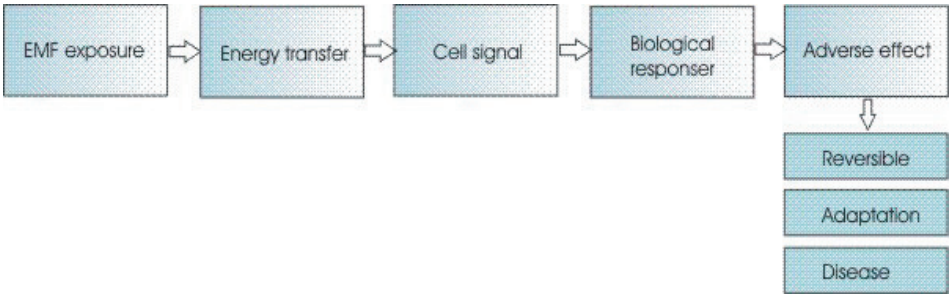
Typical electric fields		**Typical magnetic fields**	
Atmosphere (naturally occurring)	12-150 V/m	Geomagnetic field	0.03-0.07 mT
Near TV sets, Visual Display Units (VDUs)	20 kV/m	Industrial DC equipment	50 mT
Under 500 kV transmission line	30 kV/m	Magnetic levitation train	50 mT
		Magnetic resonance imaging	1.5-9 T

Table 4. Typical sources of exposure to ELF fields

Typical electric fields		**Typical magnetic fields**	
Naturally-occurring (50-60Hz)	0.1 mV/m	Naturally-occurring (50-60Hz)	0.01 nT
Underneath AC transmission line	12 kV/m	Underneath AC transmission lines	10-30 μT
Around electricity generating stations	16 kV/m	Around electricity generating stations	40-120 μT
Around appliances	0.5 kV/m	Around appliances	50-150 μT
		Industrial processes	130 mT
		Average 50-60 Hz fields in residence	0.1-0.3 μT

Biological and adverse health effects of static and oscillating extremely low frequency (ELF) field. For electric or magnetic fields to cause adverse health effects they must first interact with the biological molecules or structures and induce a change by transferring energy. In turn, this must generate a signal that can be sensed and amplified by cells to produce a subsequent response of the organism. It may sometimes, but not always, lead to adverse health effects (6).

Figure 3. Biological response on the EMF exposure



A biological response occurs when exposure to electromagnetic waves causes some noticeable or detectable physiological change in a biological system.

An adverse health effect occurs when the biological effect is outside the normal range for the body to compensate, and thus leads to some detrimental health condition.

Static electric fields do not penetrate the body, but induce an electric charge on the surface of exposed humans. For example, when touching a metal object, a charged person can experience an electric shock or spark. This spark is a result of a static electric field.

Static magnetic fields can penetrate biological tissues freely and have virtually the same strength inside the body as outside it. They can interact directly with moving charges (ions, proteins, etc.) and magnetic materials found in tissues through several physical mechanisms.

Magnetic fields have the ability to induce electric fields in matter. Therefore, although external static electric fields cannot penetrate a body, external magnetic fields can induce an electric field within the body.

Theoretically, very intense static magnetic fields could alter blood flow or change normal nerve impulses. However, there is insufficient information about the effects of long-term exposure to static magnetic field at levels found in the working environment such as increased risk of mortality and cancer, irritability, fatigue, headache, loss of appetite, altered EEG, itching, numbness, etc (7).

An oscillating ELF electric field will induce a charge on the body's surface that varies continuously and regularly in time.

An oscillating ELF magnetic field can also introduce time-varying electrical fields and currents inside the body, but mostly in the superficial tissues. These effects are also dependent on the frequency and are small for the ELF (8).

The most frequent symptoms that result from exposition to ELF electric and magnetic fields are (9):

- *the direct nerve and muscle stimulation,*
- *modulation of CNS activities,*
- *changes in cell metabolism,*
- *change in retinal function,*
- *alteration in enzyme activity,*
- *possible change in night-time melatonin levels.*

There is conflicting evidence about DNA alteration and contribution of ELF fields to cancerogenesis.

Evidence for all other cancers in children and adults, as well as other types of exposures (i.e. static fields and ELF electric fields) suggests that the ELF fields cannot initiate cancer, but might alter and promote its progression (10).

A number of epidemiological studies suggest small increase in the risk of childhood leukaemia. However, scientists have not concluded that these results are cause-effect related with ELF field exposure (11).

In June 2001, an expert scientific working group of the International Agency for Research on Cancer - IARC reviewed studies related to the carcinogenicity of static and ELF electric and magnetic fields. Using the standard IARC classification, based on epidemiological studies of childhood leukaemia, ELF magnetic fields were classified as *possibly carcinogenic to humans*. The classification is based on the strength of scientific evidence, not on the strength of carcinogenicity or risk of cancer from the agent. Thus, "possible human carcinogen" means limited credible evidence exists suggesting that exposure to ELF fields may cause cancer (12).

Some investigators have reported that ELF field exposure may suppress secretion of melatonin, a hormone connected with our day-night rhythms. It has been suggested that melatonin might be protective against breast cancer so that such suppression might contribute to an increased incidence of breast cancer, already initiated by other factors (13).

Many epidemiological studies have focused on reproductive outcomes. There is no consistent evidence for adverse effects on reproduction in women working with video display units (VDUs), and no excess risk of spontaneous abortion, malformation, low birth weight, and congenital diseases (14).

Some studies reported increasing number of Alzheimer's diseases among exposed workers (15), but more research is needed for proof of association. There is little scientific evidence for "electromagnetic hypersensitivity" – aches and pains, headaches, depression, lethargy, sleeping disorders, convulsions and epileptic seizures.

Cataracts, other eye diseases, skin rashes and itching have been studied, but they could not be linked to ELF from VDUs.

There is, however, a connection between ELF fields exposition and changes in heart frequency, modification of brain waves, and changes in time perception (16).

Electric or magnetic fields may interfere with implanted medical devices as unipolar cardiac pacemakers and cause malfunction of the device.

Raiofrequency fields and microwaves

Radiofrequency (RF) electromagnetic energy and microwave radiation is used in a variety of applications in industry, commerce, medicine and research, as well as in the home.

Common sources of RF fields include: monitors and video display units (VDUs), AM and FM radio, industrial induction heaters, RF heat sealers, medical diathermy, mobile telephones, television broadcast, microwave ovens, radars, satellite links etc.

Recently RF fields have been used in conjunction with static magnetic fields in magnetic resonance imaging (MRI).

Measurements reported in the literature (17) show that in many cases, electric and magnetic leakage fields are very high near these RF devices. The leakage fields are often extensive in some occupational situations, resulting in whole-body exposure of operators and very high absorption of RF energy.

Microwaves have wavelengths that can be measured in centimetres. The longer microwaves are used to heat the food in a microwave oven. Microwaves are also good for transmitting information like telephone calls and computer data from one place to another because microwave energy can penetrate haze, light rain and snow, clouds, and smoke. Shorter microwaves are used in remote sensing. These microwaves are used for radar like the doppler radar used in weather forecasts.

Dosimetry

The basic dosimetric quantity for RF fields above 10 GHz is the intensity of the field measured as power density in watts per square meter (W/m^2).

The basic dosimetric quantity for RF fields between 1 MHz and 10 GHz is the specific absorption rate - SAR. SAR is the quantity of the RF field's energy absorbed by a given tissue mass.

Current density is the basic dosimetric quantity for RF fields with frequencies below 1 MHz.

Biological and adverse health effects of radiofrequency and microwave fields.

RF fields above 10 GHz are absorbed at the skin surface, with very little of theenergy penetrating into the underlying tissues.

RF fields between 1 MHz and 10 GHz penetrate exposed tissues and produce heating due to energy absorption in these tissues. A SAR of at least 4 W/kg is needed to produce adverse health effects in people exposed to RF fields in this frequency range.

Induced heating in body tissues higher than 1 degree Celsius may provoke various physiological and thermoregulatory responses, including a decreased ability to perform mental or physical tasks.

Induced heating may affect the development of a fetus. Birth defects would occur only if the temperature of the fetus is raised by 2-3 degrees Celsius for hours (18). Induced heating can also affect male fertility and lead to the induction of eye opacities (cataracts).

RF fields below 1 MHz do not produce significant heating. Rather, they induce electric currents and fields in the tissues.

There is little evidence that RF radiation can initiate cancer in humans. Nevertheless, a study has suggested that it may act as a cancer promoter in animals (19,20)

Human assessment and epidemiological studies in Europe (21) report that the following specific problems may arise from RF exposition:

- RF burns or burns from contact with thermally hot surfaces
- numbness (i.e., paresthesia) in hands and fingers; disturbed or altered tactile sensitivity
- eye irritation (possibly due to fumes from vinyl-containing material)
- significant warming and discomfort of the legs of operators (perhaps due to current flow through legs to ground).

Electromagnetic fields and public health

Public perception of EMF risk

The general public is concerned that exposure to EMF from such sources as high voltage power lines, radars, mobile telephones and their base stations could lead to adverse health consequences, especially in children.

In trying to understand people's perception of risk, it is important to distinguish between a health hazard and a health risk.

A hazard can be an object or a set of circumstances that can potentially harm a person's health.

A risk is the likelihood (or probability) that a person will be harmed by a particular hazard.

A number of factors influence a person's decision to take a risk or reject it. People usually perceive risks as negligible, acceptable, tolerable, or unacceptable, and compare them with the benefits. These perceptions can depend on people's age, sex, and cultural and educational backgrounds.

Communities feel they have a right to know what is proposed and planned with respect to construction of EMF facilities that might affect their health. They want to have the right information for the sources of EMF in their homes, environment and at work, to have some control and be a part of the decision-making process (22).

Unless an effective system of public information and communications among scientists, governments, the industry and the public is established, new EMF technologies will be mistrusted and feared.

Mobile Phones.

Mobile telephones, sometimes called cellular phones or handies, are now an integral part of modern telecommunications. Their use is rapidly increasing. There is a prediction that there will be as many as 1.6 billion mobile phone subscribers worldwide in the year 2005. Because of this, increasing numbers of mobile base stations have to be installed. Base stations are low-powered radio antennae that communicate with users' handsets. In early 2000 there were about 20,000 base stations in operation in the United Kingdom and about 82,000 cell sites in the United States.

However, the exposure to the public from these stations is low. Base station antennae are typically about 20-30 cm in width and a meter in length, mounted on buildings or towers at a height of 15 to 50 meters above the ground. These antennae emit RF beams that are typically very narrow in the vertical direction but quite broad in the horizontal direction. Because of the narrow vertical spread of the beam, the RF field intensity at the ground directly below the antenna is low. The RF field intensity increases slightly as one moves away from the base station and then decreases at greater distances from the antenna.

The handsets are small, low power radio transmitters that are held in close proximity to the head when in use. Mobile phone handsets and base stations present quite different exposure situations. RF exposure to a user of a mobile phone is far higher than to a person living near a cellular base station. However, the handset transmits RF energy only while a call is being made, whereas base stations are continuously transmitting signals.

None of the recent reviews have concluded that exposure to the RF fields from mobile phones or their base stations causes any adverse health consequence such as brain cancer (23). Other effects such as changes in brain activity, reaction times, and sleep patterns are small and have no apparent health significance (24).

On the other hand, research has clearly shown an increased risk of traffic accidents when mobile phones (either handheld or with a "hands-free" kit) are used while driving.

Public health awareness has to be raised regarding electromagnetic interference. When mobile phones are used close to some medical devices (including pacemakers, implantable defibrillators, and certain hearing aids) there is the possibility of causing interference. There is also the potential of interference between mobile phones and aircraft electronics.

International guidelines have been developed to protect everyone in the population: mobile phone users, those who work near or live around base stations, as well as people who do not use mobile phones. RF-absorbing covers or other "absorbing devices" on mobile phones cannot be justified on health grounds.

Video display units (VDUs).

A VDU is essentially a television-type monitor that displays information received from a computer (computer screen) or from a broadcast signal for television. There are different types of computer screens – with cathode-ray tube, or liquid crystal display (LCD). The large increase in computer use at the workplace and at home leads to an increased number of VDUs. It is estimated that in the year 2000 there were more than 150 million units in service worldwide (25,26).

Almost the entire electromagnetic spectrum is included in the electric and magnetic fields and optical radiation produced by VDUs, including static electric fields from the build-up of electric charge by electrons striking the front of the screen, particularly when there is low humidity.

When first introduced into the workplace, VDUs were suggested as the cause of many health complaints, for example, headaches, dizziness, tiredness, cataracts, adverse pregnancy outcomes and skin rashes. Many scientific studies were conducted to determine if electromagnetic fields (EMF) could have any health consequence. At some time other work environment conditions such as indoor air quality, job-related stress and ergonomic issues - such as posture and seating were the subjects of many epidemiological and animal studies health (27)

The most interesting and maybe most controversial are the studies about adverse pregnancy outcomes, dated from the late 1970s. The suggestion was that working with VDUs led to unusually high occurrence of spontaneous abortions and congenital malformations. But, all these studies have failed to demonstrate any effect on reproductive processes due to EMF emitted from VDUs (28).

Cataracts and other eye diseases were not found to have any link with VDU work. Symptoms such as skin rashes or itching could not be linked to EMF emissions from VDUs

Some individuals have experienced headaches or dizziness, and musculoskeletal discomfort. Researchers have studied various factors related to the indoor work environment and they found the connection between those symptoms and an improper illumination and ergonomically improper workstations.

Radars and Human Health.

Radar is an acronym for "**R**adio **D**etection **A**nd **R**anging". Radar was developed to detect objects and determine their range (or position) by transmitting short bursts of microwaves. The strength and origin of "echoes" received from objects that were hit by the microwaves is then recorded.

Radar systems detect the presence, direction or range of aircraft, ships or other, usually moving objects. Many types of radar have antennae, which are continuously rotating or varying their elevation by a nodding motion, thus constantly changing the direction of the beam. There are different types of radars: air traffic control radars, weather radars, military radars and speed control radars.

People who live or routinely work around radars have expressed concerns about long-term adverse effects of these systems on health, including cancer, reproductive malfunction, cataracts and changes in the behaviour or development of children. A recent example has been the alleged increase in testicular cancer in police using speed control hand-held radar "guns".

The very low RF environmental field levels from radar systems cannot cause any significant temperature rise. Heating effects could be expected if time is spent directly in front of some radar antennas, but they are not possible at the environmental levels of RF fields.

There is no evidence that multiple exposures to RF fields below threshold levels cause any adverse health effects or that there is accumulation of damage from repeated low-level RF exposure.

At present, there is no substantive evidence that adverse health effects, including cancer, can occur in people exposed to RF levels at or below the limits set by international standards. However, more research is needed to fill certain gaps in knowledge.

Cautionary Policies

Public exposure to EMF is regulated by a variety of voluntary and legal limits. The most important of these are the international guidelines drafted by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) together with various national safety standards. Guidelines are designed to avoid all identified hazards, from short and long term exposure, with a large margin of safety incorporated into the limit values. Actual exposure levels are nearly always far below recommended limits (29).

Current standards. Standards are set to protect our health and are well known for many food additives, for concentrations of chemicals in water or air pol-

lutants. Similarly, field standards exist to limit overexposure to electromagnetic field levels present in our environment.

Countries set their own national standards for exposure to electromagnetic fields. However, the majority of these national standards draw on the guidelines set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). This non-governmental organization, formally recognized by WHO, evaluates scientific results from all over the world. Based on an in-depth review of the literature, ICNIRP produces guidelines recommending limits on exposure. These guidelines are reviewed periodically and updated if necessary (30,31).

The responsibility to investigate fields around power lines, mobile phone base stations or any other sources accessible to the general public lies with government agencies and local authorities. They must ensure that compliance with guidelines is maintained.

With electronic devices, the manufacturer is responsible for complying with the standard limits.

ICNIRP issues guidelines on the basis of the current scientific knowledge. Most countries draw on these international guidelines for their own national standards.

Guidelines do not protect against potential interference with electro medical devices.

The table below is a summary of the exposure guidelines for the three areas that have become the focus of public concern: electricity in the home, mobile phone base stations and microwave ovens. These guidelines were last updated in April 1998.

Table 5. Summary of the ICNIRP exposure guidelines

	European power frequency		**Mobile phone base station frequency**		**Microwave oven frequency**
Frequency	50 Hz	50 Hz	900 MHz	1.8 GHz	2.45 GHz
	Electric field (V/m)	Magnetic field (μT)	Power density (W/m2)	Power density (W/m2)	Power density (W/m2)
Public exposure limits	5 000	100	4.5	9	10
Occupational exposure limits	10 000	500	22.5	45	

Source: ICNIRP, 1998

Maximum exposure levels in everyday life are typically far below guideline limits.

Due to a large safety factor, exposure above the guideline limits is not necessarily harmful to health. Furthermore, time averaging for high frequency fields and the assumption of maximum coupling for low frequency fields introduce an additional safety margin.

Typical exposure levels of electromagnetic fields at home. Electromagnetic fields at home arise from electricity transmission and distribution facilities, electric appliances in the household such as television sets and computer screens, microwave ovens, portable telephones etc. The tables below contain the data for typical electric and magnetic field strengths measured near household appliances.

Table 6. Typical electric field strengths measured near household appliances (at a distance of 30 cm)

Electric appliance	Electric field strength (V/m)
Stereo receiver	180
Iron	120
Refrigerator	120
Mixer	100
Toaster	80
Hair dryer	80
Colour TV	60
Coffee machine	60
Vacuum cleaner	50
Electric oven	8
Light bulb	5
Guideline limit value	5000

Table 7. Typical magnetic field strength of household appliances at various distances (normal operating distance in bold)

Electric appliance	3 cm distance (μT)	30 cm distance (μT)	1 m distance (μT)
Hair dryer	6 – 2000	0.01 – 7	0.01 – 0.03
Electric shaver	15 – 1500	0.08 – 9	0.01 – 0.03
Vacuum cleaner	200 – 800	2 – 20	0.13 – 2
Fluorescent light	40 – 400	0.5 – 2	0.02 – 0.25
Microwave oven	73 – 200	4 – 8	0.25 – 0.6
Portable radio	16 – 56	1	< 0.01
Electric oven	1 – 50	0.15 – 0.5	0.01 – 0.04
Washing machine	0.8 – 50	0.15 – 3	0.01 – 0.15
Iron	8 – 30	0.12 – 0.3	0.01 – 0.03
Dishwasher	3.5 – 20	0.6 – 3	0.07 – 0.3
Computer	0.5 – 30	< 0.01	
Refrigerator	0.5 – 1.7	0.01 – 0.25	<0.01
Colour TV	2.5 - 50	0.04 – 2	0.01 – 0.15
With most household appliances the magnetic field strength at a distance of 30 cm is well below the guideline limit for the general public of 100 μT at 50 Hz and 83 μT at 60 Hz.			

Source: Federal Office for Radiation Safety, Germany, 1999.

Electrical appliances differ greatly in the strength of fields they generate. Both electric and magnetic field levels decrease rapidly with distance from the appliances. In any event, fields surrounding household appliances usually are far below guideline limits (32).

Uncertainties about electromagnetic fields

Assessment of potential health risks of EMFs includes numerous uncertainties. In particular, a number of epidemiological studies suggest the existence of weak links between exposure to EMF and human disease. The studies involve a variety of diseases and exposure conditions.

Several different policies promoting caution have been developed to address concerns about public, occupational and environmental health issues in the face of scientific uncertainty. These include:

- *Precautionary Principle,*
- *Prudent Avoidance,*
- *ALARA (As Low As Reasonably Achievable).*

The Treaty of Rome states "Community policy on the environment … shall be based on the precautionary principle". The Precautionary Principle is a risk management policy applied in circumstances with a high degree of scientific uncertainty, reflecting the need to take action for a potentially serious risk without awaiting the results of scientific research.

In this definition, the *precautionary principle* is "risk-oriented", in that it requires an evaluation of risk research including cost-benefit considerations.

Prudent avoidance was initially developed as a risk management strategy for power frequency EMF by Drs. Morgan, Florig and Nair at Carnegie Mellon University. These authors in their 1989 report defined Prudent Avoidance as "taking steps to keep people out of fields by rerouting facilities and redesigning electrical systems and appliances". Prudence was defined as "undertaking those avoidance activities that carry modest costs".

Since 1989 prudent avoidance has evolved to mean taking simple, easily achievable, low cost measures to reduce EMF exposure, even in the absence of a demonstrable risk. The terms "simple", "easily achievable", and "low cost", however, lack precise meaning. Generally, government agencies have applied the policy only to new facilities, where minor modifications in design can reduce levels of public exposure. It has not been applied to require modification of existing facilities, which is generally very expensive.

Defined in this way, prudent avoidance prescribes taking low-cost measures to reduce exposure, in the absence of any scientifically justifiable expectation that the measures would reduce the risk.

In prudent avoidance, as implemented by various countries, "prudent" refers to expenditures, not an attitude to risk. It does not imply setting exposure limits at an arbitrarily low level, and requiring that they be achieved regardless of cost,

but rather adopting measures to reduce public exposure to EMF at a modest cost. There is no requirement for assessment of potential health benefits.

ALARA is an acronym for **A**s **L**ow **A**s **R**easonably **A**chievable. It is a policy used to minimize known risks, by keeping exposures as low as reasonably possible, taking into consideration costs, technology, benefits to public health and safety and other societal and economic concerns. ALARA today is mainly used in the context of ionizing radiation protection, where limits are not set on the basis of a threshold, but rather on the basis of "acceptable risk". Under these circumstances, it is reasonable to minimize risk that can be presumed to exist even at levels below recommended limits, on the grounds that what constitutes "acceptable risk" can vary widely among individuals.

ALARA has not been applied to setting public policy related to exposure to EMF. Indeed, it is not an appropriate policy for EMF (either power line or radio frequency fields) in the absence of any expectation of risk at low exposure levels and given the ubiquity of exposure.

Prudent avoidance and other cautionary policies regarding EMF exposure have gained popularity among many citizens, who feel that they offer extra protection against scientifically unproven risks. However, such approaches are very problematic in their application.

Optical part of the electromagnetic spectrum

Visible light and infrared radiation

Visible light and infrared (IR) radiation are two forms of optical radiation, and together with ultraviolet radiation, they form the optical spectrum. Within the optical spectrum, different wavelengths have considerably different potentials for causing biological effects, and for this reason the optical spectrum may be further subdivided. The term light should be reserved for wavelengths of radiant energy between 400 and 760 nm, which evoke a visual response at the retina. Light is the essential component of the output of illuminating lamps, visual displays and a wide variety of illuminators. Aside from the importance of illumination for seeing, some light sources may, however, pose unwanted physiological reactions such as disability and discomfort glare, flicker and other forms of eye stress due to poor ergonomic design of workplace tasks.

Infrared radiation is that part of the non-ionizing radiation spectrum located between microwaves and visible light.

Exposure to light and IR radiation results from various natural and artificial sources. The greatest natural source of visible light is the sun. The most significant artificial sources of human exposure to light and infrared radiation include welding and cutting, arc and infrared lamps, medical treatment with infrared

lamps for a variety of diagnostic and therapeutic purposes, general lighting with fluorescent or tungsten and tungsten-halogen lamps, optical projectors and other similar devices. The spectral emission from these sources may be limited to a single wavelength (laser) or may be distributed over a broad wavelength band.

"Near infrared" light is closest in wavelength to visible light and "far infrared" is closer to the microwave region of the electromagnetic spectrum. *"Far infrared"* waves are thermal. In other words, we experience this type of infrared radiation every day in the form of heat. The heat that we feel from sunlight, a fire, a radiator or a warm sidewalk is infrared radiation. Shorter, near infrared waves are not hot at all. These shorter wavelengths are the ones used by your TV's remote control.

Infrared radiation may also be referred to as thermal radiation (or radiant heat), and is emitted from any warm object (hot engines, molten metals and other foundry sources, heat-treated surfaces, incandescent electric lamps, radiant heating systems, etc.).

Following the classification by the International Commission on Illumination (CIE), the infrared radiation part of the spectrum is divided into IRA, IRB and IRC subparts.

Biological effects. In general, infrared radiation from the most common sources such as lamps, or from most industrial applications, will not cause any risk to the population or workers. The primary targets of an IR exposure are the skin and the eye (33).

There are at least five separate types of hazards to the eye and skin from intense light and IRR sources:

- thermal injury to the retina; the local burning of the retina results in a blind spot (scotoma);
- blue-light photochemical injury to the retina; a particular form of this injury is named, according to its source, solar retinitis;
- near-infrared thermal hazards with the potential for industrial heat cataract, known as glass blower's or furnaceman's cataract;
- thermal injury of the cornea and conjunctiva; this type of injury is almost exclusively limited to exposure to laser radiation;
- thermal injury of the skin.

Long-term exposure even at relatively low level causes heat stress to the human body.

Lasers. A laser is a device, which produces coherent electromagnetic radiant energy within the optical spectrum from the far infrared (sub millimetre) to the extreme ultraviolet. The term laser is actually an acronym for **L**ight **A**mplification by **S**timulated **E**mission of **R**adiation.

The laser process was theoretically predicted by Albert Einstein in 1916, but the first successful laser was demonstrated in 1960. In recent years lasers have found their way from the research laboratory to the industrial, medical and office setting. In many applications, such as videodisk players and optical fibber communication systems, the laser's radiant energy output is enclosed. Therefore, the user faces no health risk. However, in some medical, industrial or research applications, the laser's emitted radiant energy is accessible and may pose a potential hazard to the eye and skin.

Current laser safety standards throughout the world follow the practice of categorizing all laser products into hazard classes. Generally, the scheme follows a grouping of four broad hazard classes, from 1 through 4. Class 1 lasers cannot emit potentially hazardous laser radiation and pose no health hazard. Classes 2 through 4 pose an increasing hazard to the eye and skin. The classification system is useful since safety measures are prescribed for each class of laser. More stringent safety measures are required for the highest classes.

The International Commission on Non-Ionizing Radiation Protection (ICNIRP 1995) has published guidelines for human exposure limits for laser radiation that are periodically updated. Virtually all laser beams exceed permissible exposure limits.

Ultraviolet radiation

The ultraviolet radiation (UVR) is a form of optical radiation with shorter wavelengths and more energy than its visible counterpart. UVR is present in sunlight and is also emitted from a large number of ultraviolet sources used in industry, science and medicine.

Just as light can be divided into colours which can be seen in a rainbow, UVR is subdivided and its components - UVA, UVB and UVC.

UVC (very short-wavelength UVR) in sunlight is absorbed by the atmosphere and does not reach the Earth's surface. UVC is available only from artificial sources, such as germicidal lamps, that are very effective in killing bacteria and viruses on a surface or in the air.

UVB is the most biologically damaging UVR to the skin and eye. Although most of this energy is absorbed by the atmosphere, it still produces sunburn and other biological effects.

UVA, is normally found in most lamp sources, and is also the most intense UVR reaching the Earth. Although UVA can penetrate deeply into tissue, it is not as biologically damaging as UVB because the energy of this component of UVR is less than for UVB or UVC.

Sources of Ultraviolet Radiation. The natural source of ultraviolet radiation is sunlight. Other artificial sources are industrial ark and welding, industrial UVR lamps, "black" light, some medical treatments, germicidal UVR lamps, cosmetic tanning and general lighting.

Biological Effects. The most important localization of the biological effects caused by UVR is the skin and the eye.

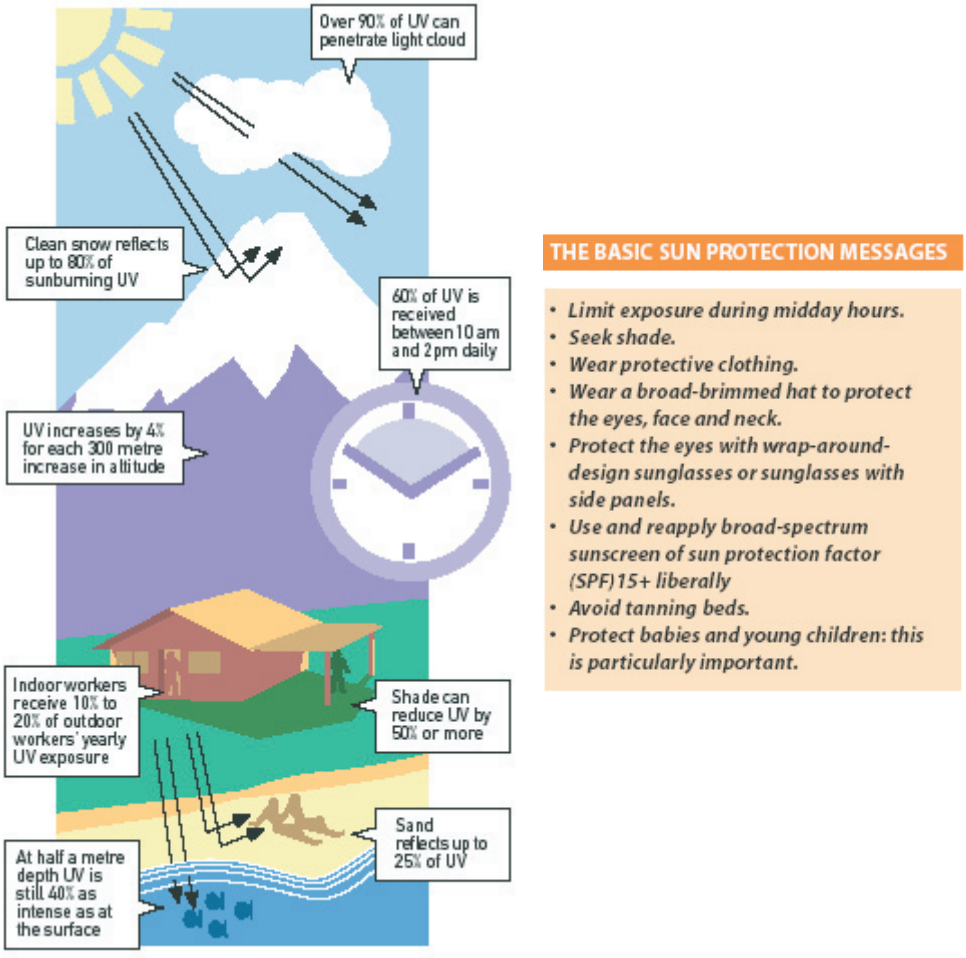
The most frequent changes on the skin are erythema or "sunburn" and photosensibilisation. Erythema normally appears in four to eight hours after exposure to UVR and gradually fades after a few days. Severe sunburn can involve blistering and peeling of the skin. UVB and UVC are both about 1,000 times more effective in causing erythema than UVA, but erythema produced by the longer UVB wavelengths (295 to 315 nm) is more severe and persists longer. The use of some medicines or certain products such as parfumes, body lotions, creams and so on may produce a photosensitising effect on exposure to UVR. Reactions to photosensitising agents involve both photoallergy (allergic reaction of the skin) and phototoxicity (irritation of the skin).

Chronic exposure to sunlight-especially the UVB component-accelerates the aging of the skin and increases the risk of developing skin cancer. Exact quantitative dose-response relationships for human skin carcinogenesis have not yet been established, although fair-skinned individuals are much more prone to develop skin cancer. Using the standard IARC classification UV-radiation was classified as probably carcinogenic to humans.

The most frequent changes on the eyes after the exposure to UVR are photo keratitis, photoconjunctivitis and retinal injury from bright light. Long-term exposure to UVR may contribute to cataract and such non-eye-related degenerative effects as skin aging and skin cancer. Between 2-3 million non-melanoma skin cancers and 132 000 melanoma skin cancers occur globally each year (34). Some 12-15 millions people are blind from cataracts and about 20% of those cataracts are connected with UVR exposure.

Small amounts of UV radiation are beneficial for people and essential in the production of vitamin D.

Figure 4. Factors that influence the UV radiation



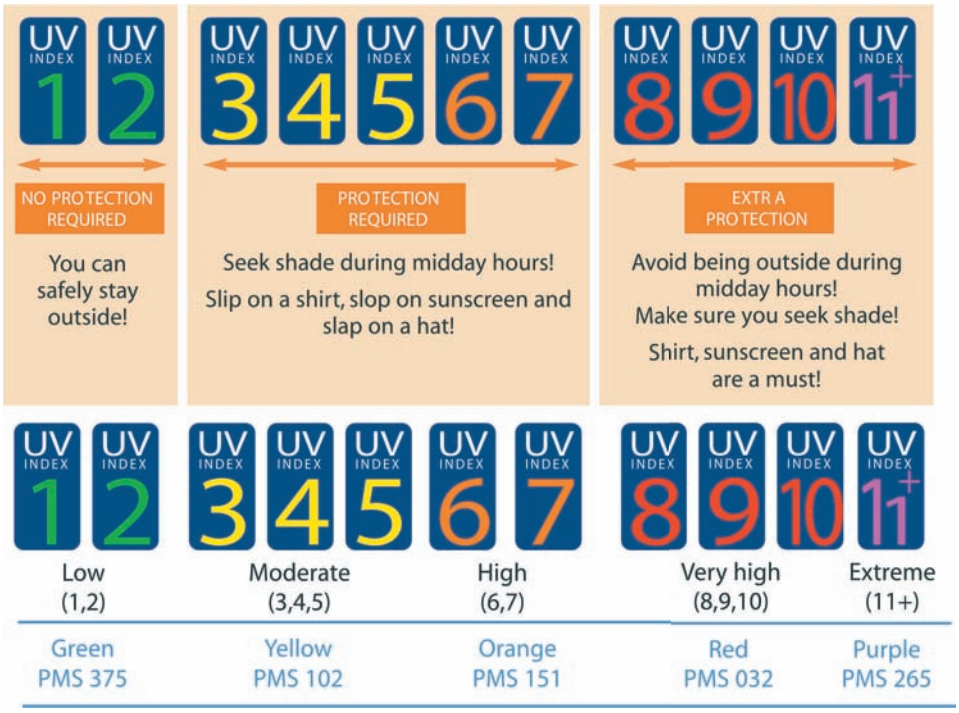
Source: WHO, WMO, UNEP, ICNIRP, 2002.

What is the global solar index? The Global Solar UV Index (UVI) describes the level of solar UV radiation at the Earth's surface. The values of the index range from zero upward – the higher the index value, the greater the potential for damage to the skin and eye, and the less time it takes for harm to occur. The UVI should especially target vulnerable and highly exposed groups within the population, e.g. children and tourists, and should inform people about the range of UV radiation-induced health effects including sunburn, skin cancer and skin ageing, and effects on the eye and immune system (35).

Graphic presentation of the UVI. A standard graphic presentation of the UVI

promotes consistency in UVI reporting on news and weather bulletins, and serves to improve people's understanding of the UVI concept. Ready-made materials for UVI reporting facilitate successful media uptake, and more than one option is given to allow different media to cope with technical limitations. The graphics package can be downloaded from the website of WHO's Global UV Project Intersun http://www.who.int/uv/.

Figure 5. Graphic presentation of UV index and required level of protection



Source: Adaptation from WHO, WMO, UNEP, ICNIRP, 2002

Simple precaution measures to prevent UV exposition:

Avoid the peak ultraviolet radiation period

Reduce exposure to the sun or seek shade during periods when the sun's ultraviolet radiation is at its most intense. If you avoid the sun during the 2 hours on either side of solar noon, you could avoid up to 60% of the day's ultraviolet radiation. Ultraviolet radiation is part of the sun's rays that causes sunburn, eye damage and leads to skin cancer and skin ageing;

Wear a Hat

A hat with a wide brim offers good sun protection for your eyes, ears, face, and the back of your neck - areas that are particularly prone to overexposure to the sun;

Wear Protective Clothing

Wear lightweight, loose-fitting clothing as much as possible. Tightly woven cloth is best, but any clothing is better than none at all;

Use Sunscreen

Apply a SPF of at least 15+ broad-spectrum sunscreen to all exposed areas of the skin as the last line of defence against the sun. Sunscreen should not be relied upon as the only form of sun protection and should be reapplied liberally every two hours;

Wear Sunglasses that Block 99-100% of UV Radiation

Sunglasses can help protect your eyes from sun damage. The ideal sunglasses don't have to be expensive, but they should block 99-100% of UVA, and UVB radiation. Check the label to see if they do. Wraparound sunglasses are best because they can protect your eyes from all angles;

Look out for the UV Index

The UV Index provides a forecast of the expected risk of overexposure to the sun and indicates the degree of caution you should take when working, playing, or exercising outdoors. The UV index will provide you with guidance as to how strong the UV will be for the day.

EXCERSISES

Health risk assessment regarding the non-ionizing radiation

The purpose of the exercise is to provide students with relevant information about the sources, possible adverse health effects and basic principles of monitoring as a condition for environmental and occupational risk assessment.

Task: Estimating the effects of non-ionizing radiation on cancer morbidity and mortality

Students read the two files containing the cancer morbidity and mortality data and data for occupation and environmental living condition. After that, they should:

- to describe the data for morbidity, mortality and exposition,

- to estimate the relations between morbidity, mortality, exposition and other environmental factors,

- to calculate the risk.

Systematic literature review

The purpose of the exercise is to provide students with basic information about relevant literature as a solid basis for health impact assessment regarding the possible effects of non-ionizing radiation.

Students will be divided in three groups and will prepare essays in accordance to Task 1-3. Each of the group will oppose or accept the findings from others.

Task 1: Determine the scope and types of the literature review

Basic needs are to define the:

• Inclusion criteria

• Exclusion criteria

Task 2: Determine the sources of relevant literature

Primary sources (such as original peer-reviewed articles)

Secondary and tertiary sources (also called grey literature) such as review articles, reports, citations in journal articles, books, literature directories, Internet databases, newspapers, personal communications and unpublished data

Task 3: Review and evaluate literature

- Develop evaluation criteria

- Evaluate each paper in relation to:

  Methods used;

  Relevance to local area;

  Validity of findings.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**The Impact of Transport on Health**
Module: 5.7	**ECTS (suggested): 0.75**
Author(s), degrees, institution(s)	**Silvia-Gabriela Scintee, MD, MSc, PhD** **Adriana Galan, IT Specialist** Institute of Public Health Bucharest
Address for correspondence	Silvia-Gabriela Scintee, MD, MSc, PhD Adriana Galan, IT Specialist Institute of Public Health Bucharest 1-3 Dr. Leonte Street 76256 Bucharest Romania Tel: +4021 2249228 ext.188, Fax: +4021 3123426 Email: gscintee@ispb.ro, agalan@ispb.ro
Keywords	Healthy transport, traffic accidents, health impact assessment.
Learning objectives	At the end of this module , students should be able to: • Discuss the notions of healthy transport and road safety; • Identify both the positive and negative effects of transport on health; • Recognize the international and regional initiatives related to healthy transport; and • Use available information for developing policy oriented reports

Abstract	This module covers the following topics: • Basic concepts • The effects of transport on health • International and regional initiatives related to healthy transport • Exercise: development of a policy-oriented report
Teaching methods	Lectures, interactive presentation of key concepts (overheads or PowerPoint presentation), group discussions, group assignments. Work in small groups (4-5 persons) and a "Fact Sheet" to be presented by each group.
Specific recommendations for teachers	It is recommended to assign 0.75 ECTS to this module. The supervised work is suggested to comprise lectures and discussion of students' assignments, whereas individual work should consist of data collection and preparation of a "Fact Sheet" draft.
Assessment of students	Should be based on the final draft of a "Fact Sheet".

THE IMPACT OF TRANSPORT ON HEALTH

Adriana Galan, Silvia-Gabriela Scîntee

Basic concepts

Transport includes walking and cycling, as well as the use of private vehicles and public transport (1). Healthy transport means less driving and more walking and cycling, backed up by better public transport (2). The notion of healthy transport was taken into account within the WHO Global Strategy on Diet, Physical Activity and Health, as more cycling and walking could promote health by increasing exercise and reducing traffic accidents and air pollution.

Another important concept is the road safety, which is a response to the growing problem of road traffic injuries and the need to step up interventions. A road traffic injury is defined by WHO as any injuries due to crashes originating, terminating or involving a vehicle partially or fully on a public highway (3). A traffic injury seems to turn road traffic crash into a road traffic accident. While a road traffic crash is defined as a collision or incident, occurring on a public road and involving at least one moving vehicle, that may or may not lead to injuries (4) a road traffic accident is a collision involving at least one vehicle in motion on a public or private road that results in at least one person being injured or killed (5).

The effects of transport on health

Transport has both positive and negative effects on health. While transport has a key role in the economy and contributes to the population well being by increasing access to different services, concern is increasing about the harm to health and the environment of current transport policies and about their social sustainability.

Positive effects

Recreation. By cycling and walking components, the transport is a mean of recreation. There is also a close related link between travel by private vehicles or public system and recreation. Transport facilities allow people to reach recreation places no matter how far they are. A national survey conducted in Great Britain by the Department of Transport shows that for 2002 the leisure (which includes visiting friends, eating out, sport and entertainment, holiday and day trips, or just to go for a walk) accounted for the highest percentage of both distance travelled and total trips, as shown in Table 1 (6).

Table 1. Journeys undertaken by purpose as a percentage of mileage and all journeys in Great Britain in 2002

Purpose	Trips per person per year (%)	Miles per person per year (%)
Commuting	19	15
Business	10	3
Education	4	11
Shopping	13	20
Leisure	40	30
Other personal business	14	21

Source: Department of Transport

Physical activity. Physical activity is defined as any body movement that results in energy expenditure (7). Transport, through walking and cycling is a form of physical activity. The health benefits are increased as the walking and cycling are promoted within the healthy transport policies.

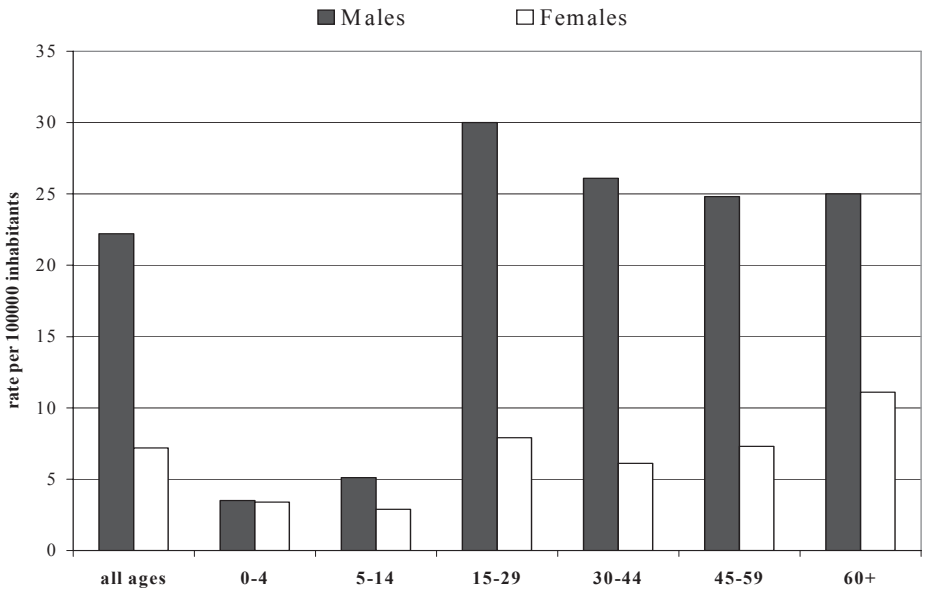
Walking is considered the nearest activity to perfect exercise. Walking has been associated with a lower risk of death in middle-aged men and specifically with a reduced risk of heart disease and colon cancer (8). Compared with walking, the health benefits of cycling are even greater because the intensity of effort is greater. Walking and cycling as means of daily transport can be the most effective strategy to achieve health gains. Furthermore, walking and cycling go beyond the benefits of physical activity, as they encompass decreasing air and noise pollution and improving the quality of urban life (8).

Improved access to different services. Transport, by its entire means, enables access to work and leisure activities, as well as to certain services such as: health services, social support services. It is well known that regions with a poor transport system encounter more health problems because of poor access of people to services, inadequate supply of drugs and sanitary materials and even lack of professionals' will to work in isolated areas.

Negative effects

Traffic accidents. In 2000, road accidents killed over 40,000 people in the European Union and injured more than 1.7 million. The most affected age group was the 15–29 year olds, especially males (see Figure 1). The directly measurable cost of road accidents was estimated at about EUR 45 billion. Indirect costs (including physical and psychological damage suffered by the victims and their families) are three to four times higher. The annual figure is put at EUR 160 billion, equivalent to 2 % of the EU's GNP (9).

Figure 1. Mortality by Road traffic injuries in Europe, by sex and age group, 2002



Source: World Report on Road Traffic Injuries Prevention, WHO 2004

Road traffic accidents represent one of the most important cause of premature death (especially among males) and an important cause of physical disability, especially among the youngest. Table 2 shows that if we use a synthetic index like DALY, combining information on the number of years of life lost from premature death with the loss of health from disability, we can notice that the rank for road traffic accidents is different when comparing mortality figures with DALY (3).

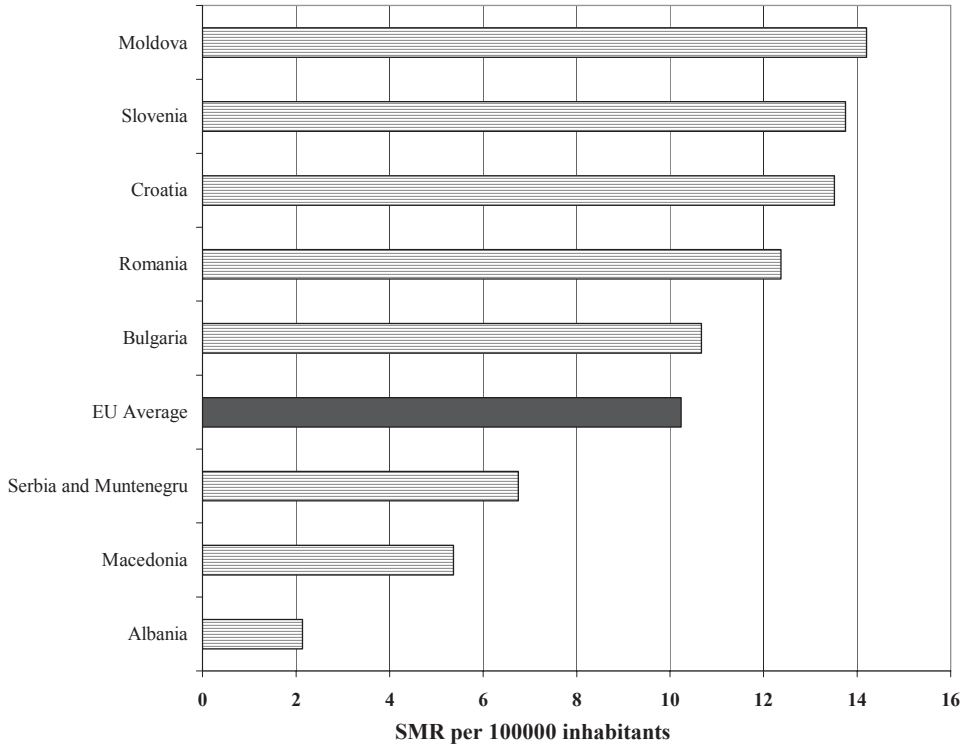
Table 2. The leading causes of mortality and DALYs, and rankings for road traffic injuries by WHO for the European Region, 2002

Deaths	**Proportion of total (%)**	**DALYs**	**Proportion of total (%)**
1. Ischaemic heart disease	24.7	1. Ischaemic heart disease	10.4
2. Cerebrovascular disease	15.1	2. Cerebrovascular disease	7.2
3. Trachea, bronchus, lung cancers	3.8	3. Unipolar depressive disorders	6.3
4. Lower respiratory infections	2.8	4. Alcohol use disorders	3.1
5. COPD	2.7	5. Hearing loss, adult onset	2.6
6. Colon and rectum cancers	2.4	6. Road traffic injuries	2.4
7. Hypertensive heart disease	1.8	7. COPD	2.3
8. Cirrhosis of the liver	1.8	8. Self-inflicted injuries	2.3
9. Self-inflicted injuries	1.7	9. Trachea, bronchus, lung cancers	2.1
10. Stomach cancer	1.6	10. Osteoarthritis	2.1
11. Breast cancer	1.6	11. Alzheimer and other dementias	2.0
12. Diabetes mellitus	1.5		
13. Road traffic injuries	1.3		

Source: World Report on Road Traffic Injuries Prevention, WHO 2004

When analysing the mortality rates in SEE countries, it can be noticed (Figure 2) that with the exception of Serbia and Montenegro, Macedonia and Albania, this rate lies above the average EU mortality rate for the remaining countries. A reverse situation is currently present in the Western countries.

Figure 2. Standardised Mortality Rate (SMR) per 100,000 Inhabitants
By Road Traffic Injuries, SEE Countries, 2000-2002



Source: HFA-2004 database

Air pollution. Increased traffic and urban congestion go hand in hand with more air and noise pollution and accidents. Frequent short journeys made with the engine cold increase fuel consumption exponentially, and emissions may be three or four times higher while traffic speed is three or four times slower. Urban transport on its own accounts for 40% of carbon dioxide emissions from road vehicles. Carbon dioxide is the main greenhouse gas causing climate change. In addition, there are the other pollutants, which have a disturbing effect on the health of town and city dwellers, in particular nitrogen oxides, which cause peaks in ozone levels, and unregulated small particles. The most vulnerable sections of the population, such as children, the elderly and the ill (with respiratory, cardio-vascular or other diseases), are the main victims and some studies have put the cost to the community at 1.7% of GDP (9). In terms of safety, one fatal accident in two takes place in urban surroundings, and the highest casualties are among pedestrians, cyclists and motorcyclists.

Noise pollution. World Health Organization estimates that about 65% of the European population (450 million) is exposed to noise levels exceeding 55 dB (A) Leq over 24 hours. Road traffic is appreciated as the main source of exposure to noise. Children chronically exposed to loud noise show impairments in the acquisition of reading skills, attention and problem-solving ability (10). Noise exposure causes annoyance, sleep disturbance, stress and adverse effects on cognition. Cardiovascular diseases including elevated blood pressure are also associated with exposure to noise (11).

European initiatives

A 5-year WHO strategy for road traffic injuries prevention

In 1974 the WHO passed a resolution to address the growing problem of road traffic accidents and their health consequences. Unfortunately, like the European Community, over the next decades WHO involvement in this area has been sporadic and unsustainable. Only in 2000 the Injuries and Violence Prevention Programme at the WHO was given full departmental status (12). In most developing countries in the world, where the burden of disease is higher, there is little public health concern and involvement for the prevention and control of the consequences of such accidents.

Commonly, aggregate global and regional data on road traffic non-fatal injuries are not routinely published or accessible. Data on non-fatal injuries are routinely available only for some high-income countries, while such data are rarely available for low/middle income countries. Routinely, these data are collected by the police and/or transport sector, but the underlying definitions and classifications of injuries severity they use are not standardized, making the comparison of data difficult if not impossible.

Despite these limitations, it was estimated that the road traffic injuries were the 9th leading cause of all disability-adjusted life years (DALY) lost and accounted for 2.8% of global disability. By 2020, it is projected that road traffic disability-adjusted life years lost will move from being the 9th rank to the 3rd (Table 3) (12). They are already the leading cause of injuries-related disability.

Table 3. Burden of Disease (DALYs lost) for 10 leading causes

Cause of death, 1998	**Cause of death, 2020**
1. Lower respiratory infections	1. Ischemic heart disease
2. HIV/AIDS	2. Unipolar major depression
3. Perinatal conditions	***3. Road traffic injuries***
4. Diarrhoeal diseases	4. Cerebrovascular disease
5. Unipolar major depression	5. Chronic obstructive pulmonary disease
6. Ischemic heart disease	6. Lower respiratory infections
7. Cerebrovascular disease	7. Tuberculosis
8. Malaria	8. War
9. Road traffic injuries	9. Diarrhoeal diseases
10. Chronic obstructive pulmonary disease	10. HIV/AIDS

Source: WHO, Evidence, Information and Policy, 2000

This WHO Strategy aims to integrate road traffic injuries prevention into public health programmes at country level, in order to reduce the sufficiently high levels of road traffic injury rate.
Three strategic objectives were established:

- To build capacity at national and local level to monitor the magnitude, severity and burden of road traffic injuries;
- To incorporate road traffic injury prevention and control into public health agendas around the world; and
- To promote action-orientated strategies and advocate for prevention and control of the health consequences of motor vehicle collisions.

The strategy was developed for the three areas where the WHO can add value, i.e. epidemiology, prevention and advocacy (12). For each of the three above-mentioned areas, there is designed a framework that presents the strategy, plan of action, proposed outcomes, partners and timeline. Three major gaps in road traffic injuries prevention process were detected:

- Inaccurate or missing data on the magnitude of the problem, related risk factors and economic consequences;
- Inadequate evaluation of prevention efforts in middle and low income countries;
- Limited awareness of the problem, particularly among policy-makers; and
- Donors.

WHO and its partners will focus the efforts to promote the development of a multi-disciplinary national strategic plan within countries by strengthening capacity, collection of data, research, training and the development of appropriate road traffic injuries prevention interventions. It should be stressed that concerted multisectoral efforts, strong partnerships and international co-operation will be required to push such an agenda forward.

EU White Paper – European transport policy for 2010 – time to decide

For a long time the European Community was unable or maybe unwilling to implement the common transport policy promoted by the Treaty of Rome (13) in 1957. After many decades, in 1992, the Treaty of Maastricht has set up the political, institutional and budgetary foundations for the European transport policy (13). The Maastricht Treaty introduced for the first time the concept of the trans-European network. This new concept has urged the design of a plan of action for the transport infrastructure at European level, with the financial support of the Community. The Commission's first White Paper on the future development of the common transport policy was published in December 1992, having as guiding principle the opening-up of the transport market in EU.

The Transport White Paper adopted by the European Commission on September 12, 2001 (13) describes in detail the present situation with regard to European transport and establishes an ambitious action plan comprising about 60 objectives to be implemented until 2010.

Current European problems described by this document can be summarised as follows:

- Unequal development of different modes of transport:
  - goods' transport market: road – 44%, short sea shipping – 41%, railways – 8%, inland waterways – 4%;
  - passengers' transport market: road – 79%, air – 5%, railway - 6%.
- Harmful effects on the environment and public health (main health effect: road traffic accidents);
- Congestion on the main road and rail routes in town and at airports.

A continuous growth in demand for transport in Europe is observed. This fact is mainly due to two factors (13):

The spectacular growth in car use. The number of cars has tripled in the last 30 years, and is expected to increase substantially by 2010 when more and more candidate countries will become EU members, countries where the car ownership is perceived as a sign of freedom and socio-economic well-being.

The shift from a "stock" economy to a "flow" economy. It is foreseen that the

strong economic growth expected in the candidate countries, and better links with other European regions, will also increase transport flows in the enlarged Europe. In 1998 the candidate countries already exported more than twice their 1990 volumes and imported more than five times their 1990 volumes.

The EU White Paper (13) proposes about 60 specific objectives to be achieved at community level under the transport policy. It also includes a detailed Action Programme until 2010, with a mid-term review in 2005.

Between these objectives there can be mentioned:

- Revitalising the railways;
- Improving quality in the road transport sector and improving road safety;
- Promoting transport by sea and inland waterway;
- Striking a balance between growth in air transport and the environment;
- Building the trans-European transport network;
- Recognising the rights and obligations of users;
- Developing high-quality urban transport;
- Putting research and technology at the service of clean, efficient transport;
- Managing the effects of globalisation; and
- Developing medium and long-term environmental objectives for a sustainable transport system.

The present European transport policy is trying to push the users foreward to represent the core of the policy. It is clear that of all modes of transport, transport by road is the most dangerous and the most costly in terms of human lives. It is stated (13) that the European Union must, over the next 10 years, pursue the ambitious goal of reducing the number of deaths on the road by half; this, by way of integrated action taking account of human and technical factors and designed to make the trans-European road network a safer network. The responsibility for taking measures to halve the number of road deaths by 2010 will fall mainly to the national and local authorities.

Member States will be asked to strengthen and focus their cooperation and exchange of experience on accident prevention and analysis, predominantly by means of common tools developed via the CARE database or the creation of an European road safety observatory, bringing all support activities under one roof for the benefit of road safety experts and the general public.

Global Road Safety Partnership

The Global Road Safety Partnership (GRSP) is a partnership involving business, civil society and governments dedicated to the sustainable reduction of road collisions in developing and transition countries (14). It was initiated by the World Bank in 1999 and located in Geneve.

The partnership operates in a limited number of focus countries where:

- road safety has been identified as a problem;
- governments are willing to tackle the issue; and
- there is an agreed framework – usually a National Road Safety Action Program – within which GRSP can operate.

GRSP is currently active in ten focus countries, three being from Europe: Poland (where the partnership started), Romania and Hungary. The partnership aims to find more effective and innovative ways of dealing with road safety problems in developing and transition countries. Through a comprehensive approach to road safety GRSP partners collaborate and coordinate road safety activities. This approach aims to build the capacities of local institutions and the ability of professionals and communities to pro-actively participate to the safety problems. GRSP strategy integrates the following key elements:

- Create a real partnership between all the key stakeholders with a strong interest in improving road safety - the business community, civil society, government and donor agencies. Partners collaborate on road safety projects and make lobby to the government to mandate and accomplish further interventions (e.g. research, major infrastructure improvements, road safety database analysis etc.).
- Undertake small-scale pilot projects with funds provided by the business members of the coalition, which demonstrate that road safety can be improved in achievable and cost-effective way.
- Share lessons learned from ongoing projects already being implemented or involved in the business sector and demonstrate that partnerships can increase development impact.

Assessment of the health effects of transport policy

Health Impact Assessment (HIA)

As in any other sector, transport policy should take into account the impact on population health. HIA is a combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population (15). Integrated Impact Assessment (IIA) and Health Needs Assessment (HNA) are other approaches used across sectors to improve health and reduce in-

equalities. Health Development Agency has made a comparative analysis of the three approaches showing how they may link together (16). Thus, when the interest is focused on a target population the appropriate approach is the Health Needs Assessment. The results are further used to inform decisions about strategies or to inform future HIAs and IIAs. When the problem of concern is a proposal (either policy, programme, strategy, plan, project or other development) either a Health Impact Assessment or an Integrate Impact Assessment is appropriate. The difference between HIA and IIA is that the second assesses the possible impact not only on health, but also on other issues, such as economic, environmental, sustainability, equal opportunities, well-being and quality of life.

World Health Organization developed HIA methods and tools to support Member States in defining and managing mobility policies that are beneficial to health. The Health Impact Assessment Methods and Strategies programme supports the development of national case studies, providing the evidence base for the integration of health considerations in transport policies. Numerous examples of national assessments of the health effects of transport policies can be found on WHO website (17).

Establishment of a health information system supporting transport policies

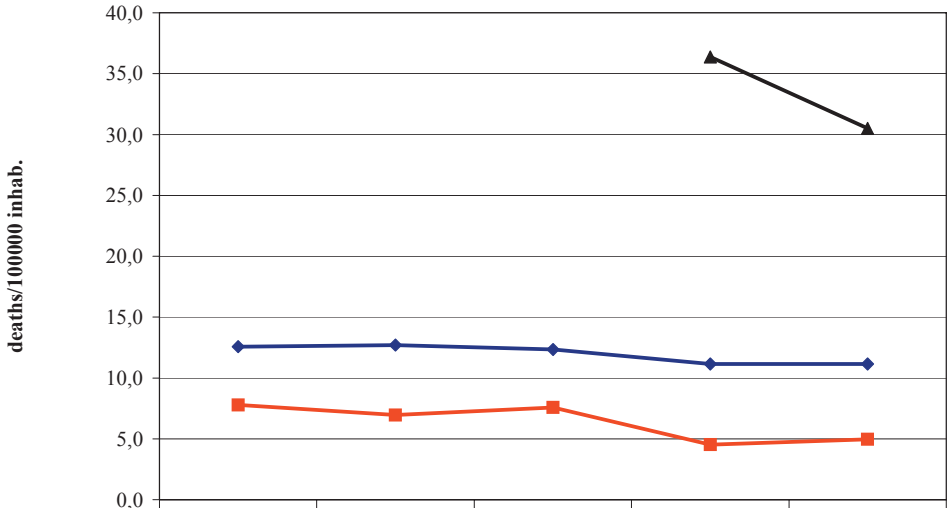
The WHO European Centre for Environment and Health (WHO-ECEH), Bonn Office, has implemented an information system consisting of environment and health indicators, endorsed by the 4th Ministerial Conference on Environment and Health, Budapest, 2004 (18). This system also includes a reporting system, in form of a Fact Sheet for each indicator, policy-oriented, to be used by different stakeholders: policy-makers, managers, civil society and international agencies. Among these indicators, traffic-related ones are included (mortality and injuries from traffic accidents).

An example of an indicator-based, transport policy-oriented report (Fact Sheet Model proposed by WHO-ECEH, Bonn Office) is presented below.

Mortality from traffic accidents in Romania

Since 1996, mortality from traffic accidents had a slight decreasing trend in Romania. This rate reached in 2000 a value of 11.1 deaths due to traffic accidents per 100,000 inhabitants, a comparative value with those for EU countries. At district level, mortality from traffic accidents ranged from 5.0 deaths due to traffic accidents per 100,000 inhabitants in Botosani (year 2000) to 30.5 deaths due to traffic accidents per 100,000 inhabitants in Ilfov (year 2000), Ilfov being the district surrounding Bucharest.

Figure 3. Mortality rate from traffic accidents, ROMANIA, 1996 - 1999



	1996	1997	1998	1999	2000
Romania	12,6	12,7	12,3	11,2	11,1
Botosani	7,8	7,0	7,6	4,5	5,0
Ilfov				36,4	30,5

Source: National Institute of Statistics and the Ministry of Health

Environmental health context:

Deaths, as well as injuries by road traffic accidents obviously represent the direct health effects. At the same time, traffic is also a major source of air, water and soil pollution. Due to the fact that the number of vehicles has sharply increased in Romania after 1990 (for example only the number of private cars has increased from 1.3 million by 1990 to 2.97 million by 2002), traffic emissions affect more the health of people, especially the urban population. Exposed people became more annoyed during the last decade on account of pollution and noise produced by traffic.

Policy relevance:

In order to reduce the number of injured or dead people from traffic accidents, The Romanian Government has issued on December 2002 an Ordinance concerning the "Circulation on Public Roads", enforced starting with February the 1st, 2003. The present Ordinance has as major objectives to better protect the human health, as well as the environmental health.

In order to achieve these objectives, some important regulations have been

updated and implemented:

- The threshold for blood alcohol level is 0.8 per mille
- It is forbidden the use of mobile phones without hand-free devices while driving
- Minimum age to apply for a driving license is 18
- Maximum speed allowed inside cities/villages was reduced to 50 km/h
- Mandatory use of seat belts inside cities too
- Rising of fines
- Several institutions (ministries and Public Administration bodies) have different responsibilities concerning the implementation of this Ordinance:
- Ministry of Transport – must secure a safe traffic behaviour and safe roads
- Ministry of Education – must introduce in the school curricula the "traffic education" topic for school pupils under 18 years of age
- Ministry of Health – elaborates the norms for medical examination of drivers, performs and certifies the lab tests to establish the blood alcohol level

Reducing injuries and deaths from accidents also represent an important target for WHO (Target 9 – "Health for all in the 21st century").

Policy context:

The government in office between 2000 and 2004 has intensified efforts to ensure stable economic growth, to prepare Romania for access to the European Union. European Transport strategies are now more proactive. Although some of the targets may be difficult to achieve in the present economic situation, they are necessary for the future orientation of the transport market in regard to mobility, efficiency, accessibility, environmental protection, safety and comfort.

In the effort to improve road safety, the European Union and the candidate countries, such as Romania, have established ambitious targets to halve the number of road crashes by 2010.

Despite strains on the Romanian economy, car ownership has risen steadily. Non-motorized transport does not play a significant role in mobility behaviour in the large cities, but both bicycles and horse drawn vehicles are significant in and around the outlying villages.

The traffic safety situation in Romania is still worse than the EU average, but over the past few years, road safety issues have begun to gain greater attention from national decision-makers. This change is partly due to pressure from international organizations such as the EC and the World Bank, but can also be attributed to a slow but growing public awareness of the importance of road safety.

National coordination of road safety activities in Romania falls under the Inter-Ministerial Council for Road Safety (ICRS). It was set up in 1995 and under its authority are five taskforce commissions:

- Human Factor for Road Safety Commission;
- Infrastructure Commission;
- Commission for Transport of Goods, Persons and for Combined Transport;
- Law Enforcement Commission; and
- Road Vehicles Commission.

Starting with 2001, the Global Road Safety Partnership-Romania (GRSP-Romania) has been working as a sixth ICRS taskforce commission in order to expand government-business-civil society partnership activities. It is working within the National Road Safety Action Plan (approved by ICRS in February 2002). It has a "2002-2003 short-term" component and a "2002-2006 long-term" component. All projects are managed by the ICRS taskforce commissions. The Minister of Transport declared the period September 2002 – September 2003 as Romanian road safety year. From the activities performed during this period of time, there can be mentioned:

- Construction of centre islands or reserve areas for slower traffic in the linear villages along the main roads
- Pedestrian crossing areas on the national road between Bucharest-Brasov (pilot project)
- Traffic calming measures around 367 schools in Bucharest
- Retro-reflective devices on slow-moving horse-drawn carriage in rural area to improve night-time visibility (included in the new Romanian Road Code)
- A weather information system to inform the truck drivers about road conditions.

As a result of dedicated work by the authorities and of all partners, in the last seven years a visible improvement of road safety has been achieved, despite rising levels of motorization. Mortality rate from traffic accidents reached in 2002 a level of 10.71 per 100,000 inhabitants (a decline of 3.5% compared with 2000).

Assessment:

Since 1996, mortality from traffic accidents had a slight decreasing trend in Romania. This rate reached in 2000 a value of 11.1 deaths due to traffic accidents per 100,000 inhabitants (19), a comparative value with those for EU countries. This means that mortality data from traffic accidents are more reliable and complete than the reported injuries from traffic accidents.

At district level, mortality from traffic accidents ranged from 5.0 deaths due to traffic accidents per 100,000 inhabitants in Botosani (year 2000) to 30.5 deaths

due to traffic accidents per 100,000 inhabitants in Ilfov (year 2000), Ilfov being the district surrounding Bucharest (19). Concerning the district rate differences, we can mention that Ilfov District, where also the rate of injuries due to traffic accidents is the highest in Romania, is an area mainly rural, surrounding Bucharest and including the International Bucharest Airport, where the traffic is extremely heavy. This can be an explanation for the high value of the indicator.

Possible explanations for the decline of the indicator since 1996 could be: considerable efforts to improve the roads and highways, even if more efforts are requested; traffic rules imposed by law were more strictly obeyed; modern cars have more safety devices (airbags); seat belts are compulsory according to the law, even in the urban areas.

From the available data on mortality due to road traffic accidents, we cannot assess the most exposed population groups. Existing data are describing only the person who caused the accident, and not the person who died or have been injured in a road traffic accident.

Data:

Table 3. Mortality from traffic accidents, 1996 to 2000, Romania and the Romanian districts

	Year				
District	**1996**	**1997**	**1998**	**1999**	**2000**
Romania	12.6	12.7	12.3	11.2	11.1
Alba	11.4	10.7	13.5	10.1	9.3
Arad	13.2	14.9	14.4	15.1	15.5
Arges	14.5	13.3	14.4	12.1	11.5
Bacau	13.4	12.3	12.6	13.1	12.9
Bihor	13.8	14.2	13.6	12.9	13.1
Bistrita-Nasaud	15.9	15.3	13.8	11.0	9.5
Botosani	7.8	7.0	7.6	4.5	5.0
Braila	11.8	15.9	13.6	12.1	10.6
Brasov	14.1	13.8	14.7	13.8	13.5
Bucuresti	11.9	12.6	13.2	7.1	5.1
Buzau	11.7	14.2	10.2	12.1	13.7
Calarasi	15.0	18.3	16.9	16.0	19.9
Caras-Severin	13.2	11.1	10.6	12.7	11.0
Cluj	14.4	14.1	13.0	10.9	9.3
Constanta	16.7	15.4	15.3	13.9	12.5
Covasna	10.8	12.1	10.4	11.3	13.0
Dambovita	10.6	11.9	12.3	11.2	10.9
Dolj	10.2	9.5	7.2	6.6	8.9
Galati	13.7	12.8	11.5	8.6	10.7
Giurgiu	16.6	14.7	14.8	14.6	14.3
Gorj	14.9	18.6	14.4	10.6	11.7
Harghita	6.7	9.6	7.3	5.6	8.2
Hunedoara	10.3	15.8	14.3	11.4	10.3
Ialomita	18.4	26.9	23.6	26.3	26.9
Iasi	10.2	10.3	10.4	8.2	8.2
Ilfov*	-	-	-	36.4	30.5
Maramures	9.9	11.4	11.3	10.0	9.4
Mehedinti	14.7	12.3	12.0	14.2	9.6
Mures	11.7	11.6	11.3	9.6	10.1
Neamt	12.1	11.5	12.3	12.8	13.5
Olt	9.7	9.2	11.3	9.0	10.4
Prahova	12.1	13.3	13.7	15.2	14.7
Salaj	8.4	7.3	8.9	9.0	7.4
Satu Mare	11.4	11.5	11.5	10.2	9.7
Sibiu	10.6	12.6	12.1	11.5	12.2
Suceava	6.6	12.4	11.3	10.2	12.0
Teleorman	7.2	7.5	7.6	7.2	6.8
Timis	12.7	11.4	11.0	9.9	10.2
Tulcea	9.0	6.0	6.8	6.1	7.6
Valcea	16.5	19.8	23.6	10.4	16.3
Vaslui	11.0	10.6	10.8	8.4	7.9
Vrancea	13.8	19.4	14.0	14.6	15.3

* Ilfov District was created only in 1997.

Source: Computing Centre for Health Statistics, 2001

Data provider:

National Institute of Statistics

Computing Centre for Health Statistics Romania

Description of the data:

- Death Certificates filled in by the physicians (family doctors, emergency doctors, hospital doctors)
- Population data from the National Institute of Statistics (Vital Statistics)
- Units of measure: no. of deaths due to traffic accidents in 100,000 inhabitants
- Only Road traffic accidents are considered
- Data are available only for resident population
- For the denominator, the visiting population data are not available.

Coverage of the data:

Data are complete with respect to population coverage in a percentage of >90.

Temporal coverage and frequency of data collection/ update:

Data concerning deaths began to be collected for the first time in Romania in 1938 and since then had a continuous collection (except the period of the Second World War).

The raw data are collected in an exhaustive manner. The doctors are obliged to report the deaths to the Vital Statistics. Data collection is performed in a continuous manner, while the data processing/reporting is performed quarterly and annually.

Data strength and weakness:

Data collection is statutory. Weakness of data consists of misdiagnosing in the deaths certificates. Data are easily accessible for the Health Care System.

There are only coding quality control mechanisms, but not data entry control mechanisms. For the population, there are data entry control mechanisms when a census is performed.

Data reliability:

The ICD Revision-10 codification is used for coding the death causes.

EXERCISES

Based on the Fact Sheet concerning "Mortality from traffic accidents in Romania" presented in the session, find the data related to this topic from your own country and try to develop a similar policy-oriented report.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Weather and Climate: Concept and Assessment**
Module: 5.8	**ECTS (suggested): 0.25**
Author(s), degrees, institution(s)	**Vladimir Kendrovski, MD, PhD** Associate professor **Dragan Gjorgjev, MD, PhD** Professor Republic Institute for Health Protection, Republic of Macedonia
Address for correspondence	Assoc. Prof. Vladimir Kendrovski, MD, PhD Prof. Dragan Gjorgjev, MD, PhD Republic Institute for Health Protection 50 Divizija 6 1000 Skopje Republic of Macedonia Tel: +389 2 3147 053 Fax:+389 2 3223 354 E-mail: kendro@mt.net.mk
Keywords	Climate change, weather, environmental health, impact assessment, excess mortality, thermal environment.
Learning objectives	After completing this module, students and public health professionals should have an increased understanding of: • The influence of weather variables on health; • The climate change and health; • The methods for assessing the susceptibility from weather variables; and • Systematic literature review.

Abstract	This module gives a short overview of the relationship between weather variables and climate change with ill-health. Climate and weather have always had a powerful impact on human health and well-being. However, like the other large natural systems, the global climate system comes under pressure from human activities. Global climate change is, therefore, a newer challenge to ongoing efforts to protect human health. Interactions between weather and climate with health are location-specific; therefore, the use of epidemiological evidence-based data at local level (if available) is important. The evidence of an association between weather and health outcomes may not imply an increased burden from climate changes. Assessments should include current vulnerability to climate variability to inform understanding of what could occur with climate change. The preferred epidemiological methods for estimating the impact of temperature on mortality are the time–series studies of daily mortality. These methods are considered sufficiently rigorous to assess short-term (day-to-day or week to-week) associations between the environmental exposure and mortality if adjustment is made for longer-term patterns in the data series. During the winter months, mortality in continental climates reaches higher levels than during the summer months. A measure of this increase is provided, on an annual basis, in the form of the excess winter mortality figure. A thorough review of the relevant literature is required to provide a solid basis for health impact assessment. Such a review identifies the existing knowledge and key gaps. One approach is to convene an expert panel to conduct the review. It is important that the most appropriate experts be identified and that they represent a range of skills and subject areas that are required for the assessment. With respect to climate change, having academic experts in the various diseases of concern as well as a climatologist would be important.
Teaching methods	After an introductory lecture, students should work in small groups, in order to discuss the efficiency as a prerequisite for an appropriate environmental health assessment regarding the weather, climate change and health. Basic skills like risk estimation and assessment have to be trained. To do so, some statistical exercises have to be conducted. Students should be taught how to review the relevant literature in this field.
Specific recommendation for teachers	Stress the importance of specific skills that a public health expert needs to possess in order to contribute to the quality improvement in environmental risk assessment. The topic allows a good combination of theoretical knowledge with practical skills. It is recommended that the module be allocated 0,25 ECTS credits, out of which two thirds should be under teachers' supervision, and the rest should consist of individual data processing and presentation work.
Assessment of students	A multiple choice questionnaire and a written report.

WEATHER AND CLIMATE: CONCEPT AND ASSESSMENT

Vladimir Kendrovski, Dragan Gjorgjev

Introduction

Over the ages, human societies have altered local ecosystems and modified regional climates. Today, the human influence has attained a global scale. This reflects the recent rapid increase in population size, energy consumption, intensity of land use, international trade and travel, and other human activities. These global changes have heightened awareness that the long-term good health of populations depends on the continued stability and functioning of the biosphere's ecological, physical, and socioeconomic systems. The world's climate system is an integral part of the complex of life-supporting processes. Climate and weather have always had a powerful impact on human health and well-being. But like other large natural systems, the global climate system is coming under pressure from human activities. Global climate change is, therefore, a newer challenge to ongoing efforts to protect human health (1).

The terms weather and climate often are used interchangeably, but they actually represent different parts of the same spectrum. According to the definition from International Panel for Climate Change (IPCC), the weather is the day to day changing atmospheric condition and climate is the average state of the atmosphere and the underlying land or water in the particular region over a particular time-scale (2,3).

Weather comprises all the various phenomena that occur in the atmosphere of a planet. On Earth the regular events include wind, storms, rain, and snow, which occur in the troposphere or the lower part of the atmosphere. Weather is driven by energy from the sun, with key factors being temperature, humidity, atmospheric pressure, cloud cover, wind speed, and elevation. Climate in a narrow sense is usually defined as the "average weather", or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period is 30 years, as defined by the World Meteorological Organization (WMO). These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system. Climate change is a statistically significant

variation in either the mean state of the climate or in its variability, persisting over an extended period (typically decades or longer) (4,5).

European populations (during the four centuries of the Little Ice Age) were all affected by nature's great climatic cycles. More acutely, disasters and disease outbreaks have occurred often in response to the extremes of regional climatic cycles such as the El Niño Southern Oscillation (ENSO) cycle. The IPCC has estimated that the global average temperature will rise by several degrees centigrade during this century. There is unavoidable uncertainty in this estimate, since the intricacies of the climate system are not fully understood, and humankind's developmental future cannot be foretold with certainty. World temperature has increased by around 0.4ºC since the 1970s, and now exceeds the upper limit of natural (historical) variability. Climatologists assess that most of that recent increase is due to human influence. Warmer average temperatures combined with increased climatic variability would alter the pattern of exposure to thermal extremes and resultant health impacts, in both summer and winter. By contrast, the public health consequences of the disturbance of natural and managed food-producing ecosystems, rising sea-levels and population displacement for reasons of physical hazard, land loss, economic disruption and civil strife, may not become evident for up to several decades (6,7,8).

Interactions between weather and climate and health are location-specific; using epidemiological evidence based on local data if they are available is therefore important. Evidence of an association between weather and health outcome may not imply an increased burden from climate change. Assessments should include current vulnerability to climate variability to inform understanding of what could occur with climate change. The extent to which an assessment addresses these issues depends on the goals of the assessment and the resources available.

The health effects of exposure to heat and cold have been studied in several populations (9,10,11). Physiological and bio-meteorological studies have shown that high and low temperatures affect health and well-being. High temperatures cause well described clinical syndromes such as heat stroke, heat exhaustion, heat syncope and heat cramps. Many causes of death increase during periods of higher temperatures (heat-waves), especially those from cardiovascular and respiratory disease in temperate countries. Epidemiological studies have described seasonal fluctuation in mortality and morbidity. Most temperate countries have a strong seasonal pattern, with mortality peaking in winter. Populations with tropical climates have considerably less seasonality in mortality patterns (1,6,12).

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Climate impact assessment

The IPCC has developed methodological guidelines for assessing climate impact. The guidelines were developed primarily for the biophysical and economic sectors and were not intended to apply to the effects on health and social systems. However, it is desirable that health impact assessment follow IPCC practice to facilitate the inclusion and interpretation of health effects in the forthcoming Fourth Assessment Report. The Fourth Assessment Report is due to be completed in 2007, with research and assessments completed by mid-2005 considered in the assessment. The methods and tools in this publication are therefore consistent with IPCC guidance. Another resource is the UNEP *Handbook on methods for climate change impact assessment* and adaptation which includes a chapter on health. The aim of the UNEP country studies programme was to improve the methods for assessing the effects of climate change in developing countries or countries with economies in transition (2, 3, 4, 13, 14).

Health impact assessment should aim:

- To evaluate the impact of climate variability and change in a range of areas and populations, especially among vulnerable populations and, when possible, to determine the attributable burden of weather and climate, including extreme events, to climate-sensitive diseases;
- To evaluate possible threshold effects;
- To evaluate the effects of multiple stresses, including changes in socioeconomic systems;
- To evaluate uncertainty and its implications for risk management;
- To evaluate the effects of reducing emissions, such as by comparing impact under scenarios with business-as-usual and stabilization of emissions; and
- To measure coping capacity, especially under different socioeconomic futures and in the context of sustainable development.

The attributable burden of climate change

Projecting mortality or morbidity into the future is difficult. An important task for public health is to know the current and future burdens of disease to facilitate health policy decisions. Projecting the potential health impact of climate change requires different methods because the objective is to estimate the impact of different types of (future) climate exposure on different (future) disease patterns at specific times in the future. At the simplest level, the burden of disease attributable to climate change can be calculated as:

Attributable burden = (estimated burden of disease under climate change scenario) – (estimated burden of disease under a baseline climate, such as that in 1961–1990).

Using this scenario-based approach, nothing changes in the future world except the climate. Although this is unlikely to be realistic, for many reasons, it is a useful approach as it separates out the contribution of climate from other factors that determine the burden of disease, such as population growth, ageing and socioeconomic development (14).

In 2002, climate change was one of the types of environmental exposure analysed in the WHO comparative risk assessment of the global burden of disease. WHO developed comparative risk assessment to quantify the burden of disease from specific risk factors and to estimate the benefit of realistic interventions that remove or reduce these risk factors. For climate change, the exposure cannot be completely removed, as some amount of climate change is inevitable in the future because of the inertia of the climate and ocean systems. The burden of disease was therefore estimated based on one "business-as-usual" scenario (projected emissions with no policy on climate) and two scenarios in which greenhouse gas emissions are reduced and greenhouse gas concentrations have stabilized at some acceptable level. For other risk factors considered in the comparative risk assessment, the aim is to consider the potential benefits of reducing the risk factor rather than taking adaptive action to reduce impact.

Avoidable burden of climate change = (estimated burden of disease under a business-as-usual climate scenario) – (estimated burden of disease under a stabilization climate scenario).

Scenarios provide an important tool for estimating the potential impact of climate change on specific health outcomes. Scenarios do not predict future worlds or future climates (13). There are many ways of applying scenarios, which have been variously defined as:

- Plausible and often simplified descriptions of how the future may develop based on a coherent and internally consistent set of assumptions about driving forces and key relationships;
- Hypothetical sequences of events constructed for the purpose of focusing attention on causal processes and decision points; and
- Archetypal descriptions of alternative images of the future, created from mental maps or models that reflect different perspectives on past, present and future developments.

Methods for estimating the effect of the thermal environment on mortality and morbidity

The preferred epidemiological method for estimating the impact of temperature on mortality is time–series studies of daily mortality, following methods developed for air pollution studies (14, 15, 16, 17, 18). These methods are considered sufficiently rigorous to assess short-term (day-to-day or week to-week) associations between the environmental exposure and mortality if adjustment is made for longer-term patterns in the data series. The relationship between temperature and mortality can be derived using a regression model that quantifies the extent to which day-to-day variability in deaths is explained by variation in temperature. An important step is to remove the seasonal component of the data series so that only the short-term (day-to-day) associations are left. This is done because non-temperature seasonal effects are thought to strongly contribute to the seasonal pattern of mortality.

Several approaches can be used to adjust for season:

- Indicators for month;
- Fourier methods that fit sine and cosine patterns to model seasonal cycles in the series; and
- Smooth or moving averages, such as the LOESS (a weighted moving average) or smoothing splines.

The relationship between temperature and mortality is often nonlinear across the whole temperature range. Most studies report a linear relationship above and below a minimum mortality temperature (or range of temperatures).Thus, the temperature–mortality relationship in temperate countries is described as nonlinear (V-shaped or U-shaped) where a minimum mortality point (or threshold) is identified. The threshold value and the slope of the temperature–mortality relationship can be quantified. Populations in tropical or subtropical climates are likely to show a different temperature–mortality relationship. Quantifying temperature-related mortality requires daily counts of deaths, ideally grouped by underlying cause of death, and temperature measured at a similar temporal and geographical resolution. Mortality data are available from national or regional registries in some places. However, the data may not be available in digital format. Coding of cause of death also varies between countries and may be incomplete. Attention should be paid to the accuracy with which the date of death is recorded. The impact of individual heat-wave events can be estimated using episode analysis. This method cannot be applied to estimate future populations at risk from climate change. Studies of heat- wave events can be used to inform the adaptation assessment. Daily meteorological variables can an be obtained for stations near the population under study. In cities, this is not usually a problem. In rural areas, however, finding a station nearby may be difficult.

As a general rule, if daily data are used, temperatures are homogeneous within about a 300-km radius if no local landscape features affect climate, such as mountains, watercourses or coastal regions. For monthly data, temperatures are similar up to 1200 km in radius. Precipitation is more localized in time and space. Such data should therefore not be used beyond a 50-km radius (daily values) or 400-km radius (monthly). For these reasons, care should be taken when aggregating variables such as precipitation and humidity over large areas. Other historical climate data sets are available when data from stations that are missing have been interpolated or supplemented with modelled data (also called re-analysis data). Although these sources are readily available online, using local observed data is preferable if possible. Using reanalysis data may give spurious results for studies of local effects (14, 19, 20).

The step of estimating the effect of the thermal environment on mortality: Example of the Skopje Study

Quantifying temperature-related mortality for Skopje requires daily counts of deaths, grouped by total and underlying cause of death (vascular and respiratory diseases), and temperature and humidity measured data at a similar temporal resolution. The meteorological data on daily counts were collected from National Hydro-meteorological Institute in Skopje and the mortality data was obtained from the State Statistical Office. The huge number of days (N=1827) for the study period from 01.01.1996 to 31.12.2000, i.e. the distribution of daily total deaths in Skopje as well as deaths from vascular and respiratory diseases, make possible the sample stratification by two periods (hot and cold) due to minimized the systematic error by confounding factor. The historical long-term monthly temperature average data for Skopje showed that April is colder than October (21, 22, 23, 24).

The design of the Study- distribution by variables:

Study period: from 01.01.1996 to 31.12.2000 VARIABLE: **TOTAL** **N= 1827**	
VARIABLE: **COLD MONTHS** *(JANUARY, FEBRUARY, MARCH, APRIL, NOVEMBER, DECEMBER)* **N=907**	VARIABLE: **HOT MONTHS** *(MAY, JUNE, JULY, AUGUST, SEPTEMBER, OCTOMBER)* **N=920**

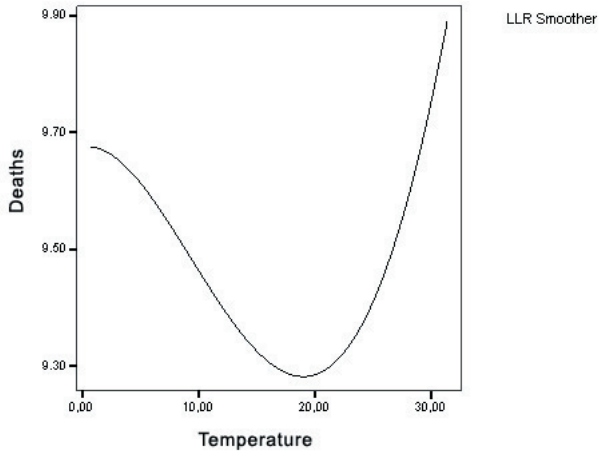
Table 1. The distribution of daily average mortality (total and specific mortality data) and weather variables (temperature and humidity) in Skopje for the period 1996-2000 by seasons

Skopje: 1996/2000	**TOTAL**				**HOT MONTHS**		**COLD MONTHS**	
	x	**SD**	**MIN.**	**MAX.**	***x***	**SD**	**x**	SD
Total mortality	10,01	3,45	1,00	24,00	9,33	3,25	10,69	3,52
Mortality from circulatory diseases	5,38	2,46	1,00	17,00	4,85	2,26	5,91	2,53
Mortality from respiratory disease	1,24	.5300	1,00	5,00	1,21	.52	1,25	.53
Temperature (^{0}C)	12,80	9,08	-11,40	31,40	20,02	5,42	5,41	5,42
Humidity (%)	65,40	15,40	10,00	100,00	51,56	9,69	72,05	14,06

Source: Kendrovski V. The influence of weather variables and climate change to urban population. Doctorial thesis. University "St.Cyril and Methodius, Skopje, 2005.

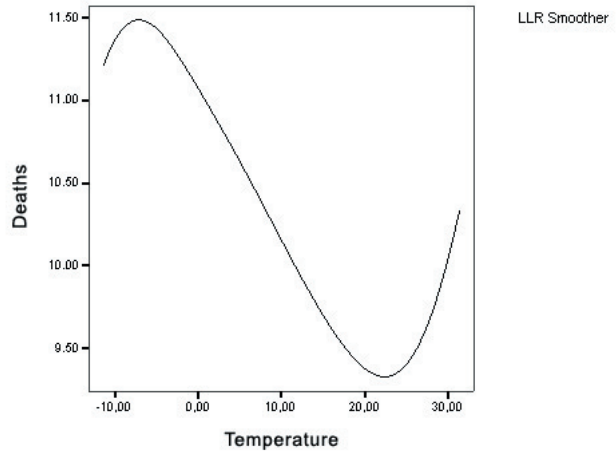
The relation between the average daily temperature and average daily deaths for the period 1996-2000, by variables using the LOESS (a weighted moving average) approach is showed as follows (fig. 1,2,3).

Figure 1. Variable: Total 1996-2000



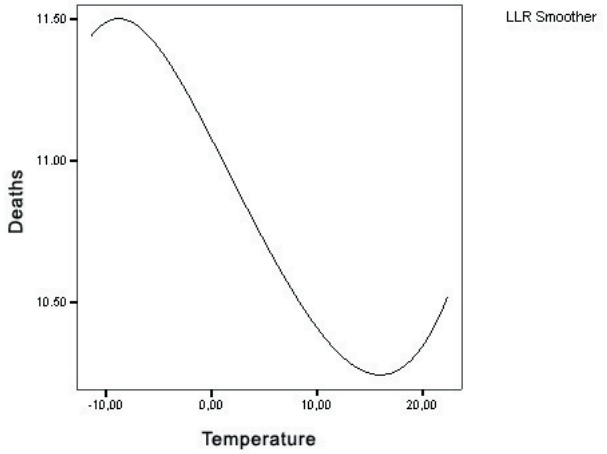
Source: Kendrovski V. The influence of weather variables and climate change to urban population. Doctorial thesis. University "St.Cyril and Methodius, Skopje, 2005.

Figure 2. Variable: HOT MONTHS 1996-2000



Source: Kendrovski V. The influence of weather variables and climate change to urban population. Doctorial thesis. University "St.Cyril and Methodius, Skopje, 2005.

Figure 3. Variable: COLD MONTHS 1996-2000



Source: Kendrovski V. The influence of weather variables and climate change to urban population. Doctorial thesis. University "St.Cyril and Methodius, Skopje, 2005.

Options for consistency and clarity

WHO recommend the IPCC approach for assessing, characterizing and reporting uncertainty within national health impact assessment (14). More formal methods have also been developed to quantify uncertainty. Authors should explicitly state what approach is being used for a specific estimate. The Bayesian approach is based on the theory that the probability of an event is the degree of belief that exists among the leading authors and reviewers that the event will occur, given the observations and modelling results and theory currently available. Scientists conducting health impact assessment are therefore encouraged to provide probability distributions for specific estimates, as this is preferable to having users less expert in the topic make their own determinations. The conclusions in the Third Assessment Report of the IPCC were assigned confidence levels according to a 5-point scale derived from the Bayesian approach. A quantitative scale was agreed to ensure that the probabilities were consistently reported. For example, "high" confidence referred to probabilities of 67–95%, and "very high" confidence referred to probabilities greater than 95%.

Epidemiological approaches to evaluating, interpreting and presenting uncertainty in health risk assessment have also been developed. The specific content of the uncertainty of analysis of climate and health depends on the objectives of the assessment. However, the following should be addressed in addition to the standard measures of statistical precision (P-values and confidence intervals):

- Qualitative estimates of uncertainty in the effect (exposure–response) estimates, which may be due to random error, bias and confounding (quantitative methods have not yet been developed);
- Uncertainty around the key assumptions, which should be investigated using sensitivity analysis, including the choice of statistical or biological model;
- Uncertainty in the baseline estimates of burdens of disease or population at risk.

Estimation of the excess winter mortality

Excess winter mortality has been reported in medical journals for about 150 years, and most countries suffer from 5% to 30% excess winter mortality (19, 20). However, there still remains much debate with regard to why certain countries experience dramatically higher rates of seasonal mortality than others. Cold strain from both indoors and outdoors has been implicated on several occasions, however other potential factors (other than cold strain) have rarely been analysed. Besides factors associated with biological and genetic considerations that have been linked with reduced health status, the health of a population is influenced by a large number of factors. During the winter months, mortality in continental climates reaches higher levels than during the summer months. A measure of this increase is provided, on an annual basis, in the form of the excess winter mortality figure. This figure is a simple way to assess mortality levels over the winter as a whole.

Excess winter mortality is calculated as winter deaths (deaths occurring in December to March) minus the average of non-winter deaths (April to July of the current year and August to November of the previous year).

The coefficient of seasonal variation in mortality is calculated using the following formula, which acts as a lower bound estimate of seasonal mortality:

CSVM = [fdeaths (Dec+Jan+Feb+Mar)]–[fdeaths(Apr+May+Jun+Jul)+ fdeaths (Aug+Sep+Oct+Nov) /2

all divided by

[fdeaths (Apr+May+Jun+Jul)+fdeaths (Aug+Sep+Oct+Nov) /2]

Example of the Skopje Study

In order to assess the impact of using the current year's special extract for January to July data, the percentage of deaths in each month which had not been registered by the following September was examined. This was done using deaths occurrences data for 1996 to 2000 and looked at death month, registration year and registration month. The table below shows the results of this analysis (24).

Table 2. The excess winter mortality in Skopje during the period 1996-2000

Skopje	Excess winter mortality in absolute numbers			Index of Excess winter mortality in %		
Period	**Males**	**Females**	**Total**	**Males**	**Females**	**Total**
1997/1996	110,5	89	199,5	18	18	18
1998/1997	12	58,5	70,5	1	11	6
1999/1998	45	69	114	6,6	13,1	9,5
2000/1999	130,5	213,5	344	19,7	44,1	30

Source: Kendrovski V. The influence of weather variables and climate change to urban population. Doctorial thesis. University "St.Cyril and Methodius, Skopje, 2005.

Systematic literature review

Thorough review of the relevant literature is required to provide a solid basis for health impact assessment. Such a review identifies existing knowledge and key gaps. One approach is to convene an expert panel to conduct the review. It is important that the most appropriate experts be identified and that they represent a range of skills and subject areas that are required for the assessment. With respect to climate change, having academic experts in the various diseases of concern as well as a climatologist would be important.

Clearly defining a search strategy is important. This would include specifying the search terms (such as exposure and outcome) and the databases that will be searched.

The types of literature to be included should be decided at the beginning of the review. The assessment may include unpublished data from official sources (such as health statistics). An experienced literature searcher familiar with the relevant public health subject area should ideally be hired to perform these activities. Comprehensive literature review requires time and money. Gaining access to literature in countries with less well developed library and Internet systems or

few literature or journal subscriptions may be difficult. A current WHO initiative is promoting access to international journals for developing countries. The Health Inter Network was created to bridge the digital divide in health, ensuring that relevant information and the technologies to deliver it. It is widely available and effectively used by health personnel: professionals, researchers and scientists and policy-makers.

EXCERCISES

1. Environmental health risk assessment regarding the weather and health

The purpose of the exercise is to provide students with basic information about the environmental health risk assessment.

Task: Estimating the effect of the thermal environment on mortality

Students read the two files containing the mortality reported data and meteorological reported data by daily account for at least 3 years. After that, they should:

- Descriptive statistic for mortality and meteorological reported data
- Estimation of the relationship between temperature (or humidity) and mortality using the smooth or moving averages, such as the LOESS (a weighted moving average) or smoothing splines.

2. Estimation of the excess winter mortality

The purpose of the exercise is to provide students with basic information about the environmental risk assessment.

Task: Estimation of the excess winter mortality

Students read the two files containing the mortality reported data and meteorological reported data by daily account for at least 3 years. After that, they should:

- Descriptive statistic for mortality and meteorological reported data
- Estimation of the excess winter mortality using the above mentioned formula and comment the differences.

3. Systematic literature review

The purpose of the exercise is to provide students with basic information about relevant literature as a solid basis for health impact assessment.

Students will be divided in three groups and will prepare essays in accordance to Task 1-3. Each of the group will oppose or accept the findings from others.

Task 1: Determine the scope of the literature review

Scope

- Inclusion criteria
- Exclusion criteria
- Types of literature
- Inclusion criteria
- Exclusion criteria (such as excluding newspaper articles or non-peer reviewed material)

Task 2: Determine the sources of relevant literature

- Primary sources (such as original peer-reviewed articles)
- Secondary and tertiary sources (also called grey literature) such as review articles, reports, citations in journal articles, books, literature directories, Internet databases, newspapers, personal communications and unpublished data

Task 3: Review and evaluate literature

Develop evaluation criteria

Evaluate each paper in relation to:

- Methods used;
- Relevance to local area;
- Validity of findings.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH

A Handbook for Teachers, Researchers and Health Professionals

Title	**Introduction to Occupational Health: History and Principles of Prevention**
Module: 6.1	**ECTS (suggested): 1.0**
Author(s), degrees, institution(s)	**Petar Bulat, MD, MSc, PhD** Associate Professor Faculty of Medicine, University of Belgrade
Address for correspondence	Prof. Dr Petar Bulat Institute of occupational health Deligradska 29 11000 Belgrade Serbia and Montenegro Tel: +381 11 3065 685 Fax: +381 11 643 675 E-mail: petar.bulat@med.bg.ac.yu
Keywords	Occupational diseases, occupational health, occupational injuries, work-related diseases.
Learning objectives	After completing this module students and public health professionals should be able to: • Understand the history, organization and the development of Occupational Health; • Understand the main goals of Occupational Health; • Recognize the main factors influencing the health of workers; • Understand different organizational models in Occupational and Environmental Health; and • Realize the role of Occupational and Environmental Health, as an important part of Public Health.
Abstract	Occupational Health is a discipline devoted to prevention and management of occupational injury, illness and disability, as well as the promotion of health and productivity of workers, their families, and communities. Having in mind that the economic and social well-being of societies is directly linked to the health of their workforce, occupational health should be recognized as in important factors for general socioeconomic development. During the history, various organizational models of occupational health have been established in Europe. So far, none of them is regarded as "perfect"; however, the evidence suggests that the "strictly preventive concept" of occupational health has some advantages compared to the mixed "preventive and curative concept".

Teaching methods	Lectures, focus group discussions, written reports, and factory visits
Specific recommendations for teachers	Students should contact at least two different occupational health services to obtain data on their organizational system, as well as to get an overview of the main health problems in enterprises covered by these two services. Students should prepare two written reports based on the findings from these two services, with a special emphasis on the achievements and failures related to the safety measures at workplace.
Assessment of students	Multiple choice questionnaires and written reports.

INTRODUCTION TO OCCUPATIONAL HEALTH: HISTORY AND PRINCIPLES OF PREVENTION

Petar Bulat

Definition of Occupational Health

Occupational health is a discipline devoted to prevention and management of occupational injury, illness and disability, as well as the promotion of health and productivity of workers, their families, and communities.

Objectives of Occupational Health

In 1950, the International Labour Organization (ILO) and the World Health Organization (WHO) defined the following aims for occupational health:

- Promote and maintain the highest degree of physical, mental and social well-being of workers in all occupations;
- Prevent the departures from health caused by working conditions;
- Protect employees in their workplaces from factors adverse to health;
- Place and maintain workers in occupational environments adapted to their physiological and psychological capabilities; and
- In summary: "To adapt the work to the individual, and each individual to his/her job".

In 1995, ILO/WHO joint committee made some additions to the abovementioned definition (1). The main objectives of occupational health were defined as follows:

1. Maintenance and promotion of workers' health and working capacity;
2. Improvement of the working environments and types of work to become conducive to safety and health; and
3. Development of "work organizations" and "working cultures" in a direction which supports health and safety at work and, in doing so, promotion of a positive social climate which may enhance productivity of the undertakings. The concept of working culture is intended in this context as a reflection of the essential value systems adopted by the undertakings concerned. Such a culture

is reflected in practice in the managerial systems, personnel policy, principles of participation, training policies and quality management of the undertakings.

Besides ILO/WHO view on occupational health (OH) objectives, there are many other standpoints in this regard. According to Felton, the objectives of OH are the following (2):

- To protect the health and well-being of workers against the stressors and potential health hazards of the work environment;
- To place job applicants or current employees in such a job which is appropriate for their physical and emotional capacities; in other words, to place the workers in jobs that can be performed without endangering their health and without damaging the property;
- To provide emergency medical care for injured or sick workers, and definitive care and rehabilitation for those with work-generated injuries or illnesses; from this point of view, employers should consider the provision of medical, surgical, or psychotherapeutic expertise, medical department policy, managerial policy, and the availability of community resources; and
- To maintain or improve the health of workers through promotional, educational, counselling, informational activities, preventive health measures including fitness or wellness programs, and periodic clinical reviews of the health status of workers.

History of Occupational Health

The history of OH traces back in antiquity. Observations of increased rates of illnesses and mortality among miners date back to Greek and Roman times. Hippocrates warned his followers to observe the environment to understand the origins of illnesses in their patients. But Bernardino Ramazzini (1633-1714) is recognized worldwide as the father of occupational medicine. He published in 1700 the book "De Morbis Artificiam Diatriba" (Diseases of Workers) – the first systematic study of trade diseases based on visits to workshops in Italy. Bernardino Ramazzini described diseases in a number of occupations such as: painters, intellectuals, potters, midwives, miners etc. He recognized mercurialism, lead intoxication among potters using lead glazes. Bernardino Ramazzini emphasized the importance of data on occupation in patient history.

The real development of Occupational Medicine started during industrial revolution. The first OH laws originate from the 19th century. During the 19th century, in England, first laws regulating child labour, work safety, and limiting working hours were installed. In 1901, in England, the first law regulating periodical check ups of workers was empowered. After it, similar laws were empowered in Germany, France and Russia. The first Institute of Occupational Health

was established in Frankfurt (Germany) at the start of the 20th century. In 1910, the first clinic of Occupational Diseases was established in Milan (Italy) and the first hospital for occupational diseases in New York (USA). The first scientific meetings on OH started with Berlin (Germany) conference on occupational diseases in 1890. The first international congress on OH was held in Milan (Italy) in 1906. In this conference, the International Commission on Occupational Health (ICOH) was established. This organization is still active and plays a major role in developments of the international OH.

Since the start of the 20th Century, development of OH in industrial countries was much more rapid than in the past centuries, especially in countries with rather developed industry. In Russia, a huge development of OH was registered after revolution. The same trend was registered in Eastern Europe after the Second World War, due to the Russian influence.

Occupational Health Facts

As already mentioned, according to ILO the total workforce is around 3200 million persons. Similar to this are the estimates of WHO: about 45% of the world's population and 58% of the population over 10 years of age belong to the global workforce.

Occupational health hazards are present in many different sectors and influence large numbers of workers.

According to ILO, out of the total workforce (3200 million), there are 800 million unemployed (26%), 150 million (5.5%) aged-workers, 250 million (8.3%) child workers, 300 million (10%) handicapped workers, 1000 million (33.3%) female workers, 150 (5.5%) migrant workers, 1000 million (33.3%) high risk workers and 750 million (25%) illiterate workers. WHO data suggests at least 30% of workers to be in hazardous physical, chemical or biological exposures, or in unreasonably heavy physical workload; an equal number of working people report a psychological overload at work resulting in stress symptoms. Many individuals spend one-third of their adult life in such hazardous work environments. About 120 million occupational accidents with 200,000 fatalities are estimated to occur annually. In addition to unnecessary human suffering, the costs involved in these health hazards have been estimated to amount up to several percent of some countries' gross national product (GNP).

According to ILO data from 2000, there are 355 millions occupational accidents per year (among which, 350.000 are fatal). Also, every year there are 160 million occupational diseases and 3 million pesticide poisonings (40.000 fatal). It is estimated that the total economic loss (4-5 % of the World GNP) due to occupational accidents and diseases is 1500 billion dollars.

Having in mind the importance of workers' well-being for development of societies, the WHO data on their hazardous exposures, as well as the data on fatalities and the consequent GNP loss, it is obvious that development of OH services is of utmost importance for all societies. But, according to WHO data, in developing countries only 5-10% of workers are covered by OH services. In developed countries, the situation is better; however, only 20-50% of workers have access to OH services in these countries. Considering the fact that most of the workers exposed to occupational hazards work in developing countries (80% of the global working population), it is obvious that there is a great need for development of OH services.

According to WHO Occupational Health for All strategy (3), the most important challenges for occupational health beyond 2000 will be: occupational health problems linked with new information technologies and automation, new chemical substances and physical energies, health hazards associated with new biotechnologies, transfer of hazardous technologies, aging of working populations, special problems of vulnerable and underserved groups (e.g. chronically ill and handicapped), including migrants and the unemployed, problems related to growing mobility of worker populations and occurrence of new occupational diseases of various origins.

Organization of Occupational Health

According to the principles of the ILO Convention No. 161 on OH Services, the primary responsibility for improvement of health and safety at work and for occupational health services at the workplace and within the enterprise lies with the employer. Most countries implement occupational health and safety policies and practices at the national level through tripartite collaboration between government, employers and employees.

Principal actors responsible for OH and safety at the workplace level are the employers and the workers who, according to the internationally accepted principles, should collaborate to carry out activities for health and safety at work (4). However, they often need advice, assistance and services of occupational health and safety experts.

In the past, two main concepts of OH organization were established, based on the existing political, social and economic systems (5, 6). The first one, "classical", or "integral" is focused on the worker and his health and, besides preventive actions include curative actions too. The second concept, "occupational and environmental health", includes environmental health as well as preventive actions. The "classical" concept was developed in Russia and implemented in various forms in Eastern European countries. The "occupational and environmental health" concept was developed in Western Europe and currently tends to

spread all over Europe. In USA, it was developed a kind of mixture of these two concepts. The main differences between the "classical" and the "occupational and environmental health" concepts relate to the caregiver of the worker. According to the "classical" concept, OH specialists apply preventive and curative measures; on the contrary, the "occupational and environmental health" concept requires family doctors or general practitioners to be responsible for treatment, whereas OH specialists should be responsible for prevention. The second most important difference is that the "classical" concept does not include environmental health as well as influences of the working conditions on environment. Thus, in this concept, the enterprise gate is the border of OH influence. Each concept has its advantages and disadvantages, which are briefly discussed below.

Advantages of the "classical" concept:

The physician who cures the worker has all the information about workplace hazards and their possible influence on worker's health. Therefore, physicians can recognize the occupational and work-related diseases better than GPs. Also, in cases of disease, physicians can assess workers' fitness. According to this concept, OH specialists have all the necessary data on workers' health and therefore they can estimate their ability for work.

Disadvantages of the "classical" concept:

OH specialists are limited to the working environment. Due to the interlinking of preventive and curative work, OH specialists tend to give advantage to the curative approach and to neglect the preventive work. Also, OH specialists in the "classical" concept do not have enough education and knowledge for curative and preventive work (7).

Advantages of the "occupational and environmental health" concept:

According to this concept, OH specialists are not limited to the working environment. Their knowledge about occupational hazards could be used also in environmental medicine. As their work is limited to prevention, it could be expected that their knowledge is sufficient and that they focus only on prevention.

Disadvantages of the "occupational and environmental health" concept:

OH specialists do not have all the necessary data when evaluating the ability for work. Family doctor who provides health care usually does not have information on working conditions. Also, during their education family doctors receive a limited knowledge on occupational health; consequently, even when they have all the necessary information on working conditions, it turns out to be of little use.

The aforementioned advantages and disadvantages of both concepts make it impossible to draw a final conclusion. Nevertheless, the evidence suggests that "occupational and environmental health" concept is gaining more and more support and, in the near future, it will become a dominant concept in Europe.

In the "occupational and environmental health" concept, OH physicians assist employers in: identifying hazards, detecting exposures, protecting the workforce, and educating people regarding workplace hazards. As the fulfilment of these tasks demands a multidisciplinary approach, OH physicians should develop an OH team within the enterprise. Usually, participants of the OH teams come from the industry (safety professionals, industrial hygienists, worker or trade union representatives, ergonomists and environmental engineers) and from medicine (family doctors, nurses, epidemiologists). In small and medium enterprises, OH teams are slightly different. In such cases, members of OH teams from the industry are owners, directors, or worker representatives. Other members of OH teams in small and medium enterprises come from external services. In some cases, bigger OH services have their own ergonomists, safety professionals, and industrial hygienists, so as they do not employ external services.

Factors influencing the health of workers

Factors influencing the health of workers are divided into four groups:

1. Physical factors;
2. Chemical factors;
3. Biological factors;
4. Socio-economical factors.

In most cases, workers are not exposed to a single hazard. Rather, they are exposed to a number of different hazards. Therefore, exposure assessment, in many cases, is a complex task. Even in the easiest situations, when workers are exposed to a limited number of well known physical and chemical hazards, exposure assessment includes a number of rather complicated procedures of ambiental and biological monitoring, job analysis and evaluation. In more complex situations when workers are exposed to new chemicals, various physical factors, work under stress, or in hostile environments, hazard assessment is very difficult.

Modern OH strategies, when analysing the factors influencing the health of workers, besides the analysis of hazards, perform also a risk assessment procedure. This is the process of characterizing and quantifying potential adverse effects of hazards. In risk assessment procedures, the goal is shifted from the concern for immediate hazards with readily perceptible linkages between a specific hazardous situation and an adverse outcome, to situations where there are only probabilistic linkages between exposure to an agent and the occurrence of an adverse health effect over a long period of time.

Occupational diseases

An occupational disease is any disease contracted as a result of an exposure to risk factors arising from work activities (ILO definition from 2002 Occupational Safety and Health Convention). All definitions of occupational diseases specify causality between the disease and the exposure factor (physical, chemical, biological and others) present in the work/activity taken into account.

In contrast with the definition of occupational diseases, which is almost similar in different countries, the structure of national lists is not uniform. Because of differences in structure and content, these lists are difficult to be compared in an international scale. It should be noted that national practices, from country to country, vary widely.

For example, in the European Union there is a significant difference among countries regarding the list of occupational diseases (8). According to the official EU sources, in Italy there is a list of 58 occupational diseases, in France 98 tables of occupational diseases, in Germany a list of 67 occupational diseases, in Austria a list of 52 occupational diseases, in United Kingdom a list of 70 occupational diseases, whereas in The Netherlands occupational diseases are not recognized at all. Also, in many EU countries there is a possibility to claim for occupational diseases through the so-called, open list (when occupational demands are found to be the determining and direct cause of the disease). It has to be mentioned that among EU countries there are great differences in prerequisite conditions for occupational diseases. All these differences make it difficult (even impossible in some cases), the comparison of occupational disease incidences. For occupational injuries there are also great differences in regulations among countries.

Generally, every country has to publish its list of occupational diseases, prerequisite conditions for its approval and reporting statutes considering the actual knowledge in the field, as well as its specificity and the economic potentials. Regulations of the occupational injuries demand clear and firm criteria, as well as definitions for approval and strong monitoring of reporting.

Occupational injuries

An occupational injury is any personal injury, disease, or death resulting from an occupational accident (ILO). According to ILO definition, an occupational accident is an unexpected and unplanned occurrence, including acts of violence, arising out of, or in connection with the work, which results in one or more workers incurring a personal injury, disease, or death. ILO suggests that occupational accidents should include travel, transport or road traffic accidents in which workers are injured and which arise out of, or in the course of work; in other words, any accident that involves an economic activity.

According to the Occupational Health and Safety Administration (OSHA) occupational injury is defined as any injury that results from a work accident or from an exposure involving a single incident in the working environment. Comparison of ILO and OSHA definitions of occupational injury does not show significant differences, expect for one detail – ILO's definition leaves open the possibility that commuting accident could cause occupational injury. ILO clearly indicates that injuries during commuting accidents as well as occupational diseases are not occupational injuries; however, many countries still did not change their regulation of commuting accidents. This difference in classification of occupational injuries causes a lot of problems in statistics of occupational accidents and injuries. Currently, there is no consensus among countries regarding this issue. Even the EU countries do not share unique regulations for occupational accidents and injuries.

Besides the aforementioned problems, there are many other problems related to occupational injuries. In some countries, regulations force employers to report every injury, even a minor one; in some other countries, employers must report only injuries which lead to sick-leave. Also, there is a problem of underreporting in some countries, as well as injuries among workers who are not officially employed. There is also a problem of comparison for two injuries; from a statistical point of view, one minor accident resulting in a finger slash is the same serious as an accident resulting with eye loss or death. To overcome this problem, tree indicators are introduced, as described below:

- Frequency rates - the number of new cases of injury during a calendar year divided by the total number of hours worked in the reference group during the year, multiplied by 1,000,000.
- Incidence rates are calculated as the number of new cases of injury during a calendar year divided by the number of workers in the reference group during the year, multiplied by 100,000.
- Days lost, by economic activity - the number of days lost by cases of occupational injury with temporary incapacity for work. In few cases, they also

include days lost by cases with permanent incapacity. The days lost are generally the calendar days during which the injured worker is temporarily unable to work, excluding the day of the accident, up to a maximum of one year. In some countries, particularly in those where sources of statistics are accident compensation schemes, days lost are expressed in workdays. Temporary absences from work of less than one day for medical treatment are not included.

It must be pointed out that changes in figures of occupational injuries over a period of time may reflect not only changes in conditions of work or in the working environment, but also modifications in the reporting procedures, or data collection methods.

Prevention of Occupational Accidents, Injuries and Diseases

Considering the fact that there are around 120 million occupational accidents per year with 200,000 fatal cases, prevention of occupational injuries is an important issue for modern societies. There are several strategies for the prevention of occupational accidents, injuries and diseases, each of them having its pros and cons.

Usually, every prevention strategy starts with the estimation of the magnitude of the problem. It has been already mentioned that there are many obstacles in recording occupational injuries and diseases which may lead to wrong conclusions. Nonetheless, prevention strategies are usually designed at the national level, so the policy makers are aware of the data limitations. In the process of data analysis, a particular attention has to be focused on the comparison of data between different industrial branches and, if possible, within the most affected industrial branches. Depending on the results of the data analysis, there are several options for prevention. The first one is to start a global national activity on safe work through media, trade unions, chambers of commerce backed up with increased presence of labour inspectors in the field. The second option is to focus activities on the most affected sectors (in most countries it is the construction industry). The third option is to start a national activity with focus on most affected sectors. Whichever option is selected, it is of utmost importance to involve all stakeholders. Active participation of trade unions, employers and government is essential. The general focus of all campaigns has to be directed towards the promotion of safe work and benefits for individuals, groups and societies. Besides the general focus, campaigns should be focused on the statistics of accident reports. During such campaigns, particular attention should be given to the rectification of problems discovered in this process.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Occupational Lung Diseases as Public Health Problem**
Module: 6.2	**ECTS (suggested): 0.25**
Author(s), degrees, institution(s)	**Jovanka Karadzinska-Bislimovska, MD, PhD** Professor of occupational health, Institute for Occupational Health, WHO Collaborating Centre, Skopje, Macedonia **Jordan Minov, MD, MrSci** Institute for Occupational Health, WHO Collaborating Centre, Skopje, Macedonia **Snezana Risteska-Kuc, MD, MrSci** Teaching Assistant, Institute for Occupational Health, WHO Collaborating Centre, Skopje, Macedonia
Address for correspondence	Prof. Jovanka Karadzinska-Bislimovska Institute for occupational health, WHO Collaborating Centre II Makedonska brigade No 43 1000 Skopje Macedonia Tel: + 3892 2621428 Fax: + 3892 2621428 E-mail: bislimovska_j@yahoo.com
Keywords	Occupational lung diseases, public health, prevention
Learning objectives	After completing this module students and public health professionals will increase knowledge in public health aspects of occupational lung diseases and will understand an importance of preventive and health promotion strategy in this filed.

Abstract	Exposure to occupational factors can lead to respiratory impairment and occupational lung diseases. From a public health perspective, the fact that occupational agents related to different workplaces are the most preventable causes of respiratory diseases is very important for guiding occupational health promotion strategies. Workplaces at risk for occupational lung diseases present a wide variety among which mining, metallurgy, construction, chemical, textile, pharmacological industry, food processing industry, agriculture, and health care workers are dominant. Tobacco smoking is the principal avoidable additional factor which is very important to consider in the scope of public health activities. The majority of lung diseases caused by occupational respiratory agents do not have specific features and it is not easy to distinguish occupational lung disease from those without occupational origin. Diagnosis has to be based on the clinical findings, specific tests and examinations, as well as epidemiology of disease and personal occupational history with confirmed specific exposure. Occupational lung diseases cover entire spectrum of respiratory diseases ranging from asbestos-related lung disease, silicosis, coal workers' pneumoconiosis, and byssinosis to chronic obstructive pulmonary disease, hypersensitivity pneumonitis, occupational asthma and lung cancer. Understanding the relationship between the workplace and lungs of exposed workers can provide adequate prevention of occupational lung diseases through all the specific measures including public health activities. Health promotion, workplace training programs, sharing the information regarding occupational respiratory risks and transfer of knowledge should provide concrete preventive activities to achieve healthy and safe workplace.
Teaching methods	Teaching methods will include introduction lecture, seminar, interactive small group discussions which will be followed by group reports and overall discussion.
Specific recommendations for teachers	This Module will be organised within 0.25ECTS credits. Students should be informed about basic epidemiology.
Assessment of students	Assessment will be based on seminar paper and case problem presentations.

OCCUPATIONAL LUNG DISEASES AS A PUBLIC HEALTH PROBLEM

Jovanka Karadzinska –Bislimovska, Jordan Minov, Snezana Risteska-Kuc

Introduction

Lungs are an easily accessible target organ for different hazardous agents from many working environments and a most vulnerable part of the body to airborne threats. Thus, exposure to occupational agents can lead to respiratory impairment. "The lungs are particularly affected by working environment because one can decide not to eat or drink while at work, but nobody can decide not to breathe" is the main message from Prof. Andrea Rossi in the preface of European Respiratory Monograph, concerning Occupational Lung Diseases, 1999.

Occupational lung diseases are a very important public health issue because understanding the relationship between the workplace and the lungs of exposed workers can provide adequate prevention of occupational lung diseases through all the specific measures including public health activities. Identifying the exact aetiology of the illness can facilitate formulation of the diagnosis, prevention of the progress of disease and this can give assistance in correction of a hazardous work environment. Public health programs concerning occupational lung diseases enable the possibility to prevent occupational factors as causes of respiratory diseases.

Workplace exposure and health determinants

A workplace exposure can either be the cause, a contributing factor or an aggravating factor in the development of a lung disease. Occupational factors are the causal respiratory agents related to different workplaces which when continuously inhaled, can damage the airways and lung parenchyma. Occupational respiratory agents are classified as physical agents (ionizing radiation for example), chemical substances and biological agents (micro organisms), as well as airborne particles (of mineral and organic origin). They can provoke different adverse health effects: irritating, allergenic, toxic or carcinogenic.

Many types of work are primary associated with respiratory health hazards and development of occupational lung diseases. In this process, the determinants of occupational exposure are basic. They include intensity, frequency and duration of exposure, physical and chemical properties of agents as well as lack of application of preventive measures on all levels. In addition, genetic constitution, age, gender, socioeconomic status, tobacco smoking (active and passive) can be distinguished as contributing factors. Some of them, tobacco smoking for instance, is the principal avoidable additional factor which is very important to consider in the scope of public health activities focused on preventable factors which are to be reduced or eliminated. Smoking can interact with occupational respiratory agents especially with occupational carcinogens and banning smoking can play important role in prevention of occupational lung cancer. Smoking as a confounding factor in the development of many other occupational lung diseases such as silicosis, asbestosis or asthma is well recognized. The question of adverse health effects of the passive smoking (environmental tobacco smoke - ETS) in exposed workers has not been yet clarified. The results however confirm the harmful effects of ETS exposure at work in both smokers and non-smokers. The process of tobacco control should include banning of smoking in the workplace as an important priority in public health. Campaign against tobacco smoking is an obligatory part of the public health campaign against lung diseases in order to promote health at the workplace.

Exposure to some occupational respiratory agents can lead to non-specific respiratory symptoms like coughing or chest tightness but also to very serious specific respiratory entities like silicosis or malignant pleural mesothelioma in workers exposed to asbestos. The clinical manifestations are presented in different forms, with different periods of latency, for instance, an acute form such as pulmonary oedema, acute allergic alveolitis or chronic diseases such as silicosis and lung cancer.

The majority of lung diseases caused by occupational respiratory agents do not have specific features and it is not easy to distinguish occupational lung disease from those of no occupational origin. Diagnosis has to be based on the clinical findings, specific tests and examinations, as well as on the epidemiology of the disease and the personal occupational history with confirmed specific exposure.

For compensation purposes, occupational lung diseases are defined in specific regulations, for instance, List of occupational diseases. Statutory notification or compensation is not a relevant source for defining the extent of occupational lung diseases by official statistics and thus the problem is often underestimated.

There are no uniform methods for the assessment of impairment/disability and reporting, recognizing and compensation of occupational lung diseases at international level and the regulatory issues and medical-legal aspects in this filed differ between countries.

The Surveillance of Work Related and Occupational Respiratory Diseases project, based on self-reported, work-related disease by interview in a representative sample of the working population was conducted in the United Kingdom, in 1995. From the total of 40 000 examined workers, 7% reported an illness in the last year, that was caused or worsened by work and lower respiratory diseases (mostly asthma) ranked third among the most common self-reported work-related diseases categories (1). It was estimated by ILO in 1999 that work-related injuries and diseases annually kill 1.1 million people world-wide, 34% due to cancer, 25% due to injuries and 21% due to chronic respiratory diseases. In 1997, the overall economic losses resulting from work related diseases and injuries were about 4% of the world's gross national product. According to the WHO data from 1999, respiratory diseases were responsible for 9% of the costs for work-related diseases and injuries. However, the real assessment of the problem of occupational lung diseases, especially in the frame of estimation of the global burden of occupational lung diseases is actually missing, due to under-diagnosing and under-reporting of occupational diseases in many countries of the world.

Workplaces at risk for occupational lung diseases present a wide variety among which mining, metallurgy, construction, chemical, textile, pharmacological industry, food processing industry, agriculture, and health care workers are dominant. Nevertheless, there is no technological process or work activity without possible occupational risks for occupational lung disorders.

Basic issues for prevention strategies refer to importance of key elements regarding the prevention of occupational lung diseases and the involvement of the employees and employers in the application of the general concept of prevention.

Epidemiology of the occupational lung diseases

Occupational lung diseases cover the entire spectrum of respiratory diseases ranging from asbestos-related lung disease, silicosis, coal workers' pneumoconiosis, and byssinosis to chronic obstructive pulmonary disease, hypersensitivity pneumonitis, occupational asthma and lung cancer. The contribution of occupational lung diseases to morbidity and mortality in the general population has changed quantitatively and qualitatively over the years (2). Pneumoconiosis related to dust exposure in the industries such as underground mining dominated at the beginning of the past century. In the developed countries over the last decades there is a shift from pneumoconiosis due to asbestos and silica exposure to work-related obstructive lung disease such as occupational asthma (3). At the same time, the contribution of the effects of exposure to some agents (e.g. asbestos) to morbidity and mortality is still rising due to the long latency period between exposure and manifestations of the disease (4).

Unfortunately, in most of developing countries the epidemiology of occupational lung diseases has not changed. The pneumoconiosis is still the most prevalent disease as a result of old technologies, insufficient control of specific exposure and working environment, inadequate use of protective measures.

The World Health Organization and The International Labor Office, 1997 have jointly started an initiative for the global elimination of silicosis. The initiative is to remind all stakeholders as policy makers, social partners and occupational health professionals that silicosis is preventable and the ultimate target of elimination should be achievable.

The disease burden of a population, as well as its distribution across different subpopulations (e.g. adolescents, women) are important for defining strategies and designing protective measures to reduce workplace risks and improve population health. Epidemiological studies of occupational lung diseases have been conducted for more than a century. The monocausal diseases such as silicosis and asbestos-related lung disease are almost exclusively associated with occupational exposure and trends over time and distribution of different industries and geographic areas can be evaluated efficiently through national registries of occupational diseases. By contrast, for multicausal diseases such as occupational asthma and chronic obstructive pulmonary disease, reliable information can only come from well-designed epidemiological studies.

Indicators used in the epidemiological evaluation of occupational lung disease are mortality rate, incidence, prevalence, attributable fraction (i.e. the fraction of deaths or disability from asthma that is attributable to occupational exposure), relative risk (risk for certain occupational lung disease development in the workers with specific workplace exposure compared to unexposed workers as a reference category; i.e. relative risk = 1.00) and DALYs (disability-adjusted life years, a weighted estimate of the numbers of years lived with disability).

WHO defines the geographic distribution of the occupational lung diseases using the sub regional division (5).

Occupational asthma

Occupational asthma (OA) is "a disease characterized by airway inflammation, variable airflow limitation, and airway hyper responsiveness due to causes and conditions attributable to a particular occupational environment and not to stimuli encountered outside the workplace" (6). Pepys who made an important contribution to the field of OA with his pioneer works in the 1960s and 1970s suggested the following: "Having made diagnosis of asthma, it is then necessary to establish a relationship to the work as recommended by Ramazzini in 1713" (7).

Two types of OA are recognized by whether they appear after a latency period: 1. OA with latency period or allergic OA that may be caused by high molecular weight (HMW) and low molecular weight (LMW) agents; and 2. OA without latency period termed irritant-induced asthma or reactive airway dysfunctional syndrome (RADS) (8).

OA is the most common non-malignant occupational lung disease in the industrialized countries, in many cases undiagnosed and unreported (9). Hundreds of workplace agents have been associated with OA and as often it is not possible to conduct available exposure assessment, nor obtain relative risk data for all the factors contributing to OA, occupation is used as a proxy for exposure to agents that are associated with its development.

Mortality

Despite the fact that asthmatics rarely die from their asthma, mortality from asthma exists. Steenland et al. reported in 2003 that about 5% of the mortality associated with non-malignant work-related respiratory disease in the USA was due to asthma (10).

Incidence

Estimates of incidence of OA vary between countries and occupations, ranging from 3-18 per million, per year in the USA to 187 per million, per year in Finland, with intermediate estimates of 20-40 per million in the UK and 50 per million in Canada. In spite of these differences, an increase of the incidence over the 1980s has been suggested (11).

Prevalence

The prevalence of OA also varies between countries and occupations, ranging from 5% among wood workers, 7-10% among bakers, 20-30% among laboratory technicians, 20-50% among workers in a platinum-refining industry, and up to 69% among workers processing polyvinyl chloride (fume form). Macedonian original epidemiological data indicates the prevalence of OA of 5% among grain workers, 5.7% among rice workers and 8% among pharmaceutical industry workers (12).

Attributable fraction

In a Finnish study conducted at the beginning of this decade the overall population attributable fraction for OA was estimated to be 18% (17% and 29% for women and men, respectively) (13). According to the analysis of data sets from the European Community Respiratory Health Survey (ECRHS) the proportion of asthma attributable to occupational exposure was estimated to be 5-10% (14). Balmes et al. (15) estimated that 15% of cases of asthma in USA were attributable to occupational exposure.

Relative risk

WHO experts on the base on the works of Karjalainen et al. (13) and Kogevinas et al. (16) estimated the highest relative risk for asthma by occupation in mining and manufacturing for male (1.95 and 1.56, respectively) and in agriculture and manufacturing for female (1.41 and 1.33, respectively).

DALYs

According to the WHO data the highest numbers of age-specific DALYs (given in thousands) due to OA for males were calculated in the age group 15-29 (670) and the lowest one in the age group 80-89. The highest and lowest numbers of age-specific DALYs for female was calculated also for the age groups 15-29 (228) and 80-89 (17).

The number of DALYs due to OA worldwide in 2000 was 1,110 for male and 511 for female. The highest number of DALYs for male (310) and female (166) was calculated for WHO sub region SEAR D (Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Maldives, Myanmar, Nepal, Timor Leste). The lowest number of DALYs for male (16) was calculated for sub region AMR D (Bolivia, Ecuador, Guatemala, Haiti, Nicaragua, Peru) and lowest one for female (3) for EMR B (Bahrain, Cyprus, Iran, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates) (17).

Chronic obstructive pulmonary disease

Chronic obstructive pulmonary disease (COPD) is defined as "a disease state characterized by progressive development of airflow limitation that is not fully reversible. The airflow limitation is usually both progressive and associated with abnormal inflammatory response by the lungs to noxious particles or gases" (18). COPD overlaps between emphysema and chronic bronchitis that are two distinct processes often present in combination. According to the comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990

and projected to 2020 done by Murray and Lopez COPD is expected to be the fifth-highest cause of disability in the world (19).

Cigarette smoking is a specific cause of COPD. The effect of smoking is confined to a part of smokers, commonly 15-20% (20). Data in The Republic of Macedonia indicate a prevalence of 36%, of active smokers in the country, referring to population group aged over 15 years and in the population of industrial workers it is found to be 55% (21). The natural history of COPD is characterized by a progressive and irreversible decline in lung function. As Fletcher et al. in 1970s demonstrated, the rate of forced expiratory volume in one second (FEV1) decline, due to the age is about 25 mL/yr in non-smokers, about 50 mL/yr in smokers leading to a moderate airways obstruction and the smokers with the sharpest decline (about 100 mL/yr) develop respiratory symptoms and severe obstruction (22).

Many studies have reported that some occupational environments, particularly workplace exposures to dusts, involve a risk of COPD. This effect is variable and is likely to be less potent than the smoking factor. Interactions between smoking and occupations are probably relevant (23). As both cross sectional and longitudinal studies suggest workplace exposure to quartz or silica, coal, chromium, cadmium, nickel, platinum, and cotton may increase the rise of accelerated FEV1 loss, which in general is greater in smokers than in non-smokers. Conducting studies that evaluate occupational COPD is complicated as a consequence of inability to distinguish the effect of workplace exposure and other causes. This situation differs from occupational asthma, where the acute deterioration with specific exposure can be used to make the diagnosis, as well as pneumoconiosis which radiology can separate from other causes.

Mortality

Mortality rates for COPD in Europe included in the European Respiratory Society Consensus Statement for the period 1988-1991 ranged from > 30 deaths per 100,000 people per year in Hungary, Denmark and former East Germany to about 10 deaths per 100,000 people per year in Spain, France and Greece (24).

Prevalence

The prevalence of COPD in the USA at the end of 1980s was found to be 4-6% for adult Caucasian males and 1-3% for adult Caucasian females (25). In the 1990s Strachan et al. (26) reported prevalence of COPD in the UK of 10% for males and 11% for females.

Attributable fraction

AF for COPD due to occupational dust exposure in the USA at the end of 1980s is estimated to be 14% (on the base on a community-based study of severe COPD). Finnish study reported AF for COPD due to workplace exposure of 14% for men and 5% for women. Recent review by American Thoracic Society reports AF for COPD due to workplace dust exposure of 15% (17).

Relative risk

Considering the relative risk of COPD mortality in unexposed subjects (trade, finance, and services) as 1.00 Korn et al. (27) found relative risk in high-exposed subjects (mining, manufacturing, and construction) in both developed and developing WHO sub regions of 1.8 for male and 1.4 for female. The relative risk obtained in low-exposed subjects (agriculture, electricity, and transportation) in developed WHO sub regions was found to be 1.4 and 1.2 for male and female, respectively, as well as 1.2 for male and 1.1 for female in developing sub regions (17).

Disability-adjusted life years (DALYs)

The highest numbers of age-specific DALYs (given in thousands) due to COPD caused by workplace exposure for males were calculated in the age group 45-59 (992) and the lowest one in the age group 15-29 (88). The highest and lowest numbers of age-specific DALYs for female was calculated for the age groups 70-79 (166) and 15-29 (45).

Number of the DALYs (given in thousands) from COPD caused by workplace exposure worldwide is much greater than from OA (3,733 vs 1,110). The highest number of DALYs for male (1,485) and female (378) was calculated for WHO sub region WPR B (Cambodia, China, Cook Islands, Fiji, Kiribati, Lao Peoples' Democratic Republic, Malaysia, Marshall Islands, Micronesia, Mongolia, Nauru, Niue, Palau, Papua New Guinea, Philippines, Republic of Korea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, Viet Nam). The lowest number of DALYs for male (6) and female (0) was calculated for WHO sub region AMR D (Bolivia, Ecuador, Guatemala, Haiti, Nicaragua, and Peru) (17).

Pneumoconiosis

Silicosis, asbestosis and coal workers pneumoconiosis are the most often observed pneumoconiosis caused by workplace exposure to mineral dust (mineral dust diseases).

Silicosis is defined as a diffuse interstitial fibrosis of the lungs caused by inhalation of one of the forms of crystalline silica (most frequently quartz). Silica exposure commonly occurs in mining, stonecutting, sandblasting, and demoli-

tion of buildings (1.2 - 3 million exposed workers in the USA) (28). The disease may be rapidly fatal in less than 2 years in spite of the worker being removed from exposure. More frequent, in long- term, relatively less intense exposure, silicosis appears after 15 to 20 years of exposure as uncomplicated interstitial lung fibrosis (simple form) or progressive massive fibrosis (PMF). Patients with silicosis are at a greater risk of acquiring Mycobacterium tuberculosis infections (silicotuberculosis) (29).

Asbestosis is a form of diffuse interstitial lung fibrosis caused by inhalation of asbestos fibres. Asbestos was first used extensively in the 1940s. Workplace exposure to asbestos has been significantly reduced since 1980s when its adverse effects have been documented. Exposure to asbestos used to occur in mining, milling, construction trades (pipe fitters, boiler makers), manufacture of fire-smothering blankets, safety garments, friction materials etc. Asbestos-related lung damage may be manifested as interstitial lung fibrosis (asbestosis), pleural plaques and pachypleuritis, lung cancer, and pleural mesothelioma. Tobacco smoke seems to be an important contributing factor in asbestos-related malignant tumours development.

Coal workers pneumoconiosis is a form of interstitial lung fibrosis that occurs in coal miners as a result of exposure to coal dust, often containing silica ("mixed dust" pneumoconiosis).

The incidence and prevalence of pneumoconiosis is decreasing in most western countries. The decline occurs as a consequence of work exposure control over time, changing in the basic industries (mining, foundries), and substitution of asbestos by less hazardous materials (even a complete ban in some countries). This does not apply to developing countries where the pneumoconiosis is still the most prevalent disease. At this moment silicosis is the most important form of interstitial fibrosis due to mineral dust exposure.

Diagnosis of pneumoconiosis in epidemiological studies is based on radiograph interpretation according to the International Labour Organization (ILO) combined with occupational history (30).

Prevalence

Pneumoconiosis contributed with only 9% of the total number of occupational lung diseases in the UK in 1997 according to the Surveillance of Work-related and Occupational Respiratory Disease (SWORD) reporting system (3). The prevalence of coal workers pneumoconiosis declined according to four surveys conducted among US coal workers in the period 1969-1988 from 12.7%, 11.2%, 3.0%, to 3.9% (31). In a 25 years follow-up longitudinal study on tunnel workers, Mijalkov et al. reported a prevalence of silicosis of 10,5% (32) . The prevalence of

asbestosis in Republic of Macedonia, evaluated in a cross sectional study among asbestos workers was found to be 3.7% (21).

Attributable fraction

Silicosis, asbestosis, and coal workers pneumoconiosis are essentially only caused by work-related exposures and the attributable fraction for these diseases is 100% (17).

Disability-adjusted life years (DALYs)

The number of DALYs calculated for pneumoconiosis is much lower than the number of DALYs calculated for COPD or OA.

The highest number of DALYs (given in thousands) for silicosis for both male [107] and female [41] was calculated for WHO sub region WPR B (Cambodia, China, Cook Islands, Fiji, Kiribati, Lao Peoples' Democratic Republic, Malaysia, Marshall Islands, Micronesia, Mongolia, Nauru, Niue, Palau, Papua New Guinea, Philippines, Republic of Korea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, Viet Nam), whereas the lowest one for both male [2] and female [0.3] was calculated for WHO sub region AMR D (Bolivia, Ecuador, Guatemala, Haiti, Nicaragua, Peru).

The highest number of DALYs for asbestosis for male [93] was calculated for sub region WPR A (Australia, Brunei Darussalam, Japan, New Zealand, Singapore), whereas the lowest one [0.9] for sub region AMR D (See above). The highest number of DALYs for asbestosis for female [40] was calculated for sub region WPR B (See above), whereas the lowest one [0.3] for sub region AMR D (See above).

The highest numbers of DALYs for coal workers pneumoconiosis for male [41] was calculated for sub region WPR B (See above), whereas the lowest one [0.008] for sub region AMR D (See above) (17).

Hypersensitivity pneumonitis and related diseases

Hypersensitivity pneumonitis (HP) or extrinsic allergic alveolitis (EAA) is a lung disease commonly related to the workplace caused by inhalation of a variety of antigen substances including animal proteins, fungi, bacteria, as well as inorganic molecules (e.g. isocyanates) by a susceptible host. The exposure induces an inflammation that involves the alveolar structures and the lung interstitium. HP was first described by Campbell in 1932 in farmers exposed to mouldy hay and termed "farmer's lung .

HP commonly occurs in farmers, woodworkers, mushroom workers, tobacco

workers, coffee workers, malt workers, bird and cattle breeders, and chemical workers (29).

The organic dust toxic syndrome (ODTS) is a pulmonary disease also commonly related to the workplace caused by inhalation of organic dust, characterized by alveolitis, whereas the lung interstitium is not affected. The exposures and symptoms of ODTS overlap with those of HP.

Byssinosis (cotton dust-related disease, Monday chest tightness), first described in the seventeenth century, commonly occurs in workers processing cotton, but the same syndrome to a somewhat lesser degree has been reported in exposure to flax, hemp, and jute.

The epidemiology of HP and related diseases is less described in the published literature as compared to the other non-malignant occupational lung diseases.

Prevalence

The Project Pulmonaire Sentinelle (PROPULSE) registry from Quebec, Canada, at the end of 1990s reported that 5.3% of all occupational lung diseases were HP with toluene diisocyanate and moulds as the major causes of disease (33). Data from the Finnish occupational disease registry showed that HP was the third occupational allergic respiratory disease after occupational asthma and occupational allergic rhinitis (about 10% of all allergic respiratory diseases) (34). Data from the studies reviewed indicate prevalence of HP of 3% in the workers in sugar manufacture in Italy, 4% in the US farmers, 14.4% in the Macedonian tobacco workers, etc (35).

Byssinosis used to occur in about 50% of the workers in the dustiest parts of cotton spinning process in the UK in the 1950s and 1960s. The reduction in exposure caused a reduction in prevalence, so in the 1990s the reported prevalence rates were 10% amongst high risk cotton workers and 4% in all cotton workers (36). As a consequence of working conditions similar to those present in the UK 30 years ago the prevalence rates of byssinosis in Indonesia and India in the 1980s (30% and 50%, respectively) are similar to those reported in the UK in the 1950s and 1960s (37, 38).

Prevention of the occupational lung diseases

Primary prevention.

Primary prevention is the most important part of the occupational lung diseases management that subsumes the activities which are designed to eliminate the hazards before any damage or injury has occurred. A common primary prevention requires an interdisciplinary approach that usually incorporates occupa-

tional and environmental health specialist, pulmonologist, and industrial hygiene expert.

Primary prevention activities include evaluation of the workplace and the working process, workplace health hazards assessment (e.g. qualitative and quantitative assessment of ambient air, adequate ventilation), personal and collective protective measures, prohibition of cigarette smoking at the workplace, and biological monitoring (measurement of the markers of workplace exposure not yet manifested as disease in a body fluid such as blood or urine)

Secondary prevention.

Secondary prevention includes activities for detection of the preclinical changes and arresting the process before it progresses to clinically manifested disease. A sufficient secondary prevention may be conducted in the cases of occupational asthma, particularly in the cases of allergic occupational asthma caused by high molecular weight (HMW) agents. Skin prick testing with workplace HMW agents with regular questionnaire and bronchial responsiveness evaluation in sensitized workers enable detection of the workers at the early preclinical stage of allergic occupational asthma. Secondary prevention of allergic occupational asthma caused by low molecular weight (LMW) agents is more problematic due to the difficulties in evaluation of sensitization to these agents. Detection of the preclinical changes in the workers exposed to LMW agents require periodic evaluation (respiratory symptoms questionnaire and bronchial responsiveness evaluation) of all exposed workers. Secondary prevention of occupational asthma without latency period (irritant-induced asthma) includes a respiratory symptoms questionnaire and bronchial responsiveness evaluation after every visit to the first-aid unit with respiratory symptoms.

In the cases of the other occupational lung diseases prevention activities are entirely related to tertiary prevention.

Tertiary prevention.

Tertiary prevention of the occupational lung diseases subsumes activities for early diagnosis and management of the established disease. Screening tests relevant to tertiary prevention have to be simple, easy to perform, sensitive, cheap, and reproducible.

Screening tests for tertiary prevention of occupational asthma include respiratory symptoms questionnaire, immunological assessment, spirometry and histamine or metacholine challenge. Chronic obstructive pulmonary disease can be screened by respiratory symptoms questionnaire and spirometry. For the screening purposes of pneumoconioses it is important to apply respiratory symptoms questionnaire as well as periodic radiographic assessment of the lungs supplemented with spirometry.

Early management of the established disease refers to secession of exposure and removal of the affected worker from further exposure to the offending agent and it includes non-pharmacological and pharmacological treatment as well.

Conclusion

Public health aspects of occupational lung diseases should be underlined through preventive and occupational health promotion strategies. Risk assessment is an important component and understanding the nature of exposures in the workplace and their determinants is fundamental to this process. The public health approach should include health promotion, workplace training programs and the "right-to-know" concept which refers to the mandatory sharing of information regarding occupational respiratory risks between employers, employees, regulatory agencies and local communities. Transfer of information and knowledge should provide concrete preventive activities to achieve healthy and safe workplace.

EXERCISES

Task 1: After introduction lecture the students are split in small groups (5 students) in order to prepare group reports and make overall discussion about the public health aspects of the occupational lung diseases.

Task 2: Students are asked to make an individual paper work concerning occupational lung diseases status (epidemiology, diagnosing, notification and compensation system) in their own country.

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Title	**Institutional and Non-institutional Care for Some Vulnerable Groups of Population**
Module: 7.1	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Lana Kovačević, MD** Teaching Assistant Andrija Stampar School of Public Health Medical Faculty, University of Zagreb, Croatia
Address for correspondence	Lana Kovačević Andrija Stampar School of Public Health Rockefellerova 4 10 000 Zagreb, Croatia Tel: +385 1 4566 996 Fax: +385 1 4590 275 E-mail: lana.kovacevic@snz.hr
Keywords	Social Welfare, Foster Home Care, Adoption, Aged
Learning objectives	The overall aim of this module is to increase students' awareness of adverse impact of institutional care for children without parents. The aim is also to stimulate them to improve their approach in encounter with the problem and dealing with it in social and health care system, in prevention, informing the public, education of professionals, and in possible everyday encounter in GP units, psychological counselling etc. After completing this module students and public health professionals should: • Be aware of existing the population under risk due to age and/or some adverse social circumstances, especially children without proper parental care; • Recognise the reasons which cause a problem of children abandoning; • Increase knowledge in spectrum of social (and health) care system solutions for children left alone: institutional and non-institutional care, as well as preventive measures in community; • Understand the psychosocial problems and trauma of children settled in institutions; • Identified the scope of the problem of abandoned children in general, and in her/his own country; and • Improve inter-professional understanding and collaboration in social and health care settings.

Abstract	Children without parental care and family support represent a group of population under risk for healthy psycho-social development. Because of abandonment, neglecting or abuse, parental rights can be temporarily of permanently deprived by a court and/or social welfare service. Children without parents can be settled in children's homes, in "family homes", can be fostered or adopted. Living in children's homes is burdened with many stressors: separation from native family, frequent changes of caregivers, lack of understanding of their individual problems and lack of psychotherapeutic approach by caregivers. The favourable solution for children without parental care could be non-institutional ways of care: surveillance and custody for families with problems, returning of children to native families being supported and counselled by social services. Schools, local communities and NGO should undertake their programs to improve family climate. In children's homes, quality of care should be improved through better education of caregivers and their psychotherapeutic approach to the children. Education of such children should be stimulated by support and scholarships. Older people who cannot take care of themselves can be also provided similarly: in homes, family homes, or foster families.
Teaching methods	• A short lecture (1 h) by a teacher – data and problem presentation; • Preparatory seminar under teacher supervision (2 h); • Seminar/task preparation – students' reading, consultation, visits, writing the paper (3 h); • Presentations of seminar work in the group, by the students in charge (2 h x two seminars/tasks = 4 h); • Group discussion, conclusions (2 h x two seminars/tasks = 4 h); and • Evaluation of the module, marks (1 h).
Specific recommendations for teachers	ECTS suggested - 0,50. Work under teacher supervision - 8 hours; individual students' work - 7 hours. Facilities needed - internet connection (on-line computers) for individual students' search. Training materials should include prepared laws, data and publications from Statistical Bureau/Public Health Institute/Social Welfare Institute. Some articles on research of psychosocial problem of children/elderly in social welfare institutions also welcome. Target audience are last year (6th year) medical students or postgraduate students in public health (multidisciplinary group: social workers, nurses, medical doctors, psychologists)..
Assessment of students	• Seminar paper (task 1); • Case problem presentation (task 2); • Marks by the teacher: their oral presentation and written paper.

INSTITUTIONAL AND NON-INSTITUTIONAL CARE FOR SOME VULNERABLE GROUPS OF POPULATION

Lana Kovačević

Introduction

In every society there are groups of population that are exposed to risk factors. Risk factors increase probability of adverse events and health consequences.

Some groups are considered to be vulnerable, which means they have biological risk factors; some groups are sensitive – show risk behaviours and habits; and others are exposed to environmental and social hazards.

These groups in risk, or with already manifest problems, are under special care of the welfare and/or health care systems of a state. Examples of such groups are old people who cannot take care of themselves and live independently, children without family shelter, children with behavioural problems, and mentally or physically disabled children and adults.

Extent of the problem of some vulnerable groups in population

Old people, those aged 65 and over, are vulnerable because of the increase of health problems in that age. But that group is also burdened with unfavourable socio-economic position in society. Their life-style and habits, like sedentary way of living, lack of activities, often lead to worsening their health state.

The number and proportion of old people are rising worldwide. In developed countries over 15% of population is statistically old.

At the other end of a lifespan there is childhood, sensitive period important for further development. Children who have no parents or closer relatives, who are abandoned, neglected or abused, are in high though non-specific risk.

The number of children without (appropriate) parental care is increasing in transitional and newly independent states in Central and Eastern Europe, despite of birth rate decrease. UNICEF data show that in 18 countries of that region 1% of children are protected by social care system, and the number is still growing. In Estonia, par example, amount of children without parents increased by 75% in the last decade of the 20th century. In the year 2000 more than a million of such children

are placed in the institutions, and it is for 200 thousand children more compared to the year 1990 (1).

In the whole world, there are from 135 to 210 million children without family protection, according to USAID (2) or UNICEF (3) sources. About two to five million of those children live in institutions.

A new problem of children left alone due to AIDS epidemic in Africa is also emerging. Their present number varies from 11 (4) to over 15 million (2), and will triple until 2010.

Spectrum of social care protection

These vulnerable groups of population are mostly protected by social care system. They often work together and intertwined with health care professionals in health care services. Other organisations: non-governmental, religious, those in local communities are also involved and offer their own programmes.

Reasons for special protection of children whose parents' role is damaged

Regarding care for children, there are several measures for their protection which are being undertaken according to severity of situation. Families in which social relations or parental roles are damaged, in which mistakes and omissions in care are noticed, are warned by social workers. These families can receive help, and parents are referred to counselling or "school for parents". Social service may set surveillance for families in which problems are more severe or frequent. Children can be referred to attend children's homes on part-time basis. Because of some health or economic problems, parents can temporarily entrust a child to an institution.

In a case of more severe neglecting: insufficient or bad nutrition, clothing, hygiene, medical care, school attendance control, or omission in prevention of vagrancy, begging, steeling, late nights goings-out – parents can be deprived of the right to live with the children and raise them. That measure is also temporary.

The utmost measure is reached in a case of abuse or severe neglecting of parental responsibilities. Because of physical, psychological, or sexual violence; coercion to hard work; not preventing alcohol or drug abuse, or unacceptable behaviour; as well as child abandonment, a court decides whether to deprive the parents of parental care permanently.

In the case of temporary of permanent deprivation of parental rights and care, the tutor (for legal procedure) can be designated to a child (5).

Models of institutional or non-institutional care

There is a spectrum of possible solutions and help for either abandoned children or dependent elderly.

Children without parental care can be placed in children's home, or "family home", can be fostered, or adopted by non-natural parent(s).

Children's homes ensure satisfaction of all needs of daily living: need for home, food, clothing, personal hygiene, health care, nursing, education, work activities, spare time activities.

Family home is a kind of professional care for children in which family life is imitating. Educators live with children in the same, smaller households.

Foster children are accepted to another family, which receive a financial support from a state, and their members are additionally educated for such an activity.

Similarly, older people can be settled in elderly homes, as permanent residents or part-time users; in family homes; or in foster families (6).

Characteristics and problems of living in children's homes

Separation of children form their natural – although problematic – families is always experienced as a severe loss by the children. Separation from mother in first three years of life may lead to permanent emotional problems. However, some studies show that in those cases there are always some additional circumstances that cause the psychological problem of the child: some diseases, long stay in a hospital, adverse impact of the caregivers, etc. (7).

Follow-up of the persons in children's homes from early childhood to teenage years indicates that psychological problems or mental diseases appear in the children who have been exposed to adverse circumstances not only during infancy, but throughout their childhood and youth. Children, especially those with unadjusted behaviour, change homes and caregivers frequently. But they particularly need a continuous contact with a same caregiver, and stabile relationships and environment (8).

The trauma of parental neglecting or abuse, chronic social deprivation of family, and stress of entering an institution, is often not identified by caregivers. A child should be allowed to grieve and to withdraw, their reactions should be tolerated. They should receive respect and support, feel safely, as well as be given the explanation what is happening with them in the process of legal procedure of separation, fostering, settling in a home ant the like (9).

It is also important to provide them individual psychotherapeutic treatment during first period, as well as during the whole stay in a home or foster family.

That continuous psychotherapeutic approach is insufficient or totally neglected in children's homes (9, 10).

Some studies show that children in children's homes consider their caregivers as important persons in their lives, who help them and act justly, but they still don't offer specific treatment to mach children's needs (10).

Some authors propose a screening procedure for psychological functions, needs and risks of children in process of fostering or admission in a home, in order to treat possible problems in time. Anyhow, transitional reactions in the period of placement in new environment should not be labelled as pathological disorders (11).

Follows-up of adult persons who have spent their childhood and grew up in children's homes or foster families are very rare. One survey showed that their Sense of Coherence – which represents person's orientation to life and prerequisite for health (12) – is rather low. Their general mental health, as well as affect balance, is also low (personal unpublished data).

Alternative solutions and prevention

Because of their adverse impact on psychosocial development, care for children without parents should be organised predominantly out of institutions. Children's homes are to be reorganised to become smaller, with higher quality of service, and with better educated caregivers.

As alternative to institutional care, other aspects of care should be strengthened. Social welfare centres could work more with families and children at risk through surveillance and custody. Local health centres have to establish counsellor service. Schools can also offer workshops for children and their parents to improve child–parent relationship. Non-governmental organisations are also welcome to include with their activities. Education of these children, even at university, should be stimulated by scholarships of a state or local community.

Foster parents have to be more educated for their role, have to receive professional help for consultation, and should be financially better stimulated. "Family homes" could be a model for non-institutional care. Adoption is a permanent solution in a case of children without parents alive. Coming back to natural family, after improving interrelations and parental responsibility, is the main aim. Additionally, all non-institutional aspects of care are also cheaper than placement in a children's home (13).

EXERCISES

Task 1: Find the law(s) that regulate(s) the care for children without parental care, and/or elderly who cannot take care about themselves in your country: title of the law, when it has been passed, articles that regulate these areas.

Search for the data in your own country about the number of children without parental care and the number of elderly; number and type of the institutions, professional caregivers employed, expenditure in institutions; scope of alternative and preventive measures.

Task 2: Visit a children/elderly home – make an interview with a user, and write an essay (case-study) on what you have introduced. The essay should tell a life story of a person (reasons for entering the home, family situation, health status) and her/his problems of living there.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH

A Handbook for Teachers, Researchers and Health Professionals

Title	**Birth Order, Family Structure and Health**
Module: 7.2	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Jenia Georgieva** Teaching Assistant Department of Preventive Medicine Faculty of Public Health, Medical University - Sofia **Tzekomir Vodenicharov, MD, PhD, DSc** Professor, Dean of the Faculty of Public Health, Medical University - Sofia
Address for correspondence	Jenia Georgieva Department of Preventive Medicine, Faculty of Public Health, Medical University - Sofia 8, Bialo More Str 1527 Sofia, Bulgaria Tel: +359 2 9815062 Fax: +359 2 943 21 27 E-mail: jeanager@omega.bg
Keywords	Family structure, family composition, birth order, mental health, physical health.
Learning objectives	After completing this module students and public health professionals should differentiate between the transactional and compositional dimension of family structure, as well as recognize the parameters of each dimension and increase their knowledge on the health-related effects of some parameters, as found by research studies. Students should identify typical features of the type of family structure that has shown to be related to an optimal level of health of offsprings. They should understand the significance of the basic relation in the family – the marital relation, and differentiate between complementary and symmetrical communication within the couple. Students should recognize the family boundaries and their importance. They should be aware of the preventive and health promotion meaning of this knowledge, while developing the capacity to refrain from emphasis on pathology. Also, students should recognize the need of integration of the two dimensions of family structure in future research. Finally, students should develop an understanding of the advantages of family-oriented health care and the concrete applications of systemic familial approach in prevention and health-promotion strategies.

Abstract	The module aims to providing students and public health professionals with knowledge of the family structure relatedness to mental and physical health. Students are helped to differentiate between the transactional and the compositional dimension of family structure and the advantages of each in terms of accessibility of their parameters to exploration and of the type of knowledge achieved through them. Emphasis is put on the transactional dimension i.e. family structure per se. The main part of the module fosters the identification of typical characteristics of family structure, on a continuum: severely dysfunctional, mid-range and optimal-level-of-health functioning. The health importance of congruent to the contemporary social context, transactional patterns and style of communication within the couple, is underlined. Differentiation between complementary and symmetrical communication is enabled, as well as between «clear», «overly rigid» and «diffuse» boundaries within the family (between its subsystems). Recognition of a parent/child coalition within the family structure and of its disruptive effects is furthered. In the same time, the module underlines that each family should be referred to as a social system in constant transformation, responding to new needs of its members and new information from the outside context. On this basis, students are encouraged to refrain from unneeded emphasis on pathology. Understanding of the advantages of family-oriented health care, and of familial approach to preventive and health-promotion strategies, is enhanced. In the supplementary part of the module students are acquainted with the lines taken by the 6 decades of research into one of the parameters of the second dimension of family structure - family composition, namely the parameter of birth order. Most recent findings, concerning birth order effects on the modification of the risk for certain illnesses, are provided. The need for integrating an informed-of-family-structure, qualitative aspect within this type of studies is delineated.
Teaching methods	Lectures, exercises, interactive methods, designed especially so that the small groups' contributions, when integrated, can help the group as a whole recreate the family structure and emotional dynamics of the discussed cases; thus, providing practical experience with, and deeper understanding of, the theoretical issues. Individual work on designing systemic family-oriented preventive and health-promotion strategies.
Specific recommendations for teachers	0.50 ECTS: 1. Supervised work (lectures and interactive methods); 2. Individual students' work.
Assessment of Students	Assessment is based on the student's participation in the interactive methods, and on a structured essay reflecting the individual work of designing preventive interventions.

FAMILY STRUCTURE AND HEALTH

Jenia Georgieva, Tzekomir Vodenicharov

Family structure

Family structure is a term, generated within systemic-familial approaches, and more specifically elaborated by the Structural approach to the family (1). The essence of family structure is the transactional patterns of the family (1, p.51). Its parameters include as well the family's behavioural patterns, roles, boundaries, hierarchy, and communication style.

Two dimensions of family structure.

A second dimension of the term «family structure» has come to use, due to a somewhat loose reference to its meaning of non-systemic oriented researchers. Numerous studies on single-parent families, divorced families, or on parameters like family size, birth order etc., have been classified under the topic of «family structure». That, somewhat more demographic dimension, the term has acquired in part of the literature, refers in fact to the way a family is composed i.e. to the *family composition*. Its parameters are more easily accessible to measurement, while the transactional dimension brings us deeper into the way the family is organized and into its very functioning.

This text will put emphasis on the transactional dimension of family structure in its relevance to health. The first part of the text, comprising its main body, is devoted to the differentiation that the in-depth examination of family transactional patterns and type of boundaries, allows for: a differentiation between more healthy and less healthy families.

In a second part of this text, we will pay some attention to family composition parameters, especially to the lines the examination of one of them has taken throughout the last 6 decades, namely the parameter of birth order. Illustrations will be provided of the topical, though not yet nonlinearly interpreted findings, of birth order effects on two major illnesses in the sphere of physical and mental health, respectively cancer and schizophrenia. The choice of this parameter has been made by the authors on the basis of the existing need for creating prerequisites, that would gradually lead to countering the big discrepancy around this family-related variable: birth order has been subjected to thousands of research studies within the occidental context, a growing portion of which, at present, be-

ing carried out by Public Health Institutes; while remaining a grossly neglected parameter within the Central and Eastern European public health context.

For the aims of avoiding any confusion between the two dimensions of family structure, clarified here, throughout the text we will strictly abide to the term «family structure» only when referring to the first i.e. the transactional dimension; and to the term «family composition», when referring to the second dimension.

Family structure and health

Man in his context

Structural approach to the family was developed in the second half of the twentieth century. It is one of the many responses to the concept of man as part of his environment that began to gain currency early in the century. When the artificial boundary drawn between the individual and his context became blurred, the approach to pathology had to change too. Pathology may be inside the patient, in his social context, or in *the feedback between them.* There are several axioms, underlying this approach. One is that the individual influences his context and is influenced by it in *constantly recurring sequences of interaction.* The individual who lives within a family is a member of a social system to which he must adapt. His actions are governed by the characteristics of the system, and these characteristics include the effects of his own past actions. The individual responds to stresses in other parts of the system; and he may contribute significantly to stressing other members of the system. The individual may be approached as a subsystem, or part, of the system, but the whole must be taken into account. Another underlying axiom is that *changes in a family structure* contribute to changes in the behaviour and the inner psychic processes of the members of that system.

The family is a social unit that faces a series of developmental tasks. These differ along the parameters of cultural differences, but they have universal roots. Family functions serve two different ends. One is internal – the psychosocial protection of its members; the other is external – the accommodation to a culture and the transmission of that culture.

The family system *differentiates* and carries out its functions through *subsystems*. Subsystems can be formed by generation, by sex, by interest, or by function. For proper family functioning, the boundaries of subsystems must be clear. They must be defined well enough to allow *subsystem members to function without undue interference,* but they must also allow contact between the members of the subsystem and others.

The spouse subsystem: The crucial process of evolvement of transactional patterns and *outside* boundaries

A number of tasks face a young couple at the beginning of marriage. The spouses must develop a mutual accommodation in a large number of small routines. In this process of mutual accommodation, the couple develops a set of patterned transactions – ways in which each spouse triggers and monitors the behaviour of the other and is in turn influenced by the previous behavioural sequence. These *transactional patterns* form an invisible web of complementary demands that regulate many family situations and family members' behaviour in them (1, p.51).

The couple also faces the task of separating from each family of origin and negotiating a different relationship with parents, siblings (brothers and/or sisters), and in-laws. Loyalties are to shift, for the new spouses' primary commitments are to their marriage. The families of origin are to accept and support this process.

In the same way, encounters with the extra-familial work, duties and pleasures, are to be reorganized and newly regulated. Decisions (verbalized and /or tacit) must be reached as to how the demands of the outside world will be allowed to intrude on the life of the new family. Usually each spouse is to meet the other's friends and select those who are to become the couple's friends. Each spouse may gain new friends and lose touch with old ones.

In systems' terms this is the process of structuring of the *boundaries around the spouse subsystem*.

Other family subsystems and boundaries

At later stages when the children «arrive», marking a radical change in the family organization, the quality of many subsequent processes of boundering, like the quality of the boundary of the *parental subsystem to the sibling subsystem (the inter-generational boundary)*; and the one of the *family system as a whole* to the larger community, will be well prepared for, if the couple has, at this first stage, succeeded in forming a clear boundary rather than a diffuse, or unneedingly rigid boundary to the extended family, friends etc.

The function of boundaries is to protect the differentiation of the system. Every family subsystem has specific functions and makes specific demands on its members; and the development of interpersonal skills achieved in these subsystems is predicated on the subsystem's freedom from interference by other subsystems. For example, the capacity for complementary accommodation between spouses requires freedom from interference by in-laws and children, and sometimes by the extrafamilial. The development of skills for negotiating with peers, learned among siblings, requires a degree of non-interference from parents.

The *composition* of subsystems organized around family functions is *not nearly as significant as the clarity of subsystem boundaries* (1, p.54). Though the crossing of inter-generational boundaries has been found to be severely dysfunctional, that does not mean that if a parental subsystem includes a grandmother, or even, under some temporary circumstances, a child (the so called parental child), it is dysfunctional. It can function quite well, so long as lines of responsibility and authority are clearly drawn.

Boundaries *within* the family and the evaluation of family functioning

The clarity of boundaries within a family is a useful parameter for the evaluation of family functioning.

Some families turn upon themselves to develop their own microcosm, with a consequent constant increase of communication and concern among family members. As a result, distance decreases and boundaries are *blurred*. The *differentiation of the family system diffuses*. Such a system can easily become overloaded and lack the resources necessary to adapt and change under stressful circumstances.

Other families develop *overly rigid boundaries*. Communication across subsystems becomes difficult, and the *protective functions of the family are handicapped.* Those two extremes of boundary functioning are called enmeshment and disengagement. All families can be conceived of as falling somewhere along a continuum whose poles are the two extremes of diffuse boundaries and overly rigid boundaries. According to Salvador Minuchin, the «father» of Structural approach to the family, most families fall within the wide normal range (1, p.54) (Figure 1).

Figure 1. The continuum of the main indicator of areas of possible pathology: boundary functioning

DISENGAGED (inappropriately rigid boundaries)	CLEAR BOUNDARIES (normal range)	ENMESHED (diffuse boundaries)

Source: S.Minuchin families and family therapy, London: Tavistock; 1985. p. 54.

Enmeshment and disengagement refer to a transactional style, or preference for a type of interaction, not to a qualitative difference between functional and dysfunctional. Most families have at certain periods of time, enmesghed and disengaged subsystems.

Operations at the extremes however indicate areas of possible pathology. A

highly enmeshed subsystem of mother and child, for example, can exclude father, who becomes disengaged in the extreme. A cross-generational dysfunctional transactional pattern has developed (a mother/child coalition). The resulting undermining of the child's independence might be an important factor in the development of symptoms (1, p.55).

Differentiation of levels of health, enabled by systemic structural-approach research

The research into differences between "healthy and dysfunctional families" (2, p.28) is most often research that is informed of systemic (structural, strategic etc.) approaches developed within family therapy. This family-therapy-guided research finds characteristics of the family organization and family communication and transaction patterns, that are as specific as to even sometimes allow for *prognostic diagnosing* (3, p.572; 4). Even though the central studies among the ones that examined the actual behavior and interaction of families, which ranged from the most dysfunctional to the most optimal level of health, the studies of the Timberlawn Psychiatric Research Foundation (which are presented in more details below) found reliable features in differentiating healthy from less healthy families, affecting physical as well as mental health, this type of research more often than not, refers to mental health.

How much health and dysfunction is there? We might ask first whether healthy function is common or rare. R. Skynner claims that "we may judge that truly healthy families are few and far between from existing knowledge regarding the mental health of whole populations" (2, p.28). The Midtown Manhattan Study (5) for example found 23.4% of a representative sample of the population demonstrating clear psychological dysfunction, and discovered only 18.5% who were definitely well. The results for the Sterling County Study (6), though including a more rural area, found closely similar figures, with 20% clearly dysfunctional and 17% indisputably well. It is important to begin with this kind of information since many existing studies are faulted in that they compare the obviously ill not with the most well, the "optimal" extreme, but with a measure of "normality" based more on the statistical average (that is, the midrange group), comprising about 60% of the population in the studies just mentioned, whose mental health was uncertain.

The importance of the marital relation for the offspring's health. Three scientifically rigorous studies, conducted independently, have shown much agreement in displaying that even when the health of the offspring was the main focus, what turned out to be the crucial variable, was the marital relation.

One of them (7) examined in detail the families of a group of college students who showed unusual emotional health, and compared these with families of others

who were particularly disturbed. The differences observed were checked against a study of a sample of the college population. The main findings were as follows:

- Regarding the degree of *role differentiation between the parents*, the parents of the healthiest children showed a *balance between separateness and overlap* whereby many of the parental functions were shared, but not to a point where there could be confusion between the male and female identities or parental and maternal roles and responsibilities. Families where there was greater overlap in the roles and responsibilities of husband and wife, and less differentiation in the sexual roles, produced fewer healthy children, often suffering themselves from role confusion. The "traditional" role-segregated, male-dominated family, was even worse in its effects, and the degree of ill health in the children was exceeded only in families where the traditional roles were reversed, with the father performing more than half of the "traditionally female" household and child-care tasks;

- Regarding the issue of *power*, the healthiest families were found to be father-led. Next most healthy were those which were *father-dominant*, next egalitarian and worst mother-dominant;

- In general, it was found that a *high frequency of sexual intercourse, together with increasing sexual satisfaction* during the course of the marriage, appeared related with mental health in the children. But this was not always so, and the existence of a *warm, loving and supportive relationship* between the couple appeared even more vital, compensating considerably for emotional ill health in either husband or wife. Where this was the case parental pathology appeared to be contained and coped with within the marriage, rather than passed on to the children.

The comparison of matched pairs of families with or without a mentally disturbed child, found similar features (8). More healthy families showed a strong parental coalition, but with authority exerted through negotiation rather than in a rigid, authoritarian way. Communication was clearer and more direct in the more healthy families, and was either rigid and fearfully-controlled, or confusing and disruptive, in the patient-containing families.

The comparison of families whose children are either mentally disturbed, delinquent or showing neither of these disorders, displayed many features consistent with other studies mentioned here, and underlined the significance of modulated affect, of interaction that features considerable autonomy, as well as the complementary manner of interaction between the authority figures, rather than "symmetrical" communication (9).

Reports of the treatment of families containing adolescent members who displayed various degrees of disturbance have also allowed for classifying differences between more healthy and less healthy families (10). In moving from the

description of families of the most disturbed children to families of the least disturbed children, one is struck again by:

- The importance of parental co-operation and collaboration in the matter of authority for health;
- A clear inter-generational boundary whereby the children cannot disturb the parental coalition by forming parent-child coalitions themselves;
- Mutual acceptance and understanding; and
- An ability of the family as a whole to relate to and accept help from the larger community.

Once again, moving from the families of the most, to the least disturbed children, one is impressed by the dominant position of the mother and exclusion of the father through a mother-child coalition in the former families, as well as a distrust in the larger community, openness to help only from some relatives, but not from the larger community.

Unusual degrees of health: in depth examination

The Timberlawn Studies (11) examined the actual behaviour and interaction of families which ranged from the most dysfunctional to "the extreme of health" (2, p.32). They reported the first successful attempt to find and examine in depth the personalities, relationships and typical interaction found in families "at the extremes of health" (rather than the mid-range or "average"), which is of crucial theoretical and practical importance. One of the most distinguished figures in the field of family therapy - Robin Skynner, has summarized their results (with the consent of the research team of The Timberlawn Psychiatric Research Foundation) in three tables, which should help the reader to grasp their findings rapidly.

Classification of severe dysfunction, mid-range function and optimal levels of health. In table 1, the spectrum of level of psychological function is divided into three main categories, for the sake of simplicity. Skynner focuses on the fact that Table 1 makes it possible to be seen at once, that in moving our attention from the characteristics of the most severely dysfunctional families, through the mid-range group, to the healthiest families, the change is not simply one of degree, nor is it simply a steady increase or lessening of certain features.

Instead, in certain respects, progress towards health appears to take place in a stepwise fashion, by stages (2, p.32) (or, we might say: as a sequence of thesis, anti-thesis and synthesis).

Table 1. Family structural differences between severe dysfunction, mid-range function and optimal levels of health

Level of function of children	*Severe dysfunction*	*Mid-range function*	*Healthy function*
Types of Disorder	"Process"(chronic) disturbance. Psychopathy (Sociopathy)	Reactive psychosis/ Behaviour disorders/ Neurosis	No evidence of psychiatric disorder; effective functioning
Power – Structure	Chaotic Parent-child coalition (usually between mother and index patient, father ineffective and excluded)	Structured/rigid Rigid control, little negotiation. Parents either competing for dominance (behaviour disorders) or dominant-submissive relationship (neuroses)	Structured/flexible Strong, equal-powered parental coalition, but children consulted & decisions through negotiation. Clear hierarchy with mutual respect.
Differentiation	Fusion Blurred boundaries, unclear identities, shifting roles. Blaming, scapegoating, evasion of responsibility. Invasiveness.	Separateness through Distancing Identities more defined but at cost of emotional distancing, restriction of potential and of spontaneity. Role stereotyping, including male/female.	Clear identity+intimacy Identities highly defined and secure, permitting also high levels of closeness and intimacy. High individual responsibility.
Communication	Vague, confused, evasive, contradictory. Double-binds. Mystification. Imperviousness.	Clearer than in severely dysfunctional, but in rigid, stereotyped way (so often superficially clearerthan in healthy). Impervious to new ideas; non-mutual.	Open, clear, direct, frank. Lively and spontaneous. Receptive and responsive to new ideas.
Relationship	Oppositional Distrust, expectation of evil (betrayal, desertion) Ambivalent feelings non-integrated, swings between extremes; inconsistency dealt with by denial. Marriage highly unsatisfactory; split by parent/ child coalition.	Oppositional Relative distrust; human nature seen as basically evil, needing rigid control of self and others. Regression. Suppression. Ambivalence not accepted, dealt with by repression and reaction formation against "bad" impulses. Lack of marital satisfaction; competing or dominant/ submissive roles.	Affiliate Trust; basic expectation of positive response to positive approach. Warm, caring, mutual regard and responsibility. Ambivalent feelings accepted as normal. Both sides included & integrated. Mutually satisfying, complementary marital roles; sexuality mutually satisfying.

Level of function of children	*Severe dysfunction*	*Mid-range function*	*Healthy function*
Reality - Sense	Reality denied; escape into fantasy satisfactions.	Adequate reality sense to function effectively, but with some distortion & incongruent family "myths"	Image of self and family congruent with reality.
Affect	Cynicism; hostility; sadism; hopeless and despair.	Hostility (behaviour disorders) but without the degree of sadism in severely dysfunctional. Subdued, joyless, restricted (neurotic disturbance).	Warmth, enjoyment; humour, wit. Tenderness, empathy.
Attitude to change, loss	Unable to cope with change and loss. Time-less, repetitive quality, with denial of separation and death, escape into fantasy.	Change and loss faced, but with great pain and difficulty. Separation and death not really worked through; substitutes for lost persons and feelings transferred, instead of internalization of lost person.	Change, growth, separation and death all accepted realistically and losses worked through, due to: -Strong parental coalition (in relation to older & younger generations). -Strong, varied relationships outside family. -Transcendent value system.

Source: R.Skynner Research into differences between healthy and dysfunctional families Academic press, 1982.

For example, the chaotic situation in the most severely dysfunctional families, where there is characteristically a parent-child coalition, with the other parent (most often the father), ineffective and excluded, gives way at mid-range function to a rigid structure not only with rigid control of the children by the parents, but also a rigid hierarchy with one spouse dominant to the other. But when we come to the healthiest families, this situation is not simply exaggerated, but radically changed. Structure is present, but is sufficiently secure for the children to be consulted and decisions reached through negotiation, and the parental coalition has become equal powered.

Similarly, the fusion of the severely dysfunctional family gives way to individuality and separateness in mid-range function but only at the cost of emotional distancing and role stereotyping, including rigid differences in sexual role. In healthy families this is not taken further, but radically changed (or we may say, synthesized). The sense of identity and difference has become so secure that individuals can alternate between intense intimacy, and separateness.

A similar transition is seen in regard to communication, where in the mid-range clarity is achieved at the cost of rigidity, while the latter is no longer necessary for healthy families.

Health and change. As regards relationships, reality sense and affect, the transition is more continuous. The same is true of the attitude to change, loss, separation and death. The Timberlawn researchers found the capacity to deal with these different aspects of change was an especially crucial and reliable feature in differentiating healthy from less healthy families, affecting physical as well as mental health (11, p.17). Robin Skynner comments this finding:

"This one might expect, of course, if "health" is connected with an ability to adapt to the ever changing flux of experience and the challenges posed by the developmental process, by constant change of inner "models" of "knowledge" to fit the new information" (2, p. 33).

Classification of adequate and optimal levels of health. The Timberlawn studies have also provided us with more in detail examination of the families producing healthy children, comparing those of them, whose function approximated most closely to mid-range function, to those which showed the functioning of the "healthy" group at its greatest extreme. The former they called "adequate", the latter "optimal", and an outline of the findings regarding this comparison is given in tables 2 and 3.

Table 2 needs little explanation and shows that the "optimal" families could be differentiated from the "adequate" on 7 out of 8 criteria. On all the characteristics, listed in it, except N 7 (Initiative), "optimal" families could be differentiated from "adequate" families to level of statistical significance. Both "produced" healthy children, but "adequates" showed many "mid-range" features.

Table 2. Main characteristics of "optimal" families, in order of apparent importance

(1). *Affiliate attitude to human encounter* – open, reaching-out, basically trusting (as contrasted with oppositional – distrust, withdrawal etc.).
(2). *High respect for separateness, individuality, autonomy, privacy* (as contrasted with expectation of agreement, conformity, "speaking for others").
(3). *Open, clear, frank communication* (as contrasted with confusion, evasion, restriction etc.).
(4). *Firm parental coalition*, egalitarian with shared power between parents (as contrasted with parental splits and parent-child coalitions).
(5). *Control flexible*, by negotiation, within basic parent-child hierarchy (as contrasted with rigid, inflexible control and unchangeable rules).
(6). *Highly spontaneous interaction*, with considerable humour and wit – "three-ring circus, but all under control" (as contrasted with rigid, stereotyped interaction).
(7). *High levels of initiative* (as contrasted to passivity).
(8). *Uniqueness and difference* encouraged and appreciated – liveliness, strong "characters" (as contrasted with bland, stereotyped, conformist types).

Source: R.Skynner Research into differences between healthy and dysfunctional families Academic press, 1982.

Table 3 shows that there are striking differences between the "optimal" and the "adequate" families as regards the marital relationships:

Table 3. Differences in marital and sexual function between "adequate" and "optimal" families, all producing healthy children

	Adequate	**Optimal**
ROLES	Generally traditional gender roles but in rigid, stereotyped, highly role-segregated way.	Generally traditional gender roles but seemingly from choice, with rewarding, mutually pleasurable complementarity and reciprocity.
RELATIONSHIP	Husbands successful, aggressively work-oriented. More satisfied with lives than wives – distant and providing material but not emotional support Wives generally unhappy, needy, lonely, feeling isolated from husbands and overwhelmed by children. Tending to obesity, depression and fatigue. Interests outside home limited.	Both husbands and wives express mutual pleasure and enjoyment with relationship and life generally. Husbands involved in work but responsive to wife's needs, supportive and emotionally aware. Wives feel appreciated, cherished. Many, active interests outside home, though role of mother and wife central and satisfying.
SEXUALITY	Regular, generally similar frequency (about twice weekly). Mostly satisfying to husbands. Wives generally dissatisfied (too much, too little, unpleasurable etc.).	More variable in frequency between couples (several times weekly to twice a month) but highly, mutually pleasurable and satisfying to both partners. Pattern of long-term marital fidelity.
LEISURE	Limited involvement of couple with community.	More involvement of couple outside the home and family alone.
	Both "adequate" and "optimal" families shared	very high belief and involvement in the idea of the family, and their children's activities.

Source: R. Skynner Research into differences between healthy and dysfunctional families Academic press, 1982.

R. Skynner finds it "reassuring to see that many couples showing evidence of considerable degrees of mid-range function can nevertheless produce healthy children by dint of hard work, effort and struggle, even at considerable cost. But it is even more reassuring to see that the greatest health and well-being in family

function, like the highest development of all other human skills, appears after the basic knowledge and skills are so well established that they no longer require anxious effort, giving space and time to allow spontaneity, playfulness and enjoyment" (2, p.34).

Crucial functions of the marital relation within the transition to modern society

We already emphasized on the spouse subsystem, with the initial transactional patterns evolving within it, and the quality of the boundaries around it, being basic for the further functional processes of family structuring. Then, in the presentation of research findings, that allow for classification of levels of health functioning, of the families, the importance of the marital relation for the offspring's health was underlined. To arrive at a deeper understanding of this emphasis and findings, one should be aware of the topical role of the relation between the spouses within the context of social transition processes. This awareness is especially important for the professionals, working in the so called "societies in transition" (though not exclusively for them, as the occidental world is experiencing transition too).

The marital relation has acquired *crucial functions with the transition from traditional to modern society.* This transition has rendered the couple the role of the operational nucleolus, which is responsible for the processing of information and decision-making (12), a role that once belonged to the "traditional community" and its council of elders. So, the *authorization* of the middle generation by the older one has become a demand of modern society to the psycho-social processes in the family. The relation between the couple has become the relation that is *to model for the children* transactional patterns, congruent to today's life. Many modes of relating transmitted through generations and maintained by inertia are no more relevant. As the research findings, we provided, have made it clear, neither sticking to the "traditional" role-segregated, male-dominated family, nor reversing "mechanically" the traditional roles can be functional within the new conditions of contemporary life. Both can be natural as stages of the development of the couple's relation within transition, but in order to respond to the requirements of the present day and synthesize their new, unique, and congruent with contemporary life, mode of partnership, the husband and wife have to help each other disentangle from "triangulations" and cross-generational coalitions with members of their respective families of origin, commit to the marital relation, as well as arrive at a complementary style of interaction between themselves, that allows for exchange and learning from each other, rather than each developing their personal characteristics more and more excessively in two opposite directions (as is shown to happen when the style of communication is symmetrical).

The attitude of distrust to the "world around", paralleled by "fusion" within the family, is an example of adherence to an outmoded attitude carried through, by inertia, from traditional society (the "we"/"non-we" rigid boundary of the traditional community) and maintained in the modern context, to the effect of rendering the family unable to relate to and receive help from its milieu.

Another example is the attitude towards conflict. In traditional society conflict between husband and wife was to be avoided. The traditional context had however, mechanisms through which the community itself would take care of resolving the problem, around which tension had aroused in the couple. Today, when these mechanisms are not provided any more, the disguising and "masking" of conflicting contradictions breeds chronic tension, nor does it allow the partners to utilize their differences and arrive at a creative new answer to each new information they are to process as a team.

The conflict-avoidance pattern (as well as the opposite extreme of constantly escalating conflict) becomes most destructive when it guides one of the parents (usually the mother) into forming a parent/child coalition, which disrupts the child's personal autonomy and sense of coherence and affects deeply the child's emotional wellbeing. If inter-spouse conflict is reduced or detoured when the spouses assume parental functions (which usually means: when the child poses a problem), the children (and behavioural and health problems of theirs') *function as conflict-detouring mechanisms* (1, p.8) with all the concomitant risks for the children's health.

The family and the process of change and continuity

Concluding the first part of this text, we would like to stress that it is important to always bear in mind that each family is a social system that responds to demands from both within and without, for change and growth. Responding to these demands requires a constant transformation of the position of family members in relation to one another, so they can grow while the family system maintains continuity. Inherent in this process of change and continuity are the stresses of accommodating to new situations. Many families that may seem to display characteristics of a dysfunctional structure may, in fact, be in a temporary state, in a transitional situation, suffering the pains of accommodation to new circumstances. As Salvador Minuchin underlines: a proneness on the side of family workers to put emphasis on pathology, breeds danger. He goes on to say that the label of pathology is to be reserved only for families, who in the face of stress, instead of attempting to respond to the new information from inside (for instance, new needs of family members who have entered a different age stage), or from outside, "*increase the rigidity of their transactional patterns and boundaries, and avoid or resist any exploration of alternatives"* (1).

Applications to larger systems

This criterion of Minuchin has been regarded as a criterion, bearing reference also to other human systems beside the family. In the last decade attempts have been made, the knowledge of the structural characteristics of different degrees of dysfunction in family systems, to be used as clues about the organization of larger human systems, such as working teams, organizations etc. A Bulgarian-German attempt to apply informed-of-this-knowledge approach to society was, in 1991, distinguished with the Award of The World Psychiatric Association (WPA) and The International Foundation for World Accords "Masserman" (13). Authors from this team have suggested that isomorphic patterns can be found not only generally between dysfunctional families and dysfunctional societies, but more specifically between *totalitarian societies and severely dysfunctional families; and respectively between dictatorships and midrange function families* (14).

The ideas of such an approach, searching isomorphic patterns between the different social levels (psycho-social and socio-political levels), have been further encouraged by the fact that the granting of this Award was followed by the creation, in 1992, of an East-West European Network of family therapists "Systems in Transition", of which, the first author of this text was a founding coordinator. The Network utilizes informed-of-family-dynamics-and-structure approach for arriving at deeper understanding of the psycho-social dimension of the ongoing processes of change in the so called societies in transition. This brings us to one of the existing links between the topic of family structure and health and topics like organizational health; politics and health etc. - a link that in this limited space can no more but be marked.

Family composition and health

Family composition comprises a second dimension of the term family structure.

As already stated earlier, the *composition*, itself, of the subsystems in the family is *not nearly as significant as the clarity of subsystem boundaries.*

We exemplified this with the fact that if a parental subsystem includes a grandmother, or even under some temporary circumstances, a child (the so called parental child), that does not necessarily mean it is dysfunctional. It can function quite well, so long as *lines of responsibility and authority are clearly drawn.* This should be born in mind when health-research studies are organized around parameters like single-parent families, for instance. It is not the fact itself, that the family is with only one parent (that its parental subsystem is composed of only one member), that can be expected to be directly related to health issues of the offspring. However, the only parent may be in a more difficult position to establish a clear boundary both to the extended family, and to the children's sub-

system. So, a dysfunctional cross-generational coalition may be more probable in these families, with the concomitant effects on the children's independence, sense of identity, emotional and physical wellbeing.

Similarly, the first-born among the children in the family, might be exposed more to the position of «parental child», but the family can function quite well, as long as the child is clearly authorized for concrete functions executed to the younger children, and clear lines are drawn as to responsibilities he is not to take, i.e. cases and situations when he is to turn to the parents and they are to handle what the younger child has posed. Thus the delegation of authority is explicit and the parents have not abdicated, leaving the eldest child to become the main source of guidance, control and decisions, with the concomitant clash of the demands on the parental child with his own childhood needs: demands, exceeding his ability to cope with them.

Likewise, a family with an only child might be in a more difficult position to draw a clear inter-generational boundary, but once again, it is not the composition parameter (a sibling subsystem composed of just one member) that necessarily predefines dysfunctionality.

Such a differentiated understanding of the priority of structural per se parameters, to the compositional parameters, can guide the combining of the quantitative studies of family composition variables, with more qualitative aspects, as well as can result in highering the preventive and health promotion effects, drawn upon the studies' results.

We hope readers are prepared enough to consider the above, while acquainting themselves with the quantitative findings we are going to present in the next part of this text. In difference from the first part, since composition parameters do not bring us so deep in the organization and functioning of the family, and respectively do not allow for well-grounded classifications of levels of health functioning, in the following part we will just abide to providing information on the lines, examination has taken throughout the years, and to surveying the topical research findings. We will have to select among composition parameters to be presented, in connection with the fact that due to the advantage of the composition parameters of being easily accessible to measurement, there are numerous quantitative studies on a large number of them in search of relations to health issues. In some connection with the lack of qualitative aspects to most of the studies, their results usually have not yet found unilinear interpretation. Many researchers conclude their examination on birth order effects on health, for instance, with pointing out that a specific birth order status has been confirmed by their study to be an independent risk factor for the illness they examined, however theoretical explanations may arise from biological factors unidentified by the study, and/or psychological stressors linked with these positions.

The selection of birth order for this following presentation of findings, connected with family composition variables, is advised of the need the existing contextual discrepancy around this parameter (its examination being up to now almost exclusively restricted to the occidental context), to be gradually countered. It is a parameter that also allows for at least several family composition variables to be partly presented, since it is often being examined in its interrelatedness with other family composition variables.

Birth order. Lines its examination has taken in the last six decades

Birth order, independently, and in relation with other factors of the family composition, has been subjected to literally thousands of research studies since the 1940-ies until the present day. It is generally considered that the first researchers' interest in this factor had been inspired by the well known psychotherapist Alfred Adler, who, in his Theory of personality, described the significance of the birth order position of the child in the family for the development of specific personal characteristics in adult life (15). Most of the prolific research, that followed his observations and descriptions, maintained a focus on specific personality traits and behavioural patterns developed by only children, first born and later born, respectively. The "birth order effect" field entered its "maturity" in the middle of the 1990-ies, in connection with the work of Frank Sulloway. In general, what has been learnt about birth order and personality over the last decade, since Sulloway's 1996 book appeared, is that when measured inside the family, by having siblings rate other siblings, birth order effects are impressive and are about the same size as gender differences (which are the largest known individual differences). When personality is assessed independently of the family context, that is, when people just rate themselves, birth order effects are smaller, but they are present and are statistically significant in large samples. These differences in personality and behaviour have been confirmed by a number of studies to be as described in Sulloway's "Born to rebel" (16).

Thus far, the connectedness that the field bore to health issues, was through those of the differences in behavioural patterns that have relevance to health behaviour; through stress coping strategies, found as specific for early born, middle children and later born; and sometimes through intriguing findings like the one that the "helping professions" (including health-workers) comprise mostly of persons, who, in their families of origin have had the birth order position of first-born and/or only child (17, 18). The "exceptions" – those doctors, nurses etc. who have been the younger child in their families, usually have had a big age difference between themselves and the previous sibling, which renders them, according to Isaacson a "psychological birth order status" of first-borns (19).

Some later development of the birth order research and the advised from it, theoretical concepts on the significance of the sibling subsystem (the term for the sibling subsystem that researchers with non-systemic orientation have put largely in use, being "the sibship") gave rise to a specific branch, that studies the effects of the presence of a chronic illness in the family, and especially the effects on, and risks for, the healthy elder, respectively for the healthy younger siblings of a child with chronic illness (20). The emergence of such a focus had by itself, significant preventive and health-promotion meaning, since it helped to counter the tendency of both the parents and the health workers to have their attention engulfed by the chronically ill child and neglect the stress that the other children in the family are undergoing, thus exposing them to various risks, related to their emotional wellbeing, mental and physical health.

It is mainly in the last decades, however, that birth order has been studied in direct reference to the risk of development of certain illnesses. The scope of the research in that field is quickly growing, including such a broad variety of diagnoses as allergy, eczema, diabetes, heart disease, cancer, anorexia nervosa, bulimia nervosa, alcoholism, schizophrenia etc. and nowadays a growing portion of those studies is being carried out by Public Health Institutes.

In reference to some of the illnesses listed above, a number of studies have identified specific birth order positions, independently, and/or in their interrelatedness with some of the other variables of the family composition (family size, age difference between the siblings, sibship size, maternal age at the moment of birth of the subject, paternal age, etc) as a risk factor for the development of the illness. In reference to other of the illnesses, association has been found between birth order and an increased risk for the development of the illness, in many cases this being a *significant association* (21, 22).

While the scope of the illnesses covered by birth-order-effect-studies is growing, their contextual scope remains limited usually to the occidental social context. Scandinavian countries, having precise population and medical database registries are in a position to conduct studies, that are impressive with the number of subjects analyzed. Even where such conditions are not present, public health workers should bear in mind that a topical need has emerged to enlarge the variety of socio-economic, socio-cultural and psycho-social contexts within which this type of research is carried out. A Bulgarian study of birth order effects on the risk of development of mental illnesses is in process. The results of its pilot phase, conducted among Roma population (where usually the sibships of the families are larger), have shown over-representation of only children among patients with bipolar (manic-depressive) disorder. Firstborns of both sexes were overrepresented only when the sibship they belonged to, had up to three mem-

bers. While for females being the firstborn in a larger sibship continued to predict highly elevated risk, for males it showed to be a position that went along with some protective effect. Reversely, the positions second- and third-born, showed a decreased risk for females, and a highly elevated risk for males. For both sexes the birth order rank 5 to 7 showed a risk considerably lower than expected.

In order to illustrate how birth order and other family-composition-related factors modify the risk of illnesses both in the sphere of physical health and in the sphere of mental health, we will take as examples *cancer and schizophrenia.* We will shortly dwell on results and conclusions of some of the most recent among the numerous birth-order studies on those two illnesses.

Birth order, family composition and cancer: Most recent findings

Birth order effect on the risk for breast cancer.

• Analyses of the *effects of birth order and family size on the risk of common cancers,* using the Swedish Family-Cancer Database (an impressing number of some 1.38 million subjects analyzed), though including various other explanatory variables, showed that the *only significant associations* were an increasing risk for breast cancer by birth order (i.e. the later born, the bigger the risk) and a decreasing risk for melanoma by birth order (i.e. the later born, the lower the risk) and, particularly (for melanoma), by family size (i.e. the larger the size of the family of origin, the lower the risk) (23). A hypothesis existed for some time, that the effects of birth order on breast cancer may be mediated through increasing birth weight by birth order. However, in 2004, a team of the School of Public Health, University of North Carolina (24), found there's just a weak inverse association between birth weight in the highest tertile and breast cancer.

• Analyses on *male breast cancer and birth order* have shown that firstborn men compared with later-born men had a relative risk of 1.71 for the disease. As, understandably, such knowledge can have value for prevention, this type of information has been fostered in the present year (2005) by The European Journal of Cancer Prevention (25).

Birth order effect on the risk for testicular cancer and testicular seminoma. The risk of testicular cancer also has been found to decrease with increasing birth order. Analyzes, based on the Danish Cancer Registry showed that: «compared with being firstborn, being number four or more in birth order was associated with a significantly decreased RR for all testicular cancers and testicular seminoma», (26, p.272) while no association was observed between any of the other variables analysed (high social class, age at which the study subjects had had mumps or measles etc.), and the risk.

Birth order effect on the risk of non-Hodgkin lymphoma (NHL). Most recently (in 2005) Australian researchers reported that people who were either elder siblings or only children had relatively lower risks of developing non-Hodgkin lymphoma (NHL). A similar protective effect was seen among people with a history of hay fever or food allergies. It was found that those who were a first-born or only child were half as likely to develop the cancer as people who were fourth in their line of siblings. A linear increase in NHL risk showed that second-born children had a lower risk than those who were third–born, who were in turn, less likely than later-born siblings to develop the disease.

Birth order, family composition and schizophrenia: Most recent findings.

Several family-composition variables, such as birth order, family size, parental age, sibship size, age differences to the next and to the previous sibling, age-at-onset and sex of the affected sibling have been suggested as risk factors for schizophrenia.

Siblings of female probands have shown a higher risk for developing schizophrenia than siblings of male probands (28, 29, 30, 31, 32, 33). Higher risk for siblings was also predicted by the early age-at-onset of proband (30).

In 2001 The Department of Psychiatry, University of Oulu, Finland fostered the conclusion that: "Specific birth order status is an independent risk factor for schizophrenia. Theoretical explanations may arise from biological factors unidentified here and/or psychological stressors linked with these positions." (34, p.152) The specific birth order status showed to be different for male and female probands:

- Males: elevated risk among first-borns. Risk, lower than expected among last-born;
- Females: elevated risk among last-born. Risk, lower than expected among middle-born.

Most recently, both in the European and the American context, advanced paternal age at the time of birth of the offspring has been identified as a risk factor for later development of schizophrenia in offspring (35, 36, 37). The Stockholm Centre of Public Health found in a 2002 population-based case-control study that the odds of schizophrenia in offspring of fathers 45 years old or older were 2.8 times as great as in offspring of fathers aged 20-24 years (35, p.1592). In 2004, a team of The National Public Health Institute, Helsinki confirmed that *young paternal age decreased risk, while young maternal age increased risk of schizophrenia in offspring* (38). This team investigated all the family-composition variables that had been suggested until that moment, as independent risk factors for

schizophrenia, in their interrelatedness. The analysis of an impressive number of 7914 sibships and 21 059 individuals showed that being the firstborn predicted an elevated risk for schizophrenia, as well as having a sibling who was less than 5 years older. Having siblings who were more than 10 years older predicted a lower risk.

The deficit of structural-systemic orientation in the design of studies on birth order

Birth order studies have generally been carried out by researchers of varying, sometimes opposing epistemological backgrounds - biological, individually-focused psychological, psycho-social. One common deficit, however, is the lack of family-structure orientation in the design of these studies. So, except for the need for fulfilling the contextual gap, by overcoming the neglect this parameter is generally subjected to, by researchers in non-occidental contexts; an even more topical need can be delineated, namely the supplementing of the studies of the effects of the birth order position in the «sibship», with a qualitative part, based on Structural approach to the family. Exploring the «sibship» not as an aggregate of individuals, but as a subsystem in the family, would mean for instance, paying due attention to the character of its boundary to the parental subsystem, all the more, that this inter-generational boundary has been shown by structurally-oriented research, we presented in the first part of this text, to be one of the most sensitive delineators of levels of health functioning of the offspring.

Conclusion. Family-oriented health care

Some level of integration of the transactional and compositional dimension, presented respectively, in the first, and in the second part of this text, (the differences between the types of knowledge each of them is intrinsically related to, can be easily grasped through noticing the so different style of presentation they lead to), is one of the inviting future tasks for public health professionals.

Family orientation started to gain ground in Europe from the 1960s onward, first in psychiatry, and about two decades later it began to be applied in the work of family doctors as well. At present, especially in Scandinavian countries, we can talk of family-oriented health care (39) and an impressively growing number of innovative new projects promoting family therapy and systemic family medicine.

On the basis of the concepts, information and research findings, provided in the two parts of this text, with an emphasis on the structural family parameters, allowing for classifications of the level of health functioning of the family, the advantages of family- oriented health care, and the application of systemic familial approach in the designing of research, and in prevention and health-promotion strategies, become tangible.

EXERCISES

Task 1: The students are divided into 3 small groups, and through an interactive technique recreate and explore the transactions in a family with a 13 years old boy with obesity, whose overeating behaviour is being maintained by the opposite stance the parents take to it, and by a mother/child coalition, rendering the father excluded and ineffective.

Task 2: On the basis of the experience from the previous task, the students are to differentiate whether the case reveals a family structure of the type of severe dysfunction, or mid-range functioning, as well as to design preventive interventions to similar cases, appropriate for the cultural and psychosocial context in their countries.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**The Case of Eldercare**
Module: 7.3	**ECTS (suggested): 0.75**
Author(s),degrees, institution(s)	**Peter DeGolia, MD** Associate Professor MetroHealth System Cleveland, Ohio **Edward J. Eckenfels** Emeritus Professor Rush University Medical Centre Chicago, Illinois
Address for Correspondence	Peter DeGolia, MD Associate Professor MetroHealth System 2500 MetroHealth Drive Cleveland, OH 44109-1998 U.S.A. Tel.: +216 778 8087, +216 778 8788 E-mail: pdegolia@metrohealth.org
Keywords	Public health, vulnerable populations, eldercare, systems design
Learning objectives	After completing this module students and public health professionals should: • Conceptualize a model for addressing the health care needs of the elderly; • How that model can be applied to other vulnerable groups in see; and • What can be done to make this approach feasible.

Abstract	The paper provides a model of an effective eldercare based on devising an innovative educational and training program focused on interdisciplinary team train training. The core team consists of a physician, a nurse, and a social worker. Engaging a competent and committed faculty, becoming sensitive to the socio-cultural environment, establishing a realistic timeline and assessing program efficacy are essential steps in the program implementation. The paper demonstrates how that model, based on the concepts, components, and operations described, can be applied to other vulnerable groups and how to develop appropriate health care policy in SEE countries. To make this approach feasible a Centre for dissemination of innovations should be established in order to serve as a clearinghouse for the lessons learned in SEE countries.
Teaching methods	A review of the basic components of this paper can be conducted in a lecture, but, more effectively, in a series of small group discussions. The key learning attribute is the exercise which should be undertaken with rigor and imagination.
Specific recommendations for teachers	The exercise should be grades like an essay or paper with important feedback from the teacher. Ideally, students should discuss their papers in a small group seminar.
Assessment of students	The final mark should be derived from assessment of the theoretical knowledge (oral exam), contribution to the group work and final discussion, and quality of the seminar paper.

THE CASE OF ELDERCARE

Peter DeGolia, Edward Eckenfels

COMPONENTS OF AN "IDEAL" SYSTEM

Introduction

The world is aging and there is a growing need for health care for the aged (1). As of 2000, six South-Eastern European (SEE) countries (Bulgaria, Croatia, Serbia, Hungary, Slovenia, and Czech Republic) were among the world's 25 oldest populations. Bulgaria has the 7th oldest population in the world (2). In the transitional societies of SEE, there continues to be the risk of poverty and exclusion from the benefits of better health care for older adults, to policymakers, researchers, planners and analysts. A combination of declining fertility and increasing life expectancy is raising the proportion of elderly persons (aged over 65) in the population. This is the so-called "aging phenomenon" (3).

Three important demographic traits have been identified in the aging process of populations that directly impact the delivery of health care to older adults. The first feature is the "double-aging phenomenon". This refers to the increase in the old-old people among the elderly. A second trait is the feminization of aging (a much higher ratio of females to males). The third characteristic is the difference of aging indices between urban and rural populations. People who live in rural areas are generally older than those who live in towns and cities because of, first of all, migration of younger population from villages to cities in search for better conditions for life. Rapid changes in living conditions, lifestyles, social differentiation and an unstable economic situation impact family planning, birth rate and mortality. Birth rate, mortality rate, and migration determine population demographics and the aging of the population. The decline in birth rate results in the aging of the population, but also in the reduction of the number of potential providers of care for the aging population.

As societies age, the challenge to provide appropriate and cost-effective medical and nursing care to our older adults will increase. It will require knowledge of demographic changes and social needs, as well as the training skilled and unskilled health care workers to creatively meet the needs of this segment of our society. The key elements of an eldercare model are presented in terms of the concepts, mechanisms, and applications described above.

Assessment and utilization of existing data

The program designers must be practical and realistic from the start. Based on all available information (vital statistics, census data, and survey findings), they need to create an "ecological map" of the elderly population. This map of demographic information such as how many people there are and how fast their numbers are growing (in comparison to the rest of the population), where they are distributed (urban centres, rural farms), and where they live (with families, in nursing homes, alone). In the process of making these determinations, the program developers can find gaps in the data and make suggestions on how to deal with those problems in the future. They also need to find out who is providing care to the elderly (family doctors, geriatricians), where the care is given (clinics, nursing homes, at home), and what kind of medical services are being provided (general, specialized, geriatric). In addition, they have to ascertain if there are any existing programs that are geared primarily for the aging population. If such programs already exist, they can build on them or find some way of incorporating them into the new scheme.

Devising an innovative educational and training program

A major component is on the creation of geriatric interdisciplinary teams. Therefore, a program format consisting of the knowledge and skills to be learned, the application and practice of those principles, methods for determining competencies, and procedures for disseminating program results needs to be developed. A special consideration, in view of the urgency for such programs, is to create an intense, short-term program that combines didactic courses with field practice that can be completed in six weeks in order to get newly trained professionals into the field relatively quickly (4).

The didactic curriculum combines geriatric medicine, gerontology, and social sciences. Both principles and methods are taught. Subject matter includes but is not limited to the diagnosis and treatment of the disease of the elderly, the demography of aging, geriatric assessment, communication skills, health promotion, disease prevention, patient education, ethics, cultural diversity, epidemiology, and health care systems. A special session is devoted to management training that deals with such topics as quality management, finance and budgets, resources and personnel, grant writing, fundraising, and network building.

The teaching modalities include interrelated lectures, small group discussions, problem-based learning skills, and case studies. Diagnosis and treatment procedures use evidence-based techniques. Participants quickly become familiar with findings from research studies. A valuable spin-off is learning to read the clinical research literature critically. A great emphasis is put on interpersonal skills, i.e. how to relate to the elderly as a listener, health provider, and teacher.

Cases are interspersed throughout the courses. They are selected on the basis of their relevance to the practice experiences. Systematic documentation of all activities by each participant is stressed as an important source of assessment, report writing, and problem-solving. Special training guides or manuals are prepared and serve as the text. Included in the content are current articles, tested algorithms (found in the National Program for All – Care for Elderly - PACE program from the USA), cases, and other appropriate materials (5).

Disease and illness are discussed not only in terms of their biomedical base but also with respect to social and psychological factors. Ailments of particular concern are diabetes, hypertension, stroke, heart failure, chronic obstructive pulmonary disease (COPD), falls, dementia, elder abuse, incontinence, malnutrition and depression. Poverty and deprivation are seen as part of the illness cycle. The core values of compassion, empathy, altruism, dutifulness, and social responsibility are intertwined throughout the entire course. Participants are consistently asked to reflect on what it means to be a health professional.

Initiating an interdisciplinary team train training

An interdisciplinary approach to health care recognizes that many clinical problems exceed the skills and resources of individual disciplines and requires simultaneous and ongoing collaboration in the evaluation of the patient and creation of an appropriate plan of care (6). A single provider cannot treat the multiple, complex problems of frail older patients (7). Caring for frail older adults with chronic medical diseases takes significantly more office time. Successful interdisciplinary health care teams necessitate a wide range of clinical experiences. Effective teams depend not only on the intellectual expertise of its members but on the conduct of those members within the team sessions (8). Learning to work as part of an interdisciplinary team can only be achieved if participants spend the majority of their time in practice. Practice sites include hospitals, ambulatory care settings, nursing homes, patients' homes, day care programs, and hospices. If there are no hospices, then special attention is given to establishing one. Policies and procedures as well as duties and assignments are drawn up prior to initiation of the program. Experts in the field, practicing health care professionals and community representatives scrutinize the guidelines that are developed. The core team consists of a physician, a nurse, and a social worker. Other professionals who play key roles in the process are rehabilitation therapists, pharmacist and a social scientist, preferably a sociologist. The role of the latter is to observe the process for evaluation purposes.

All core team members are taught the same curriculum. They learn to approach the problems of the elderly from the same source. In other words, they share the same conceptual scheme, goals and objectives, and belief in the importance of their mission. They also learn how to apply their own special expertise

but in a cooperative manner. For example, while the physician performs the history and medical examination, the nurse provides additional history and assists in the development and implementation of the plan of care. The social worker assesses the personal and social needs of the patient. Examples of the latter would be making sure a patient can get to the eye doctor, arranging for meals on wheels (food delivery program for impoverished home-bound elders), or placing a patient into a long-term extended care facility. In all cases continuity of care is stressed. For example, if a patient was first seen in the hospital and goes home after discharge, he or she is followed there. If the patient is seen in the clinic, a record of the patient's visits is kept to assure they are capable of meeting their appointments. From the first day of class until the program is completed the team studies, works, and stays together. A belief in the value of teamwork and commitment to helping the elderly are basic criteria used in the selection process.

Engaging a competent and committed faculty

A competent and dedicated faculty is essential if the program is to succeed. The program designers, or members of their own particular group, serve as the overall course directors. In addition, various members of local medical school, school of nursing, and school of social science faculties need to be recruited for their expertise. For example, having a cardiologist and neurologist do some of the teaching regarding the diagnosis and treatment of stroke and heart disease is an important contribution in helping the program meets its aims. Moreover, by getting the academic professors to work with the clinical practitioners breaks down barriers and shows both groups that they share the same goals.

Becoming sensitive to the socio-cultural environment

The teaching, learning, and development of a geriatric interdisciplinary team approach is complicated and takes careful thought, on-going process analysis, open-mindedness, and flexibility to be successful. Changes toward new methods of health care delivery challenge us to become better prepared to work together, as clinicians and as educators, to meet the needs of older persons in the community and in primary health care settings (9). An understanding of the cultural context of the area being served is of critical importance. Old traditions and mores are difficult to break. Trustworthiness can never be taken for granted whether by patients, practitioners, or administrators. In a world where duplicity, oppression, and outright manipulation were "business as usual," it is understandable that people are wary of those who present themselves as reformers. Before any new program is put into place great effort must be put into developing a sense of mutual trust and cultural awareness. This is not only needed at the local and community level but also inside the academic centres, as well as across and between health professions. Time must be devoted to hearing from the elderly themselves and the indigenous caretakers who look after them.

Establishing a realistic timeline

The operating schedule of an actual program is dependent on the setting in which it is employed. For example, at the beginning of each workday, the team meets to review any active or anticipated problems with their patients. The bulk of the trainees' time is taken up in learning through practice. In some situations, such as in the hospital or nursing home, a trainee can be on call as a member of the team and spend a considerable amount of time dealing with what is needed in the care of the patients in situations outside the community setting. About 12 hours a week are allocated for didactic lectures. Another 12 hours are spent in small group sessions. Related to the practice experiences are team conferences in which members exchange observations and ideas about how the team is functioning. Geriatric specialists serve as facilitators in these sessions. Each trainee is assigned an academic mentor within their discipline to discuss their professional work.

Assessing program efficacy

Evaluation is absolutely essential. Team members, with the help of the social scientist and epidemiologist, can develop simple and straightforward methods for collecting vital information. It is not their job to perform complicated statistical analyses. But data collection is important for a number of reasons. First, the program must demonstrate that it is cost-effective. This can be done by using simple measurements of basic outcomes such as the extent to which hospitalizations are decreased, risk factors are controlled (blood pressure, blood sugar), physical mobility is improved, and a positive attitude about quality of life is maintained. Second, if the program demonstrates its effectiveness, then government agencies and NGOs are more likely to support the expansion and extension of this approach to other regions. Third, program efficacy can be used to apply the same conceptual scheme and format to other vulnerable populations.

APPLICATION OF THE MODEL TO OTHER VULNERABLE COHORTS

The real test of this model is to demonstrate that it is not a "one time only" phenomenon. In other words, its real strength is twofold: its ability to serve as a basis for continual growth and development in the delivery of quality eldercare; and its applicability to similar situations, i.e. other vulnerable populations.

Training the trainers

The application of an eldercare programs for Eastern European health professionals in Hungary has been piloted by DeGolia. As the initial program evolved (acceptance by the community, patient satisfaction, effective teamwork, better care, etc.) other health care providers as well as members of the Open Society Institute encouraged its implementation in other setting. Programs were developed for training teams in Slovenia and Moldova.

The first step in making this kind of program operational is to employing the "training the trainers" component. After training the first group, it is possible to training them to train other teams in their region. To broaden the approach even further, a special training session, perhaps over the summer, could be established in a centralized area. This way people from many different regions could participate in the program. The major thrust here is to create an on-going self-sustaining eldercare program. The original program designers can be recruited to participate in the first summer program. The logistics can be worked out without too much difficulty.

Another aspect of the program is to bring especially talented participants to the USA for more extensive training. This innovation would lead to the training of cadre as "geriatric team scholars". This select group would not only oversee program operations, but also engage in more scholarly pursuits such as conducting program evaluation studies, writing papers, and giving presentations on this innovation in eldercare.

Applying the principles and methods of the model to other vulnerable populations

We firmly believe that the eldercare model, based on the concepts, components, and operations described throughout this paper, has tremendous potential for addressing the problems and concerns associated with other vulnerable groups in South Eastern Europe. There are many reasons for this belief. To begin with, the countries that make up SEE face many common problems. That being the case, there is a need for a better understanding of their interdependency when it comes to developing strategies, sharing information, and finding solutions. Furthermore, there is a need for a starting point, a blueprint, for future planning and concentrated action.

Since specific vulnerable cohorts such as refugees, displaced persons, and Romas have crossed borders and, in some cases, continue to move in unpredictable ways, it is absolutely imperative that countries and regions work in collaboration to reach these people. Moreover, since the demographic and vital statistics of the groups is spurious, the need to create a more empirically derived database also requires the joint efforts of all the governments involved.

In addition, some of the vulnerable groups tend to cluster together in families or communities (women, children, and elderly) where the focus can have multiple possibilities. If approached intelligently and creatively, a network of health professionals, academics, researchers, administrators, practitioners, community representatives, government officials, and local volunteers can be organized to cover the various territories in a systematic and comprehensive fashion. Such an attempt for fostering change is not only idealistic and humane but also pragmatic and realistic. From the operational side, the elements discussed above can

be utilized efficiently. These include an interdisciplinary team perspective and learning while providing care. It also involves assessing the situation prior, during, and after the training is completed, on-going assessment, dynamic application of change as part of the process of implementation, a continuous integration and synthesis of positive outcomes, and a communication system for a reciprocal exchange of information. With respect to the latter, telemedicine is an emerging technology that has direct application for what we are proposing.

Developing health care policy

The resilience and strength of the people of SEE is amazing. Ironically, their ability to "muddle through" such difficult times – war, sanctions, bombings, oppression, environmental and chemical disasters, political upheaval, revolution, poverty, corruption, death and disability (and the list goes on and on), actually hides some of the enormity of the current situation. A "broad brush" look at vital statistics (see previous paper) indicates SEE is in fairly good shape "health-wise" when it comes to what they have been through. But not too deep below these statistics is a part of the world going through major social and economic strife. Vulnerability is the norm not the deviation. And, strikingly, the full impact of that vulnerability remains to be seen because current reports of mortality and morbidity may really be just the tip of the iceberg. Almost every indicator points to deteriorating health and well being.

The enormity of the problem calls for immediate but well thought out action. The old axiom of "needing to have some basis for understanding before instituting change" is a luxury that the people of SEE have neither the time nor energy to adhere to totally. If, however, there is a need for action now, that action still must be based on intelligent thought, moral stamina, authentic commitment, and courage. The initiators of that action are, in reality, social activists, purveyors of change, citizens for democracy. Those beliefs will serve as their guiding light, their beacon to reform.

Nevertheless, their efforts must be carefully focused, painstakingly prepared, and clearly articulated. New health care policy that corresponds to actual need is essential. The policy makers must realize that in the long run something must be done with respect to social and economic conditions or the situation will continue to deteriorate. Health and illness are intimately correlated with socioeconomic conditions. Improvement in health must go hand-in-hand. People, regardless of their resilience, can only carry on for so long without real support. The biggest challenge faced is how to muster all of the needed resources – human and otherwise – to tackle these issues. The kind of approach outlined in this paper can serve as a catalyst for gaining much needed support. That being the case, it should be clear that external sources must be brought in to help. We hope that what we have presented in this paper serve as a touchstone for igniting that process.

What can be done now?

First, there is the task of designing, executing, and assessing a new version of the eldercare model for any particular region or community in SEE. Second, a similar mechanism can be applied to other vulnerable populations. Third, outside experts can be recruited to participate in seminars, summer training programs, brainstorming sessions, planning meetings or any other types of activities where they can make a valid contribution. Fourth, using the experts' network of persons, institutions, and programs, they can host special education programs for the training of trainers.

Finally, we would like to introduce a new activity – the establishment of a Centre for the Dissemination of Innovations based on the findings from programs that have shown progress and potential. The Centre would serve as a clearinghouse for lessons learned. In that capacity it would also function as a consortium for collaboration and information exchange. A template containing the item (the program), the setting (community, institution), the goals (attainable objects), the expertise (knowledge and skills), the collaborators (who did it) and the deliverables (outcomes that can be used by others) was created. Health care planners, educators, managers, and the like can use this information for setting priorities. The potential for such a Centre, which could be located anywhere (there is no need for a new facility) should be given careful consideration.

We would also like to close it with two quotes from George Soros (no more needs to be said):

"We must abandon the unthinking pursuit of narrow self-interest and give some thought to the future of humanity... [We need] a reassertion of morality amid our amoral preoccupations. It may be naïve to expect a change in human nature, but humans are capable of transcending the pursuit of narrow self-interest. Indeed, they cannot live without some sense of morality. It is market fundamentalism, which holds that the social good is best served by allowing people to pursue their self-interest without any thought for the social good – the two being identical – that is a perversion of human nature", and

"The fight against terrorism cannot succeed unless we can also project the vision of a better world. The United States must lead the fight against poverty, ignorance, and repression with the same urgency, determination, and commitment of resources as the war on terrorism".

EXERCISES

You are a health professional working at a community health center in an older section of your city of 100,000 people. Your health center is responsible for the delivery and coordination of health services to the residents of this section of the community. The demographic information that you received from the Ministry of Health identifies 3,000 persons over the age of 65 years living in your section of the community.

1) What other useful information would you want to know about this group of residents?

2) How might you go about obtaining that information?

3) What information might each of the following health professionals identify that would be different from the others but contribute to the overall knowledge of your patients and their living conditions?

a) Physician

b) Nurse

c) Social worker

d) Administrator

You determine that only 70% of this population is receiving any type of medical care. You conduct a survey of the residents of this community and find out that heart disease, diabetes and malnutrition are primary problems needing attention. You find that there is a need for greater education about these diseases and how they can be managed.

What general programs might be considered to address these problems?

Name 3 ways that health professional from different disciplines could work together to develop solutions to address these problems?

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Functional Assessment in the Elderly**
Module: 7.4	**ECTS (suggested): 0.25**
Author(s), degrees, institution(s)	**Bojana Matejić, MD, Msc** Teaching Assistant at the School of Medicine University of Belgrade, Serbia and Montenegro **Zorica Terzić, MD, Msc** Teaching Assistant at the School of Medicine University of Belgrade, Serbia and Montenegro
Address for correspondence	Bojana Matejić Institute of Social Medicine, School of Medicine, University of Belgrade Dr Subotića 15 11000 Belgrade Serbia and Montenegro Tel: +381 11 643 830 Fax: +381 11 659 533 E-mail: bojana_boba@yahoo.com
Keywords	Functional assessment, ADL, IADL, elderly assessment
Learning objectives	After completing this module students and public health professionals should: • Recognize the importance of integrated approach in the assessment and care of old persons • Identify the functional assessment with old persons • Increase knowledge about functional ability and possibilities of measuring that domain of life; • Understand the differences between ADLs and IADLs, in theory and during the processing different instruments of measuring; and • Identify the preferences and also the disadvantages of different types of functional assessment instruments

Abstract	Normal aging changes and health problems frequently show themselves as declines in the functional status of older adults. One of the best ways to evaluate the health status of older person is through comprehensive geriatric assessment. Less extensive assessments need to include assessment of functional ability. Functional status depends of person's biological, psychological and social capacities, which synchronically enable all activities. Activities of daily living (ADLs) and instrumental activities of daily living (IADLs) are the major categories of functional ability. The Katz Index of Independence in Activities of Daily Living is the most frequently used instrument to assess ADLs. The Lawton IADL scale was the first assessment tool to measure the more complex ADLs that demonstrate a person's ability to adapt to the environment. The functional assessment instruments could be classified in a few different types: single-item or two-item questions, self-report questionnaires, proxy report measures, direct observation measures and performance based measures.
Teaching methods	Teaching methods include: lectures, individual work and group discussions. Students should have opportunity to search through the Internet in order to explore some of the web sites concerning measuring the functional ability.
Specific recommendations for teachers	It is recommended that the module should be organized within 0.25 ECTS credits, out of which 3 hours will be done under supervision (lectures and plenary session), and the rest is individual work.
Assessment of students	Multiple choice questionnaire (MCQ)

FUNCTIONAL ASSESSMENT IN THE ELDERLY

Bojana Matejić, Zorica Terzić

The demographic shift toward an ageing population is one of the most noticeable global phenomena. The problems of elderly are often complex and multidimensional. Normal aging changes and health problems frequently show themselves as declines in the functional status of older adults. In the care and delivery of health services to older persons, it is necessary to conduct systematic approaches.

General issues about comprehensive geriatric assessment

One of the best ways to evaluate the health status of older person is through *comprehensive geriatric assessment*. The most important characteristic of CGA is the use of multidisciplinary methods. The term has been defined by the 1987 National Institutes of Health Consensus Conference on Geriatric Assessment Methods for Clinical Decision-making as a "multidisciplinary evaluation in which the multiple problems of older persons are uncovered, described, and explained, if possible, and in which the resources and strengths of the person are catalogued, need for services assessed, and a coordinated care plan developed to focus interventions on the person's problems." (1). It is a multidimensional process designed to assess an elderly person's functional ability, physical health, cognitive and mental health, and socio-environmental situation. The aim of a comprehensive evaluation is to optimize an older person's ability to enjoy good health and quality of life, to reduce the need for hospitalization and/or institutionalization, and to enable them to live independently for as long as possible.

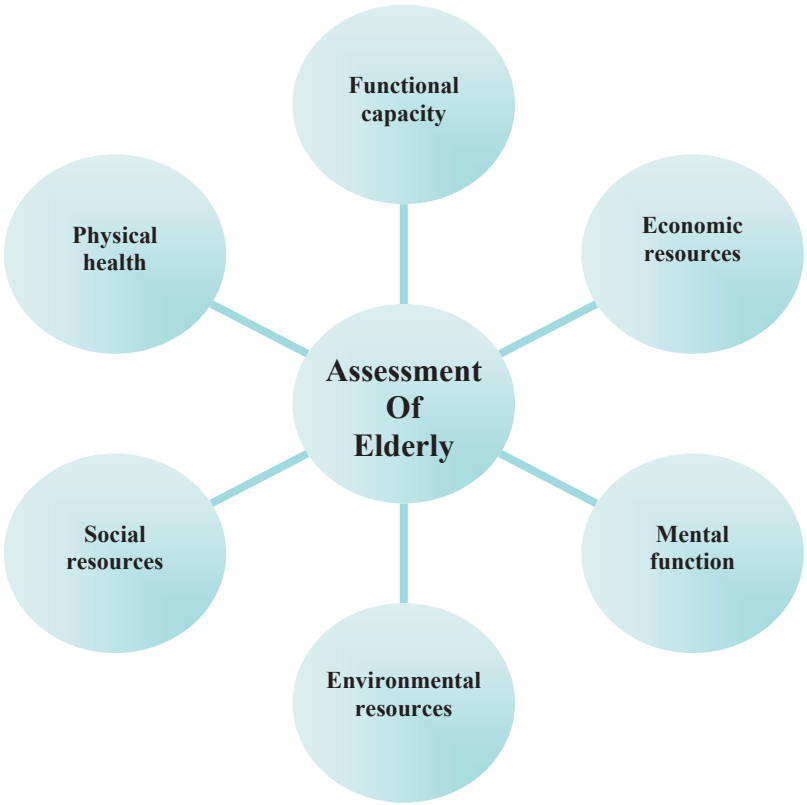
Comprehensive geriatric assessment differs from a standard medical evaluation by including domains which are not strictly medical, by emphasizing functional ability and quality of life, and, often, by relying on interdisciplinary teams. The participation of multidisciplinary teams can greatly increase the expertise and enthusiasm for patient assessment and care (2). The final organization depends on the program goals, setting, patient load, and funding. Most groups consist of a physician, a nurse, and a social worker. Other members include a physiotherapist and occupational therapist. Some assessment teams also have a dietician, psychologist, psychiatrist, podiatrist, ophthalmologist, or clinical pharmacologist. Nevertheless, the cost of programs with integrated approach has limited their

use. Although some cost-effectiveness evaluations suggest that these programs can save money, few programs operate in integrated care systems that can track these savings. An alternative approach is to conduct *less extensive assessments* in primary care offices or emergency departments (3).

Among comprehensiveness, staffing, organization, and structural and functional components, geriatric assessment programs vary widely in purpose. It can be used to decide on treatment or may serve as the basis for determining eligibility for care. At the same time, assessment is useful in the process of evaluation the effectiveness of a program or a specific service. Objective data may indicate future decline or improvement of health status, allowing the caregivers to intervene appropriately (4).

Because of the range of problems that can be present, the WHO has identified and recommended certain domains (Figure 1) to be assessed in elderly patients (5).

Figure 1. Recommended domains in the assessment of elderly



A geriatric assessment can be performed in many different settings such as a hospital, a nursing home, an outpatient clinic, a physician's office or the patient's home. It can be conducted by highly trained professionals or, sometimes lay persons with little formal training. It is appropriate to cite: "*the more structured the assessment, the less specialized the assessor needs to be"* (6).

In the process of assessment an older person there are some special issues that have to be considered (Table 1).

Table 1. General issues in the assessment of elderly

Interviewing older person	Problems	Recommendations
Establishing communication	Difficulties with hearing and vision may lead to poor performance, frustration of all parties, unnecessary use of proxies and even misdiagnoses	Establish good communication. Slowly ask questions, wait for the response and enunciate carefully, facing the respondent. Speak loudly or, when hearing is problem, use the written form of the interview.
Time	Interviewing older person take more time than usual. Some may have difficulty focusing on the task, response time is longer, and lonely people may want to talk about other things. Sometimes, we deal with persons with cognitive defects.	Interviewers need special training in learning how to accommodate some of this time delay but not get off the track. Dealing with persons with minor cognitive deficits may need more prompts and reminders.
Fatigue	Older respondents may tire easily, especially when they have multiple medical problems. That can lead to incomplete interview	Interviewers need to be trained to recognize indications of fatigue and to offer to stop and even divide the session into multiple parts geared to the respondent's tolerance
Embarrassment	Older people may become upset when they cannot perform certain physical or cognitive test. They may not feel free to admit certain problems, especially when they could face consequences (e.g. institualization).	Interviewers need to be instructed how to avoid and cope with these reactions. Assure the clients of confidentiality. However, be ready to deal with own embarrassment when asking old person about continence or depression.
Test batteries	Often it is needed to use a battery of tests during the assessment of old person. It could be very tiring for client and take a lot of time in practice.	It is better to begin with easier and less threatening material and proceeds on the basis of performance. Areas, like cognition, where failure is more feasible should be presented as late as possible.

Interviewing older person	Problems	Recommendations
Socio-environmental situation	Factors that affect the patient's socio-environmental situation are complex and difficult to quantify. They include the social interaction network, available social support resources, special needs, and environmental safety and convenience, which influence the treatment approach used.	It is important to have such information about an elderly patient at the first interview. It can easily be obtained by an experienced nurse or social worker. Several assessment instruments are available, but none is quantitative or clinically useful. A checklist can be used to assess home safety.

Source: Adapted (3, 6)

Although, it is necessary to spend approximately 60 minutes to assess an older patient, who often present with a complex array of medical conditions complicated by psychosocial problems, the doctor is usually limit to 15 to 20 minutes per patient (7). In that brief time, especially at the outpatient primary care practice, the elderly patients can't communicate the full scope of their problems and doctors can't get answers to all the questions they need to ask. Less extensive assessments have to include assessment of functional ability. The old patients perceive their health status specifically and it is usually stronger connected with the functional ability than the number and character of different diseases (8).

Functional ability

There are many different ways to define functional ability, in a very broad theoretical range. Nevertheless, three components are present in almost all definitions: self-care, self-preservation and ability to perform physically active life, as long as it is possible. A simple explanation of a term is that functional status is personal ability of fulfilling different needs (9). Functional status depends of person's biological, psychological and social capacities, which synchronically enable all activities (10). It is not a constant but changeable value, under the influence of number positive or negative modulators. Functional status does not always reflect the physician-related health state of the individual. It has been shown that functional status is a very important factor for a person's evaluation of each overall health status as 'good' or 'bad' and it constitutes in many cases the key concept for individuals, especially the old, prior to their decision to use health services. Bad functional status is one of the physical status variables leading to the more frequently use of health services, especially in the population of old people (11). Physical and cognitive function deficits are among primary predictors of decreased quality of life in home-dwelling elders (12).

Variables connected with functional ability of old people

It appears that, demographic and psycho-social variables mediate the relationship between health status and activities of everyday life. In particular, demographic characteristics have an impact on levels of daily functioning and seem to play a role even after controlling for a variety of health variables (13, 14). The most often mentioned variables connected with functional ability are: sex, age, physical and socio-environmental conditions, attitudes and believes, available technology, resources (finance and others) and physical activity (15).

Age of patient significantly determines the functional status. It is estimated that after the 30 years of live, person lose 1% of functional ability each year (16). Especially noticeable decrease in functional status is after the 85 years. Nevertheless, the mechanism of a functional decrease is individual and it cannot be exclusively connected with the age of the person (17).

Chronic diseases and number of periodically or permanent presently symptoms are expected companions of old age. As it was mentioned above, the functional status is not directly and only determined with these variables. Recently published data for Serbia (representative sample, more than 9000 respondents), illuminated the health problems of our elderly. Every second old person has gait problems and back pain, and more than 40% frequently suffers from headache and neck pain (18).

Gender is significantly associated with the functional status of old person. In the majority of published studies on the big representative samples (mostly longitudinal studies), the men of old age experience higher levels of functional ability than women (19-21)

Physical activity is most often mentioned variable in the connection with desirable functional status in old age. The WHO (World Health Organization) experts emphasized that "*physical inactivity is unnecessary loss of human recourses"* (22). The active elderly have better functional status, less are inclined to injuries and fractures, and have smaller hospitalization rates than the inactive (23). Although, there are many data that prove the benefits of physical activity, the sedentary way of living is the usual way of spending the old age. According to data from Serbia (18) only 19% of our old people are physically active and less than 10% exercise on the regular bases. The reason of that especially bad behaviour could be the still present cultural pattern, which gives a picture of old person as inactive, mostly ill and frail.

Economic status is often present variable connected with the functional status of elderly. In the model is usually bad economic status with lower level of education and less influenced (and paid) previous job of old person (24). Nevertheless, we can find the articles discussing about disparate effects of socioeconomic status on physical function and emotional well-being in older adults. The authors

are certain that in the old age exist number of compensatory mechanisms, which make very complicated the explanation of the relationship between socio-economic status and functional ability (25).

Social isolation, lower level of education, loneliness and depression are mentioned as the predictors of functional status in the population of old people, but less frequently that the previous variables. It is complicated to quantify the socio-environmental context of living and it is in the focus during the sociological, not the medical studies. The social support is proved to be in the positive correlation with the functional ability in old age. In the less developed countries, the social support and traditional function of the family are the most important contributions to the overall quality of life for elderly. The problem of isolation is more present in the developed world, but the local community is much more organized to compensate the role of family (26).

Measuring functional ability

Functional assessment is the evaluation of a person's ability to carry out the basic activities of daily living (27). It is the systematic process of identifying or diagnosing the capabilities and deficiencies of persons at risk from the consequences of ageing and illness (28). Functional ability could be assessed through three domains: physical, psycho-cognitive and socio-cultural ability. In each domain are dimensions especially important to the elderly people (Table 2).

Table 2. Dimensions of functional ability in elderly people (29)

Functional ability		
Physical ability	**Psycho-cognitive ability**	**Socio-cultural ability**
Musculoskeletal function	*Reading and writing*	*Self-care*
Hearing	*Using of the spoken language*	*Communication with other persons*
Vision	*Memory*	*Ability to work*
Voice and speech	*Time of reaction*	*Ability to learn*
Senses (hot, cold ,pain)	*Observation*	*Maintaining good relations with other persons*
Cardiovascular and respiratory function	*Intelligence, logic*	*Economic independence*
Metabolic, immune, digestive nutritive and other functions	*Personality Functioning of the CNS*	*Ability to be active in certain area of social life*

Source: Edmund MW, Mayhew MS. Functional assessment

Comprehensive geriatric assessment begins with a review of the major categories of functional ability: activities of daily living (ADLs) and instrumental activities of daily living (IADLs). A common trait of different approaches to functional assessment is measuring a level of assistance to old person, in order to fulfil certain task or activity. Deficits in ADLs and IADLs indicate a need for additional information about the patient's socio-environmental situation. When elderly persons begin to need help performing these activities, their risk of becoming more dependent increases.

ADLs (activities of daily living)

ADLs are self-care activities that a person normally does in daily living (eg, eating, dressing, bathing, transferring between the bed and a chair, using the toilet, controlling bladder and bowel). The ability or inability to perform ADLs can be used as a very practical measure of ability/disability in many disorders. When people are unable to perform these activities, they need help in order to cope, either from other human beings or mechanical devices or both. Although persons of all ages may have problems performing the ADLs, prevalence rates are much higher for the elderly than for the younger population. Within the elderly population, ADL prevalence rates rise steeply with advancing age and are especially high for persons aged 85 and over Measurement of the activities of daily living is critical because they have been found to be significant predictors of admission to a nursing home, using of paid home care, hospital or outpatient services, insurance coverage and mortality. Estimates of the number and characteristics of people with problems performing ADLs are also important because of the increasing number of private long-term care insurance policies and proposed public long-term care insurance programs that rely on ADL measures to determine whether an individual qualifies for benefits. Patients unable to perform these activities and obtain adequate nutrition usually require caregiver support 12 to 24 hours/day (3, 30). To determine a person's basic activity of daily living (ADL), the Katz index of ADL is often used (Table 3).

Table 3. Katz Index of Independence in Activities of Daily Living

ACTIVITIES Points (1 or 0)	**INDEPENDENCE:** (1 POINT) **NO** supervision, direction or personal assistance	**DEPENDENCE:** (0 POINTS) **WITH s**upervision, direction, personal assistance or total care
BATHING Points: _____	**(1 POINT)** Bathes self completely or needs help in bathing only a single part of the body such as the back, genital area or disabled extremity.	**(0 POINTS)** Needs help with bathing more than one part of the body, getting in or out of the tub or shower. Requires total bathing.
DRESSING Points: _____	**(1 POINT)** Gets clothes from closets and drawers and puts on clothes and outer garments complete with fasteners. May have help tying shoes.	**(0 POINTS)** Needs help with dressing self or needs to be completely dressed.
TOILETING Points: _____	**(1 POINT)** Goes to toilet, gets on and off, arranges clothes, cleans genital area without help.	**(0 POINTS)** Needs help transferring to the toilet, cleaning self or uses bedpan or commode.
TRANSFERRING Points: _____	**(1 POINT)** Moves in and out of bed or chair unassisted. Mechanical transferring aides are acceptable.	**(0 POINTS)** Needs help in moving from bed to chair or requires a complete transfer.
CONTINENCE Points: _____	**(1 POINT)** Exercises complete self control over urination and defecation.	**(0 POINTS)** Is partially or totally incontinent of bowel or bladder.
FEEDING Points: _____	**(1 POINT)** Gets food from plate into mouth without help. Preparation of food may be done by another person.	**(0 POINTS)** Needs partial or total help with feeding or requires parenteral feeding.

TOTAL POINTS = _____

6 = High (patient independent) *0 = Low (patient very dependent)*

Source: Katz S., Down, T.D., Cash, H.R. et al. (1970) Progress in the Development of the Index of ADL. Gerontologist, 10:20-30. *Copyright The Gerontological Society of America.*

The Katz Index of Independence in Activities of Daily Living

The Katz Index of Independence in Activities of Daily Living, commonly referred to as the Katz ADL, is the most appropriate instrument to assess functional status as a measurement of the client's ability to perform activities of daily living independently. It is basic observational tool, on which all other functional assessment instruments have been developed. Clinicians typically use the tool to detect problems in performing activities of daily living and to plan care accordingly. The index ranks adequacy of performance in the six functions of bathing, dressing, toileting, transferring, continence, and feeding. Clients are scored yes/no for independence in each of the six functions. A score of 6 indicates full function, 4 indicate moderate impairment, and 2 or less indicates severe functional impairment (31).

According to Katz, the six ADLs are in the hierarchical relationship. These ADLs were described as "early loss" and "late loss" ADLs. Complex ADLs, such as bathing and dressing, are "early loss", and represent functions that are more susceptible to early cognitive decline. "Late loss" ADLs are functions which are last expected to be lost by a person (eating, bed mobility).

IADLs (instrumental activities of daily living)

IADLs are activities related to independent living in house or apartment (e.g. preparing meals, performing housework, taking drugs, and going on errands, managing finances, using a telephone). To determine the instrumental ADL (IADL), the Lawton IADL scale is one of the more commonly used instruments (Table 4).

Table 4. Instrumental Activities of Daily Living

Obtained from patient	Obtained from informant	Activity	Guidelines for Assessment
I **A** **D**	**I** **A** **D**	**Using telephone**	**I**=Able to look up numbers, dial, receive and make calls without help **A**=Unable to use telephone **D**=Able to answer phone or dial operator in an emergency but needs special phone or help in getting number, dialling
I **A** **D**	**I** **A** **D**	**Travelling**	**I**=Able to drive own car or travel alone on buses, taxis **A**=Able to travel but needs someone to travel with **D**=Unable to travel
I **A** **D**	**I** **A** **D**	**Shopping**	**I**=Able to take care of all food/clothes **A**=Able to shop but needs someone to shop with **D**=Unable to shop
I **A** **D**	**I** **A** **D**	**Preparing meals**	**I**=Able to plan and cook full meals **A**=Able to prepare light foods but unable to cook full meals alone **D**=Unable to prepare any meals
I **A** **D**	**I** **A** **D**	**Housework**	**I**=Able to do heavy housework, i.e., scrub floors **A**=Able to do light housework, but needs help with heavy tasks **D**= Unable to do any housework
I **A** **D**	**I** **A** **D**	**Taking medicine**	**I**=Able to prepare/take medications in the right dose at the right time **A**=Able to take medications, but needs reminding or someone to prepare them **D**=Unable to take medications
I **A** **D**	**I** **A** **D**	**Managing money**	**I**=Able to manage buying needs, i.e., write checks, pay bills **A**=Able to manage daily buying needs but needs help managing check book, paying bills **D**=Unable to handle money
Date_____		**Patient's name**_____	

I=Independent **A= Assistance required** **D=Dependent**

Source: Lawton M.P. and Brody E.M. Assessment of older people: self-maintaining and instrumental activities of daily living. Gerontologist 1969; 9: 179-186.

The Lawton IADL scale

The Lawton IADL scale was the first assessment tool to measure the more complex ADLs that demonstrate a person's ability to adapt to the environment. The scale was made to improve usefulness of functional assessments of community dwelling elders. The assessment is based on seven criteria: using the telephone, travelling by car or public transportation, food or clothes shopping, meal preparation, housework, medication use and management of money. Each criterion is graded on 3 part scale: independent, assistance needed and dependent. Two separate surveys need to be completed: one from the patient, and the other from informant (nurse, doctor, care-givers or family member). The instrument produce a summary score, with a range of 0 (low function) to 7 (high function) (32).

Research studies have demonstrated the relationship between ADLs and IADLs. Persons who are dependant in ADLs are also dependant in IADLs. On the contrary, persons who require assistance in performing IADLs are not necessary unable to perform ADLs (33).

Some authors understand functional assessment as a process by stages (phases, levels), through three phases of the assessment. The first level is assessment of *Basic activities of daily living (BADLs)*, which refers to individual's ability of performing 'primary biological activities, i.e. eating or dressing ability. The BADLs are more relevant for institutionalized patients and/or elderly individuals with severe disabilities. Second, hierarchal higher level is assessment of already mentioned IADLs. In order to assess for example the ability of an old person with minor health problems to live independently in the community, the 'IADL' indexes are preferred to the previous ones. These measurement tools include more typical activities of daily living, e.g. gross mobility, home chores and role performance At the end, assessment of the highest level of activities, *Advanced activities of daily living-AADLs,* refers to range of social activities, recreation, occupation or hobby. The authors emphasize the importance of AADLs assessment, commonly forgotten in routine health interviews, but the first sign of health and functional decline (33).

Types of functional assessment instruments

There are few types of used functional assessment instruments. Sometimes, the *single-item* or *two-item questions* about functional performance are assessed domains in the much more comprehensive survey.

Self-report questionnaires represent the respondent's performance rather than their actual performance. It can be done via the mail, over the telephone or face to face interviews

The same instruments could be used as a *Proxy report measure,* after the assumption that the old person is too cognitively impaired to be a reliable respondent. The proxies can be family members or professional caregivers.

Direct observation measures require the person to perform an activity at a time and place where the performance can be observed by a trained observer. Observers are trained to assess specific indicators, for example, speed and gait pattern.

Performance based measures are tests usually focused on dimensions of physical functioning such as balance, strength, speed of performance, gait speed or hand dexterity. The preferences or disadvantages of different measures are presented in table 5 (34).

Case study

Mrs G is 82-years-old and had stroke seven years ago with gradual deterioration in her functional ability ever since. Recently, she has had a number of falls, lost confidence, and no longer feels able to socialise or get out to the shops. Isolation has slowly increased and affected her self-motivation. She also has early dementia. Her husband has arthritis and chronic obstructive airways disease and is dependent on her care. He is finding it difficult to understand changes in his wife. Tension is building between them. She will not countenance referral to social services.

The students are divided in few small groups (4 to 5 students). Each group have to discuss about a specific topic. Then, the representative of the group would present the conclusions of group work. The topics are followed:

- Usual pathways of the General Practitioner in the situation with patient Mrs G.
- Ideal (comprehensive) pathways of care with patient Mrs G.
- Shortages of assessment an old person in outpatient clinic, out of context from their real life home setting.

Time 45 minutes

The discussion will include all students, after the reports. The lecturer may use some of the key points to start the discussion.

Discuss about different social and health needs of old people and their connection. Emphasize the differences during the process of care in variable settings (countries, developed and undeveloped regions of the same country, capital or regional city…). Try to highlight the problems from the patient point of view and from the professional's point of view. Discuss with students if they recognize the integration of care for elderly between the different levels of health care? Ask the students about the mechanism (if they exist in their community), of integration between health and social services for elderly.

Time 45 minutes

Table 5. Functional assessment instruments

Type of instrument	*Preferences*	*Disadvantages*
Single-item* or *two-item questions	These tools are a relatively inexpensive way to screen out persons who do not need further functional assessment.	A confusion may arise about what standard of comparison the respondent is using
Self-report questionnaires	These measures are easy to administer and low in cost. It is not necessary to have high trained personal to assess the old person by questionnaire. They are easy to administer and can be done in person, via mail or by telephone.	These measures are not sensitive to change in function. The cognitive status or the mood state of the respondent has a direct impact on the quality of the responses. Discrepancies between self-report and actual ability to perform can be questioned.
Proxy report measure	These measures are relatively inexpensive, easy to administer and can be done in person, via mail or by telephone.	Proxies are subjects who biased recall. They can exaggerate or minimize dependency. Proxy respondents who are family members tend to underrate performance than the old person would report.
Direct observation measures	Measures of direct observation tend to have structured criteria for observing and scoring the performance. Advantages of these tools are their high degree of face validity and sensitivity to change over time.	These measures are costly in terms of performance time by the older adult and observation time of observer. In the laboratory or clinical settings, the environment is unfamiliar to the subject, which may influence the performance.
Performance based measures	These measures have excellent face validity for the tasks being performed. They are sensitive to change over time, can be used to assess function when recall is limited, and have better reliability for persons with mild to moderate cognitive impairment.	These measures are expensive. When subject do not complete the task it is difficult to determine if the failure is due to low level of motivation, inability to do the task, nonsupportive environment, or a combination of factors. Performance that occurs in the clinical setting may not equal performance at home or in daily life.

Case study

Importance of a multidimensional approach in the assessment of elderly

A 79-year-old widowed woman, who recently completed chemotherapy for breast cancer, complained of intermittent chest pain, palpitations, weakness, and forgetfulness. Her family was concerned that she may be developing dementia. She lived alone in a one-bedroom apartment and had been managing all of her affairs independently. Her family was alerted when her telephone was disconnected for non-payment of several bills. They also noted that she seemed thinner but attributed this to the chemotherapy. The apartment was disorganized, and the refrigerator was almost devoid of food.

A team for home care (general practitioner, nurse and social worker), revealed a probable diagnosis of major depression with underlying anxiety causing chest pain and palpitations and weight loss secondary to depression. Also, mucositis related to chemotherapy was noted, and polypharmacy contributed to weakness and fatigue, making it difficult to transfer out of chairs and the toilet. The team believed that the patient would need to be monitored after therapy to see if a diagnosis of dementia would be later confirmed. Social support and financial resources were considered adequate. After discussion with the patient and family, a care plan was developed and instituted.

Phase 1 included moving the patient to live with her daughter during this time of recuperation, with a trial at her apartment when the team felt she was ready to return. Her medications were streamlined to ensure that they were actually required and matched a diagnosis, and dosages were checked for appropriateness. If less expensive agents or those with improved side-effect profiles were available, a trial would be considered. An antidepressant and an analgesic were added for major depression and for mucositis. The patient was scheduled for outpatient physical therapy. A home evaluation determined that grab rails and an elevated toilet seat would assist with transfers in the bathroom. Armless chairs in the kitchen and dining area were replaced with appropriate height chairs with arms, and several throw rugs were disposed of because of the concern for fall risk. Based on the patient interview, the patient noted that she was concerned that she would have a cancer relapse, though there was no evidence of this to date. A list of breast cancer support groups was also provided to the patient. Over the next several weeks, the patient's mood, energy, and appetite all improved. Her chest pains and palpitations resolved with successful treatment of depression. Though she was still concerned about a cancer relapse, she felt the support groups were helpful. After a successful trial in her apartment, she returned to living independently, now with a home care aide visiting twice a week and with home-delivered meals.

EXERCISES

Task 1. Individual work

Students read a case study and try to distinguish the task of each member of a team from the text. How are health and social needs of the old women connected? What is the advantage of a home visit from this case? Each student will try to deal with this situation under the different circumstances, when the old person's family doesn't have home care options. Students are reading their reports and discuss different opinions and solutions.

Time 90 minutes.

Task 2. Group work

Students are organized in a few small groups (4-5 students) and have opportunity to search through the Internet. Each group will have task to find and present one successful model of integrated care for elderly.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Social Networks and Social Support as Determinants of Health**
Module: 7.5	**ECTS (suggested): 0.75**
Author(s),degrees, institution(s)	**Doncho Donev, MD, PhD, Professor** Institute of Social Medicine, Joint Institutes, Faculty of Medicine, University of Skopje
Address for correspondence	Institute of Social Medicine, Joint Institutes, Faculty of Medicine, University of Skopje 50 Divizia 6 1000 Skopje, Republic of Macedonia E-mail : donev@freemail.org.mk
Keywords	Determinants, health, interaction, social networks, social support, stress.
Learning objectives	At the end of the module, students and public health professionals should be able to: • Understand the theoretical aspects about social networks and social support; • Assess the relationships between social networks and social support with health status and health behaviour; and • Make use of social networks in health education programs, such as family network interventions, self-help groups, natural helpers and community organizing.

Abstract	Social networks and social support are general terms to describe different aspects of social relationships, including those mechanisms which may protect individuals from the negative effects of stress. The social support is offered by different segments of social networks and by people who are always ready to help the others. Individuals enjoying strong social ties appear to be at a low risk of psychosocial and physical impairment, whereas a lack of social support has been found to be associated with depression, neurosis and even mortality. In general, social support seems to be an important moderating factor in the stress process and it's consequences to ill-health. The support acts on the individual and on the societal level. The social isolation, loneliness and exclusion are related to increased rates of premature deaths and smaller chances to survive more severe illnesses, such as e.g. episodes of heart attacks. Individuals who receive little emotional and social support suffer more frequently from depression, a higher level of incapacity due to chronic diseases, and a higher risk for complications during pregnancy (in women). The availability of emotional and social support varies with social and economic status. Poverty can lead to social exclusion and isolation. Social cohesion – i.e the presence of mutual trust and respect in the local community and in society in general – helps to protect peoples' health against cardiovascular diseases and mental disorders. Experts in public health should recognize the role of social networks and social support in health promotion programs.
Teaching methods	Lectures, focus group discussions, nominal groups, and case studies.
Specific recommendations for teachers	Case Studies – students should collect data on "life stories" for various types of social networks and social support in relation to the health status and health consequences.
Assessment of students	The final grade should be based on the level of theoretical knowledge gained (oral exam), contribution to group-works, and the quality of seminar papers.

SOCIAL NETWORKS AND SOCIAL SUPPORT AS DETERMINANTS OF HEALTH

Doncho Donev

Social environment encompasses economic, political and cultural spheres and represents a complex determinant of health, human development and survival. The social environment provides social and economic safety, social stability, acceptance of differences, human rights, as well as social cohesion. Social environment includes moral sentiments defining good and bad thoughts, feelings and conduct, knowledge, ideologies including religious and secular beliefs, as well as an entire repertoire of cultural symbols and their meaning, including language. As Peter Berger (1964) has formulated it, "The human being resides in the social environment, and the social environment resides within the human being" (1).

On the other hand, socio-economic turmoil, economic transition, unemployment and poverty, national, religious and other conflicts bring about dramatic changes in the social environment and thereby affect negatively individuals' health. Conditions of war, including not only physical threats but also a throng of stressful and crisis situations, endanger the physical, emotional and psychological health of individuals and populations, especially the most vulnerable categories (women, children, and the aged). Resulting health disorders are numerous and include acute and long-term consequences. The period of the most rapid change in human health status corresponds to what historians call the Modern Era.

Social relations and supportive networks of communication and mutual obligation make people feel cared of, loved, esteemed and valued. Supportive relationships have powerful protective effects on health, and may also encourage healthier behaviour patterns. Social relations that can be analysed at a primarily individual level (social support), and at community level (social capital) are a particularly important part of a social environment.

Social networks are enveloping sets of relationships through which individuals develop their identities, which in turn shape the motivation to act and behave in accordance with a healthy lifestyle. Networks may thus act to reinforce both positive and negative patterns of health behaviour (1, 2).

Social support is a general term to describe different aspects of social relationships, including those mechanisms which may protect individuals from the negative effects of stress (e.g. family, friends, or number and frequency of social contacts). Individuals enjoying strong social ties and support appear to be at a lower risk of psychosocial and physical impairment, whereas a lack of social support has been found to be associated with depression, neurosis and even mortality. The lack of support increases the susceptibility for certain diseases, and the presence of suitable support can reduce the consequences from the exposure to stress situations and factors that have adverse affects. In general, social support seems to be an important moderating factor in the stress process (2-4).

Background to Social Network Theory and Analysis

Social network theory is a branch of social sciences that applies to a wide range of human organizations, from small groups of people to entire nations. The term network refers to a set of objects, or nodes, and a mapping or description of the relationship between the objects. In the case of social networks, the objects refer to people or groups of people. For example, a network might consist of a mapping which includes a given person with each of his or her friends and relatives. This mapping can be one directional or bi-directional. An example of a directional mapping would be the following: person A likes person B, but person B does not like person A. This is a directional mapping from person A to person B. An example of a bi-directional mapping would be the following: person A and person B both like each other (5). Although personally constructed, one's identity is impacted by the interaction with the others. Many persons have a variety of roles in an individual's life and therefore they provide a variety of impacts, ranging from the stranger on the bus to one's best friend. Not only does the strength of an individual's connection to others play a role, but also the context, the value and a wide variety of uncontrolled events are crucial in this process. These kinds of people help to establish an individual's social network, i.e. the collection of persons on whom an individual relies on for a variety of purposes. These persons around a given individual may not be known to each-other. These holes in awareness or knowledge can be described as structural holes within an individual's network, where the only relationship that one person has to another one develops through the ego whose network is being considered (6).

Social network analysts look beyond the specific attributes of individuals to consider relations and exchanges among social actors. Analysts ask about exchanges that create and sustain work and social relationships. The types of resources can be numerous and different; they can be tangible such as goods and services, or intangible, such as influence or social support. Resources are communicated to the others via textual, graphical, animated, audio, or video-based media, for example sharing information (news or data), discussing work, giving emotional support, or providing companionship (5,7).

Relations (sometimes called strands) are characterized by content, direction and strength. The content of a relation refers to the resource that is exchanged. Pairs exchange are different kinds of information, such as communication about administrative, personal, work-related or social matters, as well as the provision emotional support (e.g. arranging a meeting, exchanges of money, goods or services in the "real" world). A relation can be directed or undirected. For example, one person may give social support to a second person. There are two relations here: giving support and receiving support. Alternatively, actors may share an undirected friendship, i.e. they both maintain the relationship with no specific direction. However, while they both share friendship, the relationship may be unbalanced: one actor may claim a close friendship and the other a weaker friendship, or communication may be initiated more frequently by one actor than the other. Thus, while the relationship is shared, its expression may be asymmetrical (6-7).

Relations also differ in strength. Such strength can be operationalized in a number of ways. With respect to communication, pairs may communicate throughout the work day, once a day, weekly, or yearly. Pairs may exchange large or small amounts of social capital: money, goods, or services. Furthermore, pairs may supply important or trivial information. Such aspects of relationships measure different types of relational strength. The types of relations include the exchange of complex or difficult information; emotional support; uncertain or equivocal communication; communication to generate ideas, or create consensus; support of sociable relations, or support of virtual communities (5-7).

Social network analysis is based on the assumption of the importance of relationships among interacting units. The unit of analysis in such networks is not the individual, but an entity consisting of a collection of individuals and the linkages among them. Network methods focus on dyads (two actors and their ties), triads (three actors and their ties), or larger systems (subgroups of individuals, or entire networks) (7-8).

One of the reasons why social network theory is studied is that, by understanding the mappings connecting one individual to the others, one can evaluate the social capital of that individual. "Social capital refers to the network position of the object or node and consists of the ability to draw on the resources contained by members of the network" (9). Basically, the more mappings a person has in the social network, the more knowledge, influence, and power that person will have. Social capital can have a substantial influence on a person's life, affecting such aspects as job searches and the potential for promotions. Social networks can also help sociologists to identify primary groups and cliques (5, 7-8).

Social Network, Social Support and Social Capital

Definition of Social Network

Social Network is "a person-cantered web of social relationships". Relationships are linkages of various kinds. It does not mean, however, that a network provides necessarily social support. Social networks can be generally defined as "a web of social relationships that surround individuals," while social support is a function of those social relationships (10). Social networks include family and kinship members (father, brother etc.), friends, 'fictive kins', co-workers and social role-persons (teacher, boss), business transactions partners, information exchange persons and others connected to individuals on a personal level. Social networks and social support refer to the term 'personal ties'. Human beings form personal ties with other people throughout the life course, beginning in infancy when the newborn's survival depends upon his/her "Attachment to and nurturance by others over an extended period of time". As the individual matures, personal ties become sources of support and act as buffers against the deleterious effects of stress and disease (7-8, 10-11).

A tie connects a pair of actors by one or more relations. Pairs may maintain a tie based on one relation only, e.g. as members of the same organization, or they may maintain a multiplex tie, based on many relations, such as sharing information, giving financial support or attending conferences together. Thus, ties also vary in content, direction and strength. Ties are often referred to as *weak or strong*, although the definition of what is weak or strong may vary according to the context. Ties that are weak ("non-intimate connections") are infrequently maintained, for example ties between co-workers who share no joint tasks or friendship relations. Strong ties include combinations of intimacy, self-disclosure, provision of reciprocal services, frequent contacts, kinship, as it happens between closed friends or colleagues (7-8).

Women's social networks consist more of family and friendship ties, whereas men's social networks are more closely connected to relationships formed at work or in the neighbourhood (12).

Structural Characteristics and Relations of Social Networks

Social network analysis is the study of connections between people. These connections are valuable, because they are about the ways people gather the different types of support that they need – emotional, economical, or functional. The types of connections – or *ties* – that an individual maintains varies, but they often include family, friends, colleagues, and lovers. In addition to a difference in type, ties vary in value or *strength*. Most commonly, social network theorists refer to two levels of ties – *strong ties and weak ties*, where a strong tie is able to offer a much greater

magnitude of support than a weak tie. Although it may seem that weak ties are not particularly valuable, there are distinct advantages to having weak ties, including increased information flow and social mobility. Since weak ties require less effort to maintain, it is in an individual's best interest to maximize his/her weak ties, in order to increase the access to information (6-7).

Both, strong and weak ties play roles to exchange networks. Pairs that maintain strong ties are more likely to share the resources they have. However, what they have to share can be limited by the resources entering the networks to which they belong to. Weakly-tied persons, while less likely to share resources, provide access to more diverse types of resources because each person operates in different social networks and has access to different resources. *Reciprocity* refers to the extent to which resources and support are both given and received while *intensity* refers to the extent to which the relationship provides emotional comfort. The cross-cutting "strength of weak ties" also integrates local clusters into larger social systems. The more relations (or strands) in a tie, the more multiplex (or multi-stranded) is the tie. *Complexity* refers to the extent to which the relationship serves multiple functions. Social network analysts have found that multiplex ties are more intimate, voluntary, supportive and durable. The composition of a relation or a tie is derived from the social attributes of both participants: for example, the tie between different or same sex dyads, between a supervisor and an underling, or between two peers (6-8).

Social networks can vary in their *range: in size, density and heterogeneity.* Larger social networks have more heterogeneity in the social characteristics of network members and more complexity in the structure of these networks. Small, homogeneous networks are characteristic of traditional work groups and village communities; they are good for conserving existing resources (7-8).

Size is a very important characteristic of the network. In general, the larger a person's ego network, the more support he/she receives. This is basically because there are more people available to provide services that someone may need. In addition, it appears that alters in larger networks tend to provide more support. The mechanism is unclear; it may be however, that the alter perceives the ego as important (because they are so well-connected) and therefore deserving more help.

Network density refers to the closeness and availability to interact with eachother. The density of an ego network is defined as the number of ties in the network divided by the number of pairs of people. If "T" is the number of ties (not counting ties to ego), and "N" is the number of people in the ego network (not counting ego), then the relationship can be expressed by the following formula:

$$\text{Density} = \frac{2T}{N(N-1)}$$

The influence of density to social support is not clear yet. It is thought on theoretical grounds that density promotes mental health, but this remains to be proved by firm evidence. What is clear, instead, is that dense ego networks tend to improve the provision of emergency and chronic health care.

Density is one of the most widely used measures of social network structure: i.e. the number of actually-occurring relations or ties as a proportion of the number of theoretically-possible relations or ties. Densely-knit networks (i.e. groups) have a considerable direct communication among all members; this is the classic case of a small village or workgroup. Much traditional groupware has been designed for such workgroups. In contrast, few members of sparsely-knit networks communicate directly and frequently with each-other. As in the Internet, sparsely-knit networks provide people with a considerable room to act autonomously and to switch between relationships. However, the resulting lack of mutual communication means that a person must work harder to maintain each relation separately, as the group that would keep things going on is not present (7-8).

Definition of Social Support

In 1976, Cobb defined social support as "a sense that one is loved and cared for, is esteemed and valued and belongs to a network of communication and mutual obligation". Cobb identifies three separate elements of social support, namely: emotional (expressions of understanding, trust, sympathy and nurturance), esteem (expressions of liking, love and respect), and network support (social integration, material and other tangible aids), which are important in providing assistance or aid to individuals under stress (4, 13).

Social support is an extra quality of the social network, for it surmises, besides one's surroundings, the network of people and the frequency of communication e.g. the fact that people have obligations one to another, decreed and chosen by themselves, and it includes care, attention, and readiness to help (2, 14).

Research shows that people with strong social support risk less to die of certain diseases than those without it, and they also recuperate more quickly once a disease has been diagnosed. This is of particular importance in childhood. Thus, the presence of parents in hospital conditions, especially the mother, has a favourable effect upon the course and outcome of an illness. Research also indicates that lack of social support is an additional factor for premature death among smokers, those with high blood pressure, and in other conventional risks. Men with less social support have twice as much chance to die at a certain age than their peers with greater social support (14-15).

Definition of Social Capital

Social capital, as opposed to former social relations which are individual, is a characteristic of a community. Puttman defined it in 1993 as "those features of social organization, such as network, norms and trust, that facilitate co-ordination and co-operation for multiple benefit" (16).

It is also defined as "the resource imbedded in social relations among people and organizations that facilitate cooperation and collaboration in communities". This concept is closely connected to the development of civil society, the one which values solidarity, participation, integrity, and in which social, political, educational, and health institutions are connected horizontally, not vertically (14, 17).

Research suggests a close correlation between the social capital and infant and child mortality – the higher the indicators of social capital, the lower the mortality. There is also a relationship with general mortality (18). This connectedness is explained by the fact that communities/societies with higher levels of social capital can act so as to formulate and realize common goals.

Basic Types/Categories of Social Support

Whereas social networks constitute the structure of social relationships, social support is a function of those relationships. Numerous measures of social support exist, some of which emphasize the multidimensional nature of the construct. Some authors retain that emotional support is the essential component. In spite of difficulties with definitions and the use of different measures, most studies have found that social support is negatively related to loneliness and the general wellbeing (4).

According to Heaney and Israel (2002), there are four basic types of social support: emotional, instrumental, informational, and appraisal (10).

- *Emotional support* includes the provision of intangible support, such as love, empathy, caring and trust.

- *Instrumental/tangible support* includes the provision of services that directly help the recipient (e.g. food, money, computer assistance, or other help such as a ride to the supermarket, etc.). Emotional support is more frequently received from networks of extended family, whereas families of origin provide the largest amount of material support. Instrumental support is provided most often by informal community relations.

- *Informational support* is provided by means of offering information and advice or instructions/suggestions to help the recipient address his/her own problems. An example might be telling a neighbour where to find the nearest bank or grocery store, or giving her the name of a good paediatrician for her children.

- The fourth type of support, *appraisal support*, refers to the provision of

constructive feedback, perception of a positive comparison, encouragement, or other information that will help the recipient to evaluate his/her own sense of self-efficacy or competency. Appraisal support helps one to make sense of things and self-appraisal (4, 10, 14).

In industrialized societies, social support tends to flow through equals – peers and friends. In contrast, in agricultural societies, aid tends to flow through hierarchical relations like parent-child and boss-worker. According to Social Resource Theory (19) strength of tie is related to the kinds of resources provided. Instrumental actions (buying goods, mechanical help) require diverse social resources and therefore tend to be accomplished via weak ties (one reason is that we tend to have strong ties with people who are similar to ourselves, so diversity is achieved through weak ties). Expressive actions (sharing life experiences, emotional support) are more likely to be done by strong ties (19).

Kinship ties tend to be used for really big things, like life-threatening emergencies. One reason for this is the cultural understanding of the obligations of kins who are supposed to help. Another reason is that, the dense ties among kins make it easy for them to mobilize and coordinate their efforts. A person's friends may not even know each-other, but kins typically do.

A large proportion (25%) of active ties in a support network are local. This means that even in today's world of high mobility and excellent transportation and communication media, we still get a lot of our support from people who are physically close-by.

Social support is not clearly related to similarity of ego to alter. That is, one gets social support from both people who are similar to, and different from himself/herself. However, with respect to age, there tends to be a lot of social support provided by people of dissimilar ages. Young people tend to provide older people with physical labour, while old people tend to provide knowledge and impart skill to younger people. Also, with respect to employment similarity, people with similar employment status tend to give aid to each other.

Research on Social Networks and Social Support linked to Personal Health

Consistent relationships have been proven between social support and better health. The mechanism is thought to be a function of stress management, i.e. the way that social support reduces the impact of stress. The support acts on the individual and on the societal level. The social isolation, loneliness and exclusion are related to increased rates of premature deaths and smaller chances to survive more severe illnesses, such as episodes heart attacks. Individuals, who receive less emotional and social support than the others, suffer more frequently from

depression, higher rats of incapacity due to chronic diseases is greater, and, in women during pregnancy, the risk for complications is higher (2-4).

Differentiating social networks from social support helps to understand the different ways in which each one contributes to the individual's health and well being (or lack thereof). There are two main points of differentiation in the context of studying health and health-related behaviours. The first point is that social network research considers characteristics of social relationships beyond social support, such as negative interactions, risky health behaviours, stress, and susceptibility to infectious disease. Second, discussions on social support usually frame the provision and effects of social support in positive terms and as benefits intended by the provider. Social support is always intended by the sender, meaning it is consciously provided. Furthermore, social support is always meant to be helpful, even if the recipient does not perceive it as such (10). The assumption that social support is always intended to be positive leads researchers to highlight the existence of social support as a positive influence on health and health behaviours, and its absence as a negative influence.

Recently, there has been research about the study of the implications of social integration for personal health. This research has shown that participation in a diverse social network may have an influence on health. Some researchers decided to study social network diversity (number of social roles) and susceptibility to the common cold in people experimentally exposed to a cold virus. What they have found is that, the greater the social diversity of the person, the lesser his or her susceptibility to infectious illness. Despite these results, the researchers were not able to isolate the pathways through which social diversity was associated with susceptibility. The leading hypothesis is that, as social diversity increases, the level of exposure to a certain illness also increases. Thus, the immune system is better prepared to defend itself against any future exposure to the sickness. However, so far, researchers have not been able to support this hypothesis experimentally. What this research does show, however, is another strong benefit of having high social diversity or social capital (20).

Indeed, results of such kind of research are quite surprising: "The magnitude of the health risk of being relatively isolated (socially) is comparable to the risks associated with cigarette smoking, high blood pressure and obesity and is robust even after controlling for these and other traditional risk factors" (20). It appears that cultural isolation can have a profound effect on physical well being. Such research work has also shown that the development of mental illness is associated with the level of social contacts a person has. Some researchers believe this is due to the fact that people's identities are tied to their social roles. By meeting role expectations, individuals are given the opportunity to enhance their self-esteem. They believe that these social roles provide a purpose to life. From this point of view, a sense of purpose is an integral component of psychological well being (4, 5, 20).

Loneliness, Social Support and Personality

R. Weis (1987) has described the feelings of loneliness in depth. He considered the reactions of a lonely person to be very similar to a child who feels that he/she has been abandoned by the mother (or an appropriate attachment figure), namely: distress, an inability to be engaged in anything other than regaining the parent, tension, apprehensiveness, restlessness and vigilance. Consequently, Weis defined loneliness as 'separation distress without an object'. Loneliness has also been defined as "being without a significant other with whom to share the most personal aspects of life" (13). Peplau and Perlman (1987) described loneliness as 'a discrepancy between one's desired and achieved levels of social contact'. There are a number of measures of loneliness which indicate that *loneliness* is highly correlated with both social support and a range of personality variables such as: *introversion, extraversion, neuroticism and anxiet*y (21).

Personality may represent those characteristics of the individual that account for consistent patterns of behaviour (Pervin, 1989). A theory of personality suggests ways of bringing these together and explaining them in a systematic manner by identifying 3 basic dimensions of personality: *a) introversion/extraversion, b) neuroticism/stability (or emotionality) and c) psychotocism (tough mindedness).* The stereotyped *extravert* is sociable, likes parties, has many friends and seeks excitement. Optimism and 'easy-going' are some other attributes of extraversion; nevertheless, the extravert is also perceived as not always being reliable or keeping feelings under tight control. The *introvert* is perceived as a quiet, an introspective individual, reserved and distant, who does not like excitement, except for a few closed friends. Such individuals closely control their feelings, rarely behave in an aggressive manner, and are supposed to be reliable. A typically high scoring of a *"neurotic individual"* defines an anxious, worrying person, moody and overly emotional. He reacts too strongly to all kinds of stimuli and, in one word, may be described as a worrier (4).

Individuals are dynamic beings operating within a context which is subject to change. The link between loneliness and personality has been studied in a number of studies. A positive correlation has been found between loneliness and low self-esteem; loneliness and trait anxiety; loneliness and neuroticism; loneliness and a number of rather ineffective interpersonal behaviours such as shyness, social anxiety, low assertiveness, low risk taking and introversion (22). A high negative correlation has been found between social support and loneliness; extraversion and loneliness; and general wellbeing and loneliness. People with a low self esteem may be more vulnerable to loneliness but at the same time, loneliness may affect the person's self esteem in a negative way. Since Cassel's (1974) review of the evidence linking social upheavals to adverse health consequences for both humans and animals, hundreds of empirical studies have been completed which assessed the direct and indirect effects of social support on mental and physical

health. Social support has been defined as the presence of others, or the resources provided by them, prior to, during, and following a stressful event. Most of the studies have suggested that smaller social networks or less social support, particularly in potentially high stress situations, are related to development of a depressive symptomatology and psychopathology, a higher use of medical services and more frequent hospitalization, severe mental disability and a higher risk of mortality (2, 4, 23-28).

Many studies suggest that there is a relationship between social support and physical and psychological health status and well-being, severity of depressive symptoms, risk of institutionalization and mortality among the elderly (29-32). Less social support is associated with emotional disequilibrium in pregnancy, preterm delivery, or foetal growth retardation (33-34). A high level of social support is needed to reduce the psychological impact of stressful life events in women with breast cancer and likelihood of severe psychological distress (35).

The availability of emotional and practical social support varies with the social and economic status. The poverty can lead to social exclusion and isolation. The social cohesion - presence of mutual trust and respect in the local community and society in general - helps to protect people and their health primarily against cardiovascular diseases and mental disorders (2, 3, 27, 28).

Unemployment, Social Support and Health

Unemployment is viewed as one of the more stressful life events that an adult can experience. Unemployment has a substantial negative influence on the health of the individuals and populations: it increases the death rates, causes changes in the lifestyle, physical and mental health deterioration and an increased utilization of the health services. All these have been corroborated by the results of numerous investigations. The severity of unemployment depends not only on the risk of becoming unemployed but also on the probability of remaining so for a long time. Unemployment, as a cause of poverty and ill-health, is a particular problem in SEE countries, as well as a major pan-European issue (3, 36, 37).

The loss of work or short-term unemployment has a character of a stressful event and represents a risk factor for heath deterioration. The unemployment is usually experienced as deprivation or a deviant situation. It causes not only economic and financial difficulties, indebtedness and decreased social status, but also physical consequences, loneliness, reduction or loss of social contacts and social support, sense of rejection and loss of self esteem. Unemployment has influence on the functioning of the family (e.g. it may disrupt family and social roles), interpersonal relations and mutual support among the members of the family and their health status. Research has shown higher death rates among wives of unemployed husbands, a higher risk for separation and divorce, domestic violence, unwanted pregnancies, complications during pregnancy, a higher mortality at birth, slower growth and development of the babies, as well as an

increased exploitation of health services. At the global level, a connection has been sought between the economic and health indicators, with unemployment being the foremost economic factor. Unemployment has an almost instantaneous effect on health (especially, mental health), which is confirmed by an increase in the number of patients in psychiatric institutions and an increased number of suicides; the unemployment also initiates other processes of change in the organism, that lead to an increase in rates of chronic diseases. It has been shown that cardiovascular diseases reach their peak two years after an increase in unemployment rates. The economic recession and transition, which are the most frequent reasons for unemployment, lead to a series of consequences, which increase the sensitivity to illnesses. The death rates in all classes of society are higher among unemployed than the employed individuals. This relates especially to cardiovascular diseases, lung cancer, accidents and suicides (2, 36-39).

The psychological threats, fear or depressive symptoms are universal companions of unemployment. Changes that occur in the neuro-endocrine and the immune system as a reaction to stress, increase the sensitivity to new diseases and also "activate" the established diseases. The attitude of an unemployed towards health services, are usually associated with an extensive utilization. Studies connected with the "closure of factories" have shown that the rate of hospitalizations of unemployed individuals increases, which is usually interpreted as an indicator of deteriorated of health (25, 38).

A lot of studies have shown increased rates of smoking, alcohol consumption and irregular nourishment, as well as increased medicament consumption by the unemployed in comparison to the employed individuals. The rates of alcoholism and drug addiction do increase as well. Health consequences of an unemployed person are closely connected to the type and intensity of the social support that he/she receives from the members of the family and the broader social networks (26, 39, 40).

Limitations of Social Network Research in the Field of Health

The social network measures used in studies of health outcomes are not as advanced as those involved in formal social network analysis. A major reason is that studies of health outcomes typically involve large samples and include multiple questionnaires or interviews. For these studies, intensive quantitative measurement is reserved for some rare cases in which the researcher determines that there is sufficient need for it. Thus, results of social network in this type of research do not always hold up to the same academic rigor as other research in the field of social networks does. However, this argument does not discredit the research described above. Instead, it does propose that further research is required before these conclusions can be adequately supported (5, 36).

The implications of social network theory extend beyond the applications of business to explain the hierarchy of social and political power that exists in a society. Social networks can affect people in a variety of ways, from reputation to health. Social networks are dynamic and evolve to fit new technologies that are introduced to societies. The Internet has allowed social network interaction to expand in ways that were previously not possible (5, 7, 8).

Social Networks and Social Support in the Health Education and Health Promotion

Programs

The convincing evidence of the relationship between social networks, social support, and health status has influenced the development of program strategies which are relevant to health education. Linkage between social support and social networks and health education programs involves interventions at the network and community level. Two broad strategies are predominant: programs enhancing entire networks through natural helpers; and programs strengthening overlapping networks/communities through key opinion and informal leaders who are engaged in the process of communities' problem-solving. Some network characteristics relate to physical and mental health status. Network characteristics can be applied to these two program strategies. This approach not only recognizes, but also acts to strengthen indigenous skills and resources (2, 41).

Considering the number and variety of references to social networks and social support in health literature, it seems that social support is an important contributor to health and health behaviours. Unfortunately, as referenced above, not everyone enjoys the beneficial influence of social support on health. On the other hand, without social support, messages may not have relevance. Programs must use and anticipate the role that social support can play in disseminating an innovation or in "submarinning an innovation". Supporting innovations requires a training component in the planning and delivery of a program/innovation. It means that it is necessary to plan costs and time to train the supporting personnel, as well as to identify and train the gatekeepers. As implied in the diffusion theory, time and resources will need to be used to get the gatekeepers on board. It is particularly important in the needs assessment analysis to identify key people and bring them on board. It is also necessary to identify or develop a core group of potential mentors as an important component of many health promotion programs. It is very important to explore the possibilities to making use of buddy systems and self-help groups, too. This approach should be careful in order to assist and not hinder health promotion programs. This means that, it is necessary to identify the barriers and resources, as well as the type of training and support required (41).

Below, are presented a few ways in which support-enhancing health interventions can be accomplished. According to Heaney and Israel (2002), there are four basic ways in which health interventions can be geared towards enhancing social networks and social support. Health interventions can either seek: a) to enhance existing social network linkages; b) to develop new social network linkages; c) to enhance networks through the use of indigenous natural helpers; or d) to enhance networks through community capacity building and problem solving (10).

- *Enhancing existing network ties* involves helping individuals to identify supportive network members and to mobilize and maintain those relationships. Interventions aimed at enhancing existing social networks should also focus on enhancing the quality of relationships within the network by providing network members with specific skills for providing support.

- *Interventions that seek to develop new social network linkages a*re particularly beneficial when existing social networks are small or overburdened. Examples include providing individuals with a mentor or "buddy," or providing opportunities to participate in a self-help or support group. "Buddy" systems and support groups are based on the idea that all parties involved serve both as support provider and receiver, which increases the sense of support reciprocity in the relationships.

- *The use of indigenous natural helpers* in enhancing social networks/support requires the identification of natural helpers in the community and training them in relevant health topics. All communities have natural helpers - community volunteers, and it is very important that these people play a role in health intervention programs. Using indigenous natural helpers to enhance social support is especially important in cases where community members refer to them for advice and material or instrumental support.

- The fourth type of support-enhancing intervention is *community capacity building.* Involving community members to identify and resolve community problems may indirectly strengthen the social networks that exist in the community.

Limitations of the Social Support Interventions

All of these intervention possibilities have their limitations. Challenges to the first type of intervention, namely enhancing existing network ties, include difficulties to identify and engage the existing network members who have the commitment and resources to provide the necessary support, as well as difficulties to measure attitudinal and behavioural changes that directly result from the increased perceived support (10). It is also difficult to ensure that the intervention does not conflict with the established interaction styles within the network. Developing new social network linkages with mentors, buddies, or support groups requires the presence of such people, their availability, commitment, and other resources necessary to become involved.

While the use of indigenous natural helpers to bolster social support has been beneficial in a variety of cases, this intervention strategy may necessitate larger investments in time and resources in order to train those individuals in specific health topics and community problem-solving strategies. The same difficulty might be a potential limitation to the fourth type of intervention, namely enhancing networks through community capacity building and problem solving. However, in both cases the positive results of equipping individuals and their communities to work together to identify and resolve specific problems might outweigh these challenges. Given these limitations to each type of intervention, it is important to be aware of all alternatives and choose the one that best fits the targeted individuals/communities and health behaviours/outcomes. In some cases, a combination of two or more intervention strategies might be appropriate (10).

Policy implications

Intervention studies have shown that good social relations and provision of social support can reduce the psychological response to stress and can improve patient recovery rates from several different conditions. The World Health Organization (2) pointed out the following main directions for action and policy intervention: 1) Reducing social and economic inequalities and reducing social exclusion can lead to greater social cohesiveness and better standards of health; 2) Improving the social environment in schools, in the workplace and in the community more widely, will help people feel valued and supported in more areas of their lives and will contribute to their health, especially their mental health; 3) Designing facilities to encourage meetings and social interaction in communities could improve mental health, and; 4) In all areas of personal and institutional life, practices that cast some individuals as socially inferior or less valuable should be avoided, because they are socially divisive.

EXERCISES

Develop a role play by looking at everyday situations in the context of social networks and social support related to health and wellbeing and to the health interventions and health promotion programs.

Analysis should address (at least) the following questions:

- Are there different networks established in your target population?
- How do they get along?
- Do you need to involve them?
- What will it take to involve them?
- What will happen if you don't get them on board?
- How will you use the social groups in your intervention to keep track of what's going on at the community level?

Keep in mind that these groups are paramount in the evaluation of the implementation of the program.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Politics, Policies and Health**
Module: 8.1	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Clare Bambra, BSocSci, MA, PhD** Lecturer in Public Health Policy, University of Durham, England, UK; **Debbie Fox, BA, SRN, SCM** Research Associate in Public Health, University of Liverpool, England, UK; **Alex Scott-Samuel, MBChB, MCommH, FFPH** Senior Lecturer in Public Health, University of Liverpool, England, UK
Address for correspondence	Alex Scott-Samuel Division of Public Health University of Liverpool Whelan Building Quadrangle Liverpool L69 3GB England, UK Tel.: +44 151-794-5569 E-mail: alexss@liverpool.ac.uk
Keywords	Health determinants, health inequalities, politics, policy
Learning objectives	After completing this module students and public health professionals should be able: • To understand 'health' and its different meanings. • To increase their knowledge of health policy; and • To understand and describe the relationships between health and politics.

Abstract	This paper describes the relationships between health and politics, how politics act on health, and the political implications of public health. It is particularly relevant to those attracted by new social movements promoting health and based on shared values of equity, sustainability and the common good. Given the diverse backgrounds of current and potential new practitioners of public health, it is useful to define key terms so as to develop shared knowledge and understanding. We review key terms and highlight problems in their meaning and application. We explain our rationale as to why health is political and explore possible reasons why it has been depoliticised and why it should be repoliticised now. We suggest that the politics of health in society should be defined as one of the main topics of government and that health should be seen as a key product of social and economic development.
Teaching methods	Teaching methods include lectures, individual self-directed learning, interactive methods as in small group discussions, seminars etc.
Specific recommendations for teachers	3 lectures (60 minutes), 3 seminars or small group discussions, and 15 hours individual work.
Assessment of students	Case problem presentations

POLITICS, POLICIES AND HEALTH

Clare Bambra, Debbie Fox, Alex Scott-Samuel

" ...and at least I know this, that if a man is overworked in any degree he cannot enjoy the sort of health I am speaking of; nor can he if he is continually chained to one dull round of mechanical work, with no hope at the other end of it; nor if he lives in continual sordid anxiety for his livelihood, nor if he is ill housed, nor if he is deprived of all enjoyment of the natural beauty of the world, nor if he has no amusement to quicken the flow of his spirits from time to time: all these things, which touch more or less directly on his bodily condition, are born of the claim I make to live in good health." (1)

"As anyone who has lived among villagers or slum-dwellers knows only too well, the health of the people is influenced far more by politics and power groups and by the distribution of land and wealth than it is by the prevention and treatment of disease." (2)

"It is ultimately profit, rather than a concern to improve overall living standards, which is the most important determinant of economic and social decision-making in capitalist society, this will be reflected in various ways in patterns of health and illness." (3)

Introduction

It is profoundly paradoxical that, in a period when the importance of politics and public policy as determinants of health is routinely acknowledged at the highest political levels, there remains a continuing absence of serious debate about the ways in which political power, relations and ideology influence people's health (4). While to some extent the unhealthy policies of the Thatcher government acted as a stimulus to such debate in the UK, as early as the mid-1980s the introduction of the World Health Organisation's Health For All strategy (and, more recently, the election of the New Labour government in 1997) created the illusion that these issues had finally and adequately been acknowledged. Such views can and very clearly should be challenged.

There is an evident need for discussion and development of the theoretical issues relating to the impact of power and ideology on the public health, and to advocacy and campaigning around these issues. Freire suggests that "Action to translate the vision into reality is set in motion by relating the pattern of society it envisages to the historical circumstances of the context, in which objective and subjective conditions stand in a dialectical and not mechanical relationship to one another… the vision should be capable of being translated into reality and the steps to bring this about should be possible in the concrete conditions in which they find themselves" (5).

Health

Definitions of health have changed over time: its etymological roots lie in the Old English for 'whole'. The Old English implies that a person who was healthy was 'whole'. The World Health Organisation attempts to encompass this in its 1946 definition of health as 'a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity'. This definition is itself a political statement, as Navarro (6) notes in his discussion of the origins of Brotherston, Evang and Stampar's influential WHO formulation, which lie in the anti-fascist struggles of World War 2. In contemporary Western societies, several competing theories of health co-exist (7):

- Health as an ideal state;
- Health as a personal strength or ability;
- Health as physical and mental fitness to do socialised tasks;
- Health as a commodity;
- Health as the foundation for achievement of potentials.

Health has also been defined as the ability to adapt positively to challenges (8); as a narrative and as a metaphor (9, 10, 11, 12) that is expressed in the everyday language we use and the mental maps we construct to guide us on our journey through life (13, 14), and as spiritual strength (15). In Western societies the notion of spirituality has been the province of organised religion and viewed separately from physical and psychological well-being; however, in this context it is used to refer to a sense of the sacred and a search for wholeness.

The understanding of health and its determinants also varies by culture. For example, in several Central African languages the word for health is the same as the word for life (in the sense of "all that is necessary to live a fulfilling life") (16). Whilst similar in meaning to the old English 'hael' the underlying concept of contemporary Western notions of health is quite different to non- Western traditional thought.

Health is therefore what Gallie (17) calls a contested concept, as "there is no one clearly definable general use of any (concept)… which can be set up as the correct standard use". To understand 'health', we need to explore the political, social, cultural, temporal and spatial context within which the meaning of health is created and the processes that promote or stifle particular courses of action.

Given what we already know about the diversity of health and its determinants, it would be easy to accept as adequate, contemporary discourse on action for heath gain (for example, what actions are considered effective measures to promote and protect health; the legitimacy of different 'types' of evidence, and levels of 'measurability') that follow from debates on soft science vs. hard science, objectivity vs. subjectivity, and reductionism vs. holism. However, such simplistic polarisations render invisible the underlying values and processes that propagate one idea over another: hence the need to explore the relevance of politics, ideology, power and hegemony in relation to health.

Politics

The definition of politics is in itself a political act (18). The nature and scope of the political is, like health, a contested concept, as the naming of the key elements itself constitutes a political choice. This is evident in the divergent conceptualisations of the political that have been utilised both over time and by different political ideologies. Following Heywood (19), a broad four-fold classification is possible:

- *Politics as government* - Politics is primarily associated with the art of government and the activities of the state.
- *Politics as public life* – Politics is primarily concerned with the conduct and management of community affairs.
- *Politics as conflict resolution* – Politics is concerned with the expression and resolution of conflicts through compromise, conciliation, negotiation and other strategies.
- *Politics as power* – Politics is the process through which the production, distribution and use of scarce resources is determined in all areas of social existence.

This classification shows a large variation in the conceptualisation of politics; for example, the first concept is very narrow and the last is very broad. The first concept, which is the most prevalent definition within mainstream political discourse in the UK, places very restrictive boundaries around what politics is – the activities of governments, elites and state agencies - and therefore also restricts who is political and who can engage in politics (i.e. the members of governments, state agencies and other elite organisations). It is a 'top-down' approach that essentially separates politics from the community. This should be contrasted with

the last definition, which offers a much more encompassing view of politics: politics is everything. Politics is a term that can be used to describe any "power-structured relationship or arrangement whereby one group of persons is controlled by another" (20). This is a 'bottom-up' approach, as any and every issue is political and likewise anyone and everyone can engage in a political act.

These competing definitions have also permeated the contemporary academic discipline of political science where the different schools of thought similarly operate divergent conceptualisations:

- *Behavouralism* - Politics is the processes associated with mainstream politics and government.
- *Rational choice theory* - Politics is the conditions for collective action in the mainstream political world.
- *Institutionalism* - Politics is the institutional arrangements within the mainstream political world.
- *Feminism* - Politics is a process and the personal can be political.
- *Anti-foundationalism* - Politics is a narrative contest that can take place in a variety of settings.
- *Marxism* - Politics is the struggle between social groups: in particular, social classes (21).

The definition of politics utilised by the various different schools of political science underpins their entire approach to the study of political life. The definition of politics that is employed by an individual, a group, an organisation or a society is of vital importance as it sets the parameters that determine which issues are considered as political. Political issues enter into the political discourse and are the subject of public discussion and debate; issues that are regarded as non-political or apolitical are marginalised or ignored.

Ideology

" …sooner or later, it is ideas, not vested interests, which are dangerous for good or evil" (22)

Ideology, like health, politics or power, is an amorphous and difficult concept that encompasses many different meanings such as false ideas (Marx and Engels), class struggle (Lenin), or societal 'cement' (Gramsci, Althusser). However, perhaps a more generic and workable - if a little simple - definition for this paper would be that ideology is a system of inter-related ideas and concepts that reflect and promote the political, economic and cultural values and interests of a particular societal group. Ideologies, like societal groups, are therefore often

conflicting and the dominance of one particular ideology within a society to a large extent reflects the power of the group it represents. So, for example, the dominance of liberal democratic ideology with its emphasis on the individual, the market and the neutral state, can be seen as a reflection of the power of organised capital within our society.

Understanding ideology and how it functions is crucial in understanding how it can be used to manipulate the interests of the many in favour of the power and privileges of the few (5).

Power

Power is a key political concept which underlies public decision-making and the allocation of goods and services. It is crucial to the understanding of relations within health and health services and to the content and form of healthy public policies.

In his influential book, Lukes (23) outlines three dimensions of power:

- The first dimension is the power of A to influence the behaviour of B. This exercise of power is observable and is tied to public conflicts over interests (such as access to resources - education, decent housing, health care etc.). It is performed in the public arena as part of decision-making processes.

- The second dimension is the power of A to define the agenda, preventing B from voicing their interests in pubic (policy) decision-making processes. Potential issues and conflicts are kept off the agenda to the advantage of A and to the detriment of B. The use of this type of power can be obvious or concealed.

- The third dimension is the power of A to define the values and beliefs B ought to hold (for example what counts as fair, or who gets what). B's perceptions and preferences are moulded by A in such a way that B accepts that these are the norm. This dimension of power is played out, for example, in processes of socialisation, the control of information, and the control of the mass media. The latter dimension is akin to Gramsci's notion of 'hegemony' - discussed below.

Lukes' conceptual analysis allows for power in the form of 'want manipulation'. If someone's wants are being manipulated, then their actions may either be indicative of a genuine want in the real interests of that individual, or the result of some form of want manipulation. The recent expose of the 'newly constructed' female sexual dysfunction condition, whereby drug companies have developed a pharmacological 'cure' for a condition grounded in social (gendered) relations, appears to be a good example of hegemonic manipulation by biomedical elites (24).

It seems self-evident that the power to shape people's thoughts and desires is the most effective kind of power since it anticipates areas of potential conflict and even pre-empts an *awareness* of possible conflicts. Those that don't conform to

the norm may be blatantly portrayed (and therefore perceived) as deviants and self-righteously excluded socially, legitimising reactionary notions of 'the feckless habits of the poor'.

What is needed then is a framework or concept that would help us understand the processes by which power is exercised and that can be used to identify contradictions that are "sold as real, natural, logical, common sense" (5). As Ledwith points out, without such a framework we remain "trapped within a dominant ideological discourse". Hegemony is such a concept.

Hegemony

"*…an order in which a certain way of life and thought is dominant, in which one concept of reality is diffused throughout society in all its institutional and private manifestations, informing with its spirit all taste, morality, customs, religious and political principle, and all social relations, particularly in their intellectual and moral connotations." (25)*

Hegemony is a difficult and complex concept made up of a number of different elements. Essentially, it can be seen as the overwhelming and insidious predominance within a society of a particular political, economic, social and cultural world-view. Margaret Thatcher's famous comment on her neo-liberal philosophy - "There is no alternative" - can be seen as an expression of hegemony.

Ledwith, working as a community development worker in the 1980s, views the profound changes she observed in the values within a working class community in the North of England, as a "hegemonic consequence" of New Right ideology (5). Their (the community's) new language echoed that of the State (e.g. 'welfare scroungers') and broke down working class notions of 'solidarity' and communitarianism. In reality the 'rolling back of the State' resulted in transfer of wealth from poor to rich and new patterns of poverty and ill health, with a shameful increase in the number of children in poverty - the most vulnerable.

In relation to health, the concept of hegemony can therefore act as a tool to ask the right questions and to challenge actions to promote health that smack of ideological dominance asserted as moral persuasion of how we ought to live

Why is health political?

Like the man in the bar who begins every political statement with "I'm not political but …", the inherently political nature of health has for too long been hidden from view. It is high time that the implicit and sometimes explicit but unstated politics within and surrounding health were more widely acknowledged. Health, like almost all other aspects of human life, is political, in numerous ways. In this section we examine five aspects of the political nature of health:

- *Unequal distribution*: health is political because, like all other life chances under a capitalist economic system, some social groups gain more of it than others.

- *Health determinants*: health is political because its social determinants, such as housing and income, are amenable to political interventions and are thereby dependent on political action (or more usually, inaction).

- *Organisation*: health is political because, any purposeful activity to enhance health needs 'the organised efforts of society' (26) or the engagement of 'the social machinery' (27).

- *Citizenship*: health is political because, the right to 'a standard of living adequate for health and well-being' (28) is, or should be, an aspect of citizenship and of human rights.

- *Globalisation*: health is political because we now face a complexity of worldwide crises – social, economic, ecological and ethical – that impact upon us all and contribute to ill health and avoidable deaths.

Ultimately, health is political because *power is exercised over it*. The health of a population is not entirely under the control of an individual citizen, nor of a doctor (especially not of a doctor, except in some instances of individual disease), but is substantially under the control of the social relations of the capitalist system. Changing this system and these relations are only achievable through politics and political struggle.

Unequal distribution

The hopes, aspirations and expectations of the advances in scientific and medical knowledge in improving human health and wellbeing forecast at the beginning of the 20th century have for the majority failed to be realised (29, 39, 31). Evidence that "the most powerful determinants of health in modern populations are to be found in social, economic, and cultural circumstances" (32) comes from a wide range of sources and is also, to some extent, acknowledged by Government (29, 31, 33). Yet massive inequalities in health continue.

How these inequalities in health are approached by society is highly political and ideological: are health inequalities to be accepted as 'natural' and inevitable results of individual differences both in respect of genetics and "the silent hand of the economic market"; or are they abhorrences that need to be tackled by a modern state and a humane society? Underpinning these different approaches to health inequalities are not only divergent views of what is scientifically or economically possible, but also differing political and ideological opinions of what is desirable.

Health determinants

Whilst genetic predispositions to, and causes of ill health are becoming increasingly better understood, it is evident that environmental triggers are in most cases even more important, and that the major determinants of health and ill-health lie in the social and physical environments (31, 34). In this way, factors such as housing, income, employment - indeed many of the issues that dominate political life - are important determinants of health and wellbeing. Similarly, many of the major determinants of health inequalities lie outside the health sector and therefore require non-health care policies to tackle them (29, 31, 35). Recent wider acknowledgements on both sides of the Atlantic of the importance of the social determinants of health (36, 37) are welcome - but they fail to seriously address political determinants of health and of health inequity.

Organisation

"The science and art of preventing disease and prolonging life, and promoting physical and mental health and efficiency, through organized community efforts. … And the development of the social machinery which will ensure to every individual in the community a standard of living adequate for the maintenance of health." (27).

"The science and art of preventing disease, prolonging life and promoting health through the organised efforts of society." (26).

The above definitions of public health highlight the social and political aspects of improving health. Health is political because any purposeful activity to enhance health needs "the organised efforts of society" (26) or the engagement of "the social machinery" (27): both of these require political involvement and political actions. Health can only be improved through the organised activities of communities and societies. The organisation of society, in most countries, is the role of the state and its agencies. The state, under any of the four definitions of politics outlined earlier, is a - and more usually, the - subject of politics. Furthermore, it is not only who or what has the power to organise society, but also how that organisational power is processed and operated that makes it political.

While this constitutes a clear argument for the political nature of public health-relevant services, an external observer could be forgiven for interpreting the roles of most public health practitioners as purely bureaucratic. Certainly this was the case in the UK between 1974 and 1988, when the National Health Service (NHS) 'community physicians' who replaced the pre-1974 local government-based Medical Officers of Health fulfilled an explicitly techno-bureaucratic role. But even after the 1988 Acheson report (26) and the resulting 'reinvention of public health' (38), its political nature was – and arguably remains - barely

apparent. On the whole, as is the case with other NHS 'managers', public health practitioners carry out the current government's bidding – however unhealthy or reactionary they find it to be.

Citizenship

"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." (28)

Citizenship is 'a status bestowed on those who are full members of a community. All who possess the status are equal with respect to the rights and duties with which the status is endowed' (39). Following Marshall, it is possible to identify three types of citizenship rights: civil, political and social. Health, or the right to a standard of living adequate for health and well-being (28, 40), is an important aspect of social citizenship. Citizenship is interwoven with politics and political struggle because, whilst the emergence of civil, political and social rights accompanied the development of capitalism, their incorporation into citizenship was only gained as a result of political and social struggle.

Globalisation

The flow of information, goods, capital and people across political and economic boundaries has of course been going on for centuries. What is of growing concern is the scale and pace of change. Lee (41) defines globalisation as: 'The process of closer interaction of human activity across a range of spheres, including the economic, social, political and cultural, experienced along three dimensions: spatial, temporal and cognitive'. What this means is that 'the death of distance' has made the world feel smaller, our perceptions of time have changed (due to an electronic revolution), and there is global spread and interaction of ideas, cultures and values' (42). On the one hand this has clear advantages such as reuniting diasporic communities and the potential to develop more tolerance of difference; on the other, it represents the imposition of a neo-liberal ideology and economics that systematically neglects the basic needs of the disadvantaged in its pursuit of the accumulation of money, property and natural resources. This is resulting in a widening gap in wealth, health and quality of life, both between countries and within them (5, 43, 44).

Why has health been apolitical?

It is perhaps puzzling that despite its evident political nature, the politics of health has been marginalised: it has not been widely considered or discussed as a political entity within academic debates or, more importantly, broader societal ones. Unfortunately there is no simple solution, as the treatment of health as apolitical is almost certainly the result of a complex interaction of a number of different factors. We suggest some reasons for this below, though we would not claim that this speculative list is exhaustive

Health as health care

Health is often reduced and misrepresented as health care (or in the UK, as the National Health Service). Consequently, the politics of health becomes significantly misconstructed as the politics of health care (45), and more specifically as the politics of the NHS. For example, the majority of popular political discussions about UIK health concerns issues such as the 'State or market?' debate about NHS funding and organisation, or NHS service delivery and efficiency, or the demographic pressures on the future provision of health care facilities. The same applies in most other – especially 'developed' – countries.

The limited, one-dimensional nature of this political discourse surrounding health can be traced back to two ideological issues: the definition of health and the definition of politics. The definition of health that has conventionally been operationalised under Western capitalism has two interrelated aspects to it: health is both considered as the absence of disease (biomedical definition) and as a commodity to be marketed (economic definition). These both focus on individuals, as opposed to society, as the basis of health: health is seen as a product of individual factors such as genetic heritage or lifestyle choices, and as a commodity which individuals can access either via the market or, in the UK's case, the health system.

"The political basis of our health services is the view of health as a commodity, a function of individuals rather than of societies; something to be valued, exchanged (bought and sold in many societies), and in every way determined by the actions of individuals." (46)

Health in this sense is an individualised commodity that is produced and delivered by the market or the health service. Inequalities in the distribution of health are therefore either a result of the failings of individuals through, for example, their lifestyle choices; or of the way in which healthcare products are produced, distributed and delivered. In order to tackle these inequalities, political attention is placed upon the variable that is most amenable to manipulation - the healthcare system.

It is important to note that this limiting, one-dimensional view of health is common across the ideological spectrum. This has resulted in the naive perspective amongst health activists that societal ill-health can be cured by more and better health services. At best, this perspective is slowly changing.

Health and concepts of politics

Earlier in this paper, we outlined definitions of politics and suggested that the first one, politics as the art of government and the activities of the state, was the most prevalent within current political discourse. The hegemony of this conceptualisation of politics influences which aspects of health are considered to be political. Health care, especially in countries like the UK where the state's role is significant, is an immediate subject for political discussion. Other aspects of health, such as health and citizenship, are excluded from this narrow popular definition of politics and are thereby seen as non-political. This is not, of course, to imply that health care is unimportant; rather, that it should be seen as one of several important health determinants. Equity of access to health care should also be seen as a key citizenship right.

Health and political science

Health has not been seriously studied within political science - nor for that matter has politics within public health. This has compounded its exclusion from the political realm. Health to a political scientist, in common with more widely held views, most often means only one thing: health care; and usually, only one minor aspect of health care: the health care system. Some political scientists will argue that they do study health as a political entity; however, what is actually under analysis is the politics of health care.

The roots of this focus on health care derive from the dominance of certain schools of thought within political science and of their corresponding definitions of the political. These schools are not of equal weight within political science and the discipline is dominated, especially in the USA, by the behavouralist, institutionalist, and rational choice strands. To adherents of these schools politics - and therefore political science - is concerned with the processes, conditions and institutions of mainstream politics and government. The politics of health care is the politics of institutions, systems, funding, and elite interactions, all of which fit the priorities of these hegemonic schools of political science like a glove. Health, in its broader sense, is therefore apolitical and should only be the concern of disciplines such as sociology, public health or medicine. In this way specified aspects of health, namely health care issues, are politically defined as political while all other aspects are not.

Responsibility and authority

"When we conceive of ill-health as episodes of disease manageable by the delivery of healthcare, we are.… transferring the responsibility for health from society as a whole to an elite possessing what we define as the necessary professional and technical expertise for the management of disease." (46)

The conceptualisation of health as non-political is also in part due to medicalisation - the transfer of power over and responsibility for health from individuals, the public and therefore political life, to powerful elites, namely the medical and health professions and the multinational pharmaceutical companies. However, unlike the impression given in the above quote, this transfer of responsibility is not always voluntary. Drug companies and the medical profession have taken the power and responsibility for health for themselves (47). They have thus been able to dictate what health is and therefore, how political it is or, more usually, is not. Their historic power over the definition of health has resulted in its depoliticisation via medicalisation: health is something that doctors are responsible for, they are the providers, and we are the recipients.

Their authority and responsibility over health has further emphasised its commodity status – when ill, an individual visits a doctor and / or purchases drugs (commodity) to regain health (another, albeit less obvious commodity). Ill health is a transient state caused by the presence of disease. It can be ended by the appropriate application of medical technology. This depoliticisation of health, via the transfer of power and responsibility to these professional groups, means that we do not have power over our own health or autonomy over our own bodies.

Health policy

"We sat after lunch, five of us, arguing about the meaning of health policy. For the economist from the World Bank it was about the allocation of scarce resources. For the Ugandan health planner it was about influencing the determinants of health in order to improve public health. For the British physician it was about government policy for the health service. The Brazilian smiled. 'In Portuguese the word "politica" means both policy and politics', she said. For her, health policy was synonymous with health politics." (48)

As Walt goes on to point out, for most people, health policy is synonymous with *policy content*. Certainly in the UK it is relatively unusual to find discussions of health policy which are not focused on the pros and cons of particular courses of action in relation to particular political parties. In reality, however, health policy is part of a broader body of knowledge (social policy and public policy), whose practical aspects consist of a dynamic, multi-stage policy process which in turn is inextricably linked with politics. Public policy also forms

the knowledge base of a social science (policy science) which is characterised by a range of theories, models and constructs. (Our working definition of public policy is "purposive action within the sphere of government influence").

Given all the above, the reduction of 'health policy' to 'the content of health policies' can be viewed as a form of reductionism which diverts attention from, and renders invisible the political nature of the policy process. In reality, both content and process are crucially important. For example, the fundamental requirement within capitalism for inequality (between those who labour and those who profit) makes the meaning of government policies to 'tackle inequalities' at best highly questionable. It is only when one 'refocuses upstream' from the polarised political debates over the content of inequalities policies to the dynamics of their implementation that this fundamental contradiction becomes clear. To put it simply, no capitalist government will (or can) support a policy process which permits the full implementation of radical equity policy. Current UK Government policy in this area effectively consists of (loudly trumpeted) minor reform, in the context of an underdeveloped and inappropriate policy process whereby strategy and responsibility for reducing inequalities are handed – in the name of 'devolved autonomy' – to local managers with no knowledge or experience in this area.

Unsurprisingly, little research is undertaken on the equity policy process (49, 50). Meanwhile, no policy connections are made with the macro-political causes of the major economic, social and health inequalities, such as neo-liberal macroeconomic and trade policy, defence policy and foreign policy. None of these featured in the UK Treasury's Cross Cutting Spending Review (51), which was intended to examine the impact on health inequalities of the expenditure programmes of all government departments. Nor of course are the actions of the World Trade Organisation, of transnational corporations, of the World Bank and of US foreign policy taken into account.

It could perhaps be suggested that the globalised context of these policy areas makes it unsurprising that their major contributions to the generation of health inequalities go unrecognised. The same cannot as readily be said, however, of the one domestic area where effective policy action could have radical impact – that of gender equity. Arguably, gendered differences relating to power and control underlie all inequality. Yet this issue – which cuts across social class, ethnic and other social dimensions – is barely acknowledged in domestic policies relating to the potential action areas of (male) parenting and socialisation.

One important conclusion to this discussion is that there is an urgent need for health policy research and commentary which draw upon policy theory (52) and on an explicit awareness of the dynamics of the policy process (35, 53, 54).

In conclusion

"The public ideas – and the language associated with them – which currently envelop us are those of the market, corporatism, fiscal restraint, and globalization, ideas which are driving the near universal dismantling of the welfare state, and eroding any notion we might have of the common good." (55)

Western neo-liberal capitalism, combined with Cartesian reductionism, has become a powerful hegemonic force, nurturing the perception of people as customers and consumers and transforming the wonderful diversity of human 'being' and the process of living into a bland sameness - what Shiva (56) calls a 'monoculture of the mind.' In essence, we are losing the perception of people as human beings with feelings, needs and relationships and are creating a way of life that makes us sick. The neo-liberal ideology that emerged from the Thatcherism and Reaganomics of the 80s is now a feature of 'socialist' governments both here in the UK and globally, testifying to its hegemonic nature (5). Therefore to continue to think that a welfare state could indefinitely 'exist in an island of socialism in a sea of capitalism' (57) is delusional.

What action can we take, individually and collectively, to change things for the better, for the common good? As public health researchers and practitioners, we can acknowledge the issues raised in this paper by:

- Discussing and developing ideas on the theoretical issues relating to the impact of power and ideology on the health of the public;
- Undertaking between- and within-country comparisons of important political determinants of health inequality;
- Sctively drawing public and political attention to these issues.

In this way, our hope is that critical thought can and will lead to critical action.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Health Information: Empower Citizens to Make Healthy Choices**
Module: 8.2	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Moormann Thomas, MPH** Department of Corporate Development Techniker Krankenkasse, Hamburg
Address for correspondence	Thomas Moormann Techniker Krankenkasse Headquarters Department of Corporate Development 22291 Hamburg, Germany Tel: +49 40 6909 2629 Fax: + 49 40 6909 8 2629 E-mail: Thomas.Moormann@tk-online.de
Keywords	Health information, health system, quality, user, patient
Learning objectives	After completing this module students and public health professionals should: • Be aware of the diverse benefits of health information for various user groups; • Be aware of the contribution of health information to trans-parency, quality and efficiency of health systems; • Understand how health information determines health of individuals and populations; • Be aware of the qualitative requirements that health infor-mation must be able to meet, and how these can be meas-ured; and • Be able to identify situations in the health system where inadequate health information is available in quantitative and/or qualitative terms.

Abstract	Nowadays, health information is often easily accessible at low prices. In contrast, both emerging market and developing countries show a deficit in quality and application. For the analysis of health information it is necessary to consider not only the target groups and actual users, but also producers, providers, and the media. Good quality health information plays a key role in the concept of empowerment and therefore it is a key prerequisite for strategies and goals of the New Public Health. The exchange of information contributes to par-ticipation and user competence at all levels of a health care system. And, the more transparent a health care system is, the better the chances for each individual to get a high quality of care which is a core requirement for minimising inequalities in health. The objective must be to achieve a higher measure of co-determination and decision-sharing for citizens at all levels of the health system by means of targeted health information, among other factors.
Teaching methods	Problem-based learning and interactive methods such as group work, role-playing and group discussions.
Specific recommendations for teachers	Work under teacher supervision 60%, individual students' work 40%. Apply DISCERN-criteria on various online and/or written health information materials. Provide seminars and training especially for health experts, physicians, health insurances and other groups which produce health information.
Assessment of students	Assessment could be based on a multiple choice questionnaire (MCQ), case problem presentations and an oral exam.

HEALTH INFORMATION: EMPOWER CITIZENS TO MAKE HEALTHY CHOICES

Thomas Moormann

Introduction

There seems to be an infinite range of media and healthcare information available today, exceeding the material in brochures from health authorities by far. Thanks to the computer revolution and information technology, it is simultaneously much more easily accessible, and we can obtain more favourably priced health information than ever before. And with the aid of computers and the Internet, nowadays health-specific information can spread across the globe within seconds. For the population and for researchers alike, therefore, increasing importance is being assigned to filtering out the relevant information from the so-called "info smog", discarding irrelevant information and turning data into useable information. Consequently, public health has to move from issues of access to knowledge to the management and use of knowledge (1). Provided information remains too often unacknowledged and unused, this is defined as a knowledge-to-action gap (short: "know-do" gap). Information for health professionals, nongovernmental and international organizations does not correspond with adequate practice. The know-do gap does not only exist in developing but also in developed countries (2). And in the first place these needs have to be considered for information that addresses directly citizens and patients.

The potentials of health information in achieving good health today are recognized by health experts, public health professionals and even governmental authorities. The World Health Organization (WHO) has already integrated health information into their comprehensive health strategies.

WHO sees equitable and universal access to health-care information as an important part of worldwide strategies to reduce global disparities in health and to achieve the health-related Millennium Development Goals (3). The WHO Department of Knowledge Management and Sharing (KMS) is assigned, particularly focusing the fragile health of populations in developing countries:

- To foster an environment that generates, shares and effectively applies knowledge to improve health outcomes throughout WHO and its Member States;
- To develop and disseminate principles, tools and strategies to bridge the know-do gap by creating stronger health systems and greater health equity;

- To help establish knowledge management as a core discipline and practice in public health (4).

The further analysis takes into account the fact that health information plays an important role on all allocation and decision-making levels of the healthcare system, frequently referred to as macro, meso and micro levels. At the macro level, systemic objective-defining and planning processes take place, where health resources are quantified and allocated to the individual health sectors and the general legal and organizational parameters for the healthcare system are defined. At the meso level are the inter-organizational networks, bureaucracies and associations. Patients move at the micro level and, therefore at the final stage of the supply process, within the context of the individual healthcare and nursing facilities, measures and technologies.

Definitions

Health Information comprises all types of information relevant for healthcare purposes, and the process of exchanging health information is designated as health communication. In the process, in addition to know-how, opinions and feelings are often exchanged. Communication rarely develops in a unidirectional or linear manner; frequently the roles of addressers (suppliers, producers) and addressees (target group, users) may change during the communication process; for instance, the exchange of information between doctor and patient ideally is bilateral.

Under health communication in the narrower sense, verbal, textual or image-related communication forms can be subsumed. In the broader sense, patient and health training would need to be included. Health communication takes place either directly via language, gestures and facial expressions, traditionally between doctor and patient, or indirectly via media. The latter traditionally comprise the mass media: print media, radio and television. The new media, telephony and the Internet, are making increasingly interactive forms of health communication available (e.g. Internet relay chat), traditionally linear and hierarchical communication patterns are being penetrated in the process. A technological application of growing importance is called e-health (telehealth/telemedicine). E-health consists of the use of information and communication technologies to deliver health services, expertise and information over distance, geographic, time, social and cultural barriers. One important example are electronic health records, nevertheless comprehensive health records at least on paper are still not usual even in developed health systems.

Generally speaking, both the content (information) and the ways and means in which it is exchanged (communication) are of immense importance and they are mutually interdependent. Health information in the best quality is useless in the event of disturbances in communication between the sender and the recipient. In

this case, the information will not reach the recipient or will only arrive distorted. The outcome is not any better either if the content is successfully communicated but is not state of the art or if the content is not of relevance to the recipient. Health information and health communication should therefore be viewed as two parts of a whole unit. The two terms are not always clearly distinguished from one another but tend to be used in line with the current context instead. For instance, in health policy, the term in use tends to be "health information", whereas scientific circles prefer to speak of "health communication". Health communication has already managed to establish itself as an independent scientific partial domain of public health in several countries.

To analyze health information it is necessary to consider not only the target group and actual users but also producers, providers, and medium. The providers may act on a non-commercial basis or commercial basis and users should be aware of the motive for publishing a brochure or providing a web portal. Typical providers of health information beyond direct personal interaction in context of health care are media companies, health insurances, health authorities, non-governmental organizations, the pharmaceutical industry, and self help organizations. Providers often pay agencies for producing the contents.

The most obvious users of health information are patients and professional service providers integrated into the healthcare process as well as citizens who are interested in issues relating to health and illness and health policy information. Yet even the health politicians and the legislature routinely need comprehensive health information and health data. Table 1 lists typical examples of relevant health information – sorted according to the respective user group. Typically, there are substantial overlaps here between the user groups, and yet the focus and consequences of the information tend to vary.

Table 1. Examples of contents of relevant health information by users

Citizens / the public
• meaning of health determinants: social, environmental, and political factors, life style • benefits and risks of screening measures and secondary prevention • options and mandatory duties to take out insurance in protection from the financial consequences of illnesses, e.g. - extent of insurance premiums - cost reimbursement, deductibles, supplementary charges - optional benefit packages - service quality of health insurance • health policy information (e.g. planned reforms)

Patients and ill persons

- medical instructions on self-treatment of minor ailments and choosing the right time to see a doctor / self-care (e.g. family care of the disabled, self treatment of minor sicknesses)
- benefit entitlements to health insurance
- service access information
- care quality in facilities, e.g.
  - providers' qualification (e.g. diplomas, ongoing and advanced training) and experience, e.g. number of operations per year
  - waiting times
  - mean hospital length of stay
  - outcomes
  - complication rates
  - patient satisfaction
- personal health data (medical examination results, diagnoses, prescriptions)
- treatment standards and alternatives
- patient rights
- health counselling, training and education

Providers

- patient health data (diagnoses and results, patients' medical record, results of earlier treatment in other facilities)
- rights and duties in relation to patients
- evidence based treatment guidelines
- decision support systems
- advanced training available

Purchasers / Health Insurances

- claims-data
- morbidity rates
- evidence based treatment guidelines
- care quality in facilities

Researchers, health politicians and health authorities

- collected epidemiologic population-data
  - health indicators by population, within population (e.g. by socioeconomic groups) and by individuals
  - prevalence and incidence of diseases
- requirements of the broad population in terms of health-care services, including health information
- quantitative and qualitative status of care facilities
- performance of health care services:
  - input, throughput, output and outcome of health care units or single interventions
  - efficacy, community effectiveness, cost-effectiveness and adequacy of services
- vaccination behaviour and vaccines required

Source: Own compilation

The role of Health Information for New Public Health

Health information in all health care sections play a key role in epidemiologic research and health systems analysis, the two core disciplines of New Public Health. Information in this case is used by decision-making-bodies at state and local level who need sufficient health data to optimize resource allocation and to measure the quality of the health care system. Policymakers and health authorities need health reports and epidemiologic data to derive health targets and to take action, for surveillance of influence of health determinants from outside the health system, e.g. traffic safety, environmental quality, living conditions and work conditions, to plan health care facilities or to control the safety of pharmaceutical products.

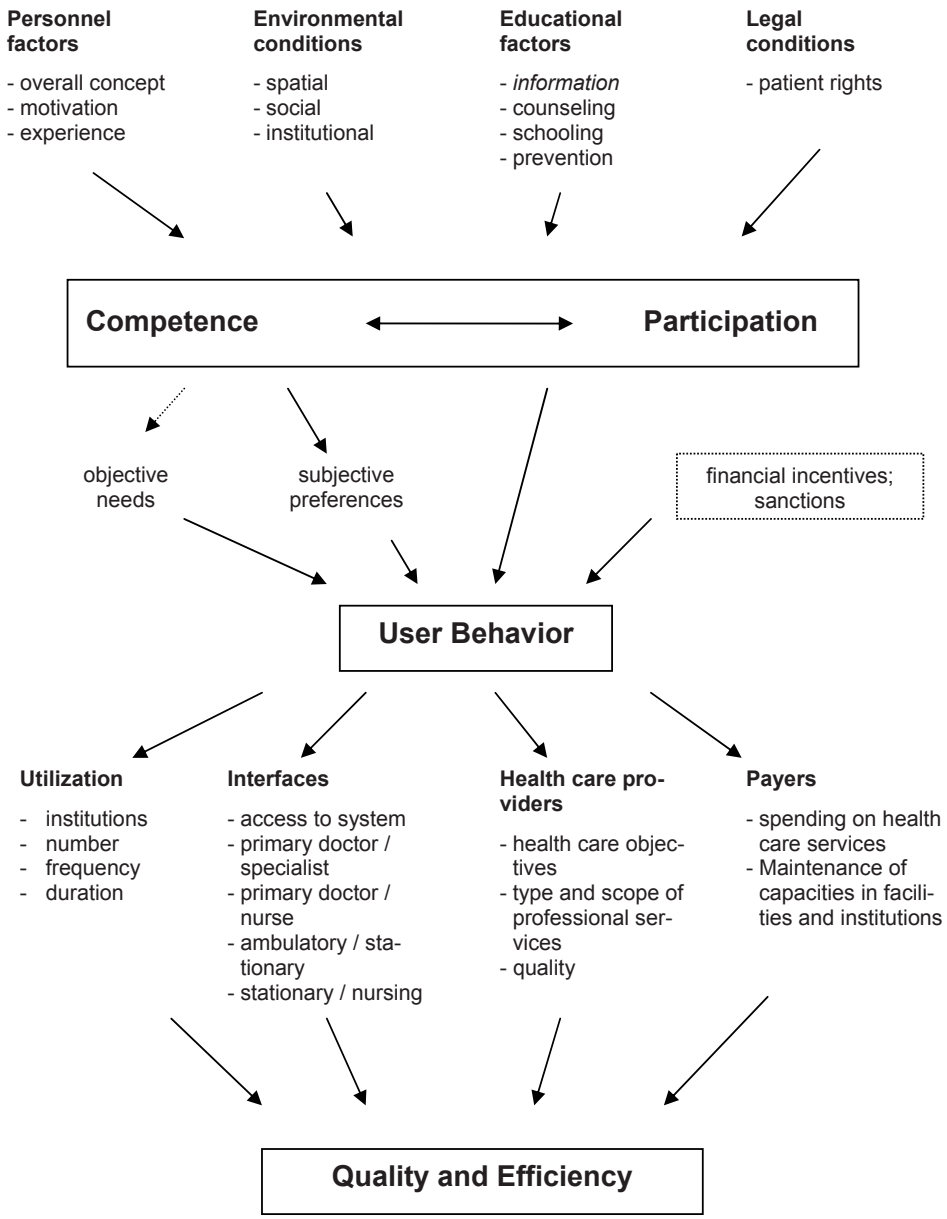
Health care providers, e.g. hospitals and doctors, are highly dependant on health information as a basis for benchmarks of health care facilities and deriving best practice. Only with comprehensive patient data they provide best diagnosis and therapeutical interventions. In this case electronic health records and telematic applications (e-health) play an important role to exchange professional expertise and ensure diagnosis in difficult cases, to avoid unnecessary duplication of tests, e.g. radiography, and to avoid contra or side effects of medicine (5).

Another big issue derives from development of "Old Public Health" to "New Public Health" in the 1980s. This development was driven by a salutogenetic perspective. Not only was the focus on the conditions in which illnesses originated (pathogenesis) but particularly on the conditions in which health originates and is maintained (salutogenesis). Public health research, which had been geared up to that point to preventing illness among disadvantaged population groups, was supplemented to include aspects to promote health resources and health potentials at all levels of society (health promotion). The concept of health promotion was developed by the WHO at the beginning of the 1980s and its objectives and principles were summarized in Ottawa Charter on health promotion in 1986. Health promotion is intended to give all people a higher degree of self-determination over their health and enable them to strengthen their health. Key strategies of health promotion are to boost the competence of and to empower humanity.

Empowerment is aimed at enabling people to develop and enhance their ability to actively shape their social environment and their lives themselves, without having someone do it for them. The challenge is to create conditions in which people can lead a responsible life according to their own decisions. These skills are essential prerequisites for physical and spiritual wellbeing. David Byrne, EU-Commissioner for Health and Consumer Protection from 1999 to 2004, formulated this nexus as follows: "Many of the choices of achieving good health lie in the hands of the citizens themselves. … Citizens' choices are based on a number of factors ranging from knowledge and information to socio-economic determinants. … The EU must empower citizens to make healthy choices and involve them in policy-making from the start" (6).

Good health information plays a key role in the concept of empowerment and therefore is a key prerequisite for strategies and goals of New Public Health. The exchange of information contributes to participation and user competence at all levels of the health care system. In addition to improvements in the dissemination of information, the expansion and redefinition of user participation is another essential element for enhancing user behaviour. Improving user participation is a continuous process and requires the practical application of participative measures. Increased user competence and participation will optimize user behaviour and therefore affect the quality of health care processes and outcomes as well as the efficiency of the whole health care system, as figure 1 illustrates.

Figure 1. Relationship between competence, participation, user behaviour, quality and efficiency of health care delivery.



Source: Advisory Council for the Concerted Action in Health Care 2001

Measures to increase user competence must start with the environmental conditions such as social and institutional support (e.g. self-help groups) as well as with educational issues (health literacy) and the legal framework. Programs should form an integral part of the health care process (7).

Increased user competence and participation during a doctor's visit for instance, enable a patient to clearly specify his or her own wishes and needs, to obtain information on treatment alternatives and their efficacy and side effects, to actively participate in defining the therapeutic treatment processes and that the patient has a say in all relevant steps of the treatment process (shared decision-making). In order to facilitate this, it should be obligatory for health providers to participate the patient in all medical decisions that affect him or her. This must include clarification of the advantages and disadvantages of planned health interventions as well as their actual benefits and possible alternatives. This enables patients who are capable or who request such information to decide for or against the planned medical interventions (8).

Providing consumers with information about treatment choices can reduce anxiety and promote more effective relationships with health professionals. If citizens are informed accordingly, this simultaneously represents a key measure of protection against unnecessary, deficient and ineffective services, against avoidable health risks and errors in treatment. Only in this way can a right of the patient to a self-determined approach to health and illness be realized. Consumers who participate in decisions about their treatment therefore may have improved health outcomes. This also extends to include the knowledge of how to obtain judicial support and compensation in case of neglecting a benefit, insufficient treatment or treatment damage, e.g. nosocomial infections.

Availability and exchange of information for citizens and – to some extent for health professionals – enhances the transparency of the health care system. Conversely, the transparency of services and benefits, particular on the quality of healthcare, represents a prerequisite for the availability of meaningful information. There is scientific evidence that there are different chances of access and fewer choices to make for low income and worse educated people, e.g. for reasons of denied access to private delivery. The higher out of pocket payments the more difficult is access to health care. And thus the more important are transparency and empowerment of citizens in order to get sufficient and proper treatment. Consequently the more transparent a health care system, the better the chances for each individual to get best quality of care and to minimise health inequalities.

The expected outcomes and opportunities related to an increase in competence and improved participation would affect the whole health care system. Some of the possible outcomes are shown in table 2:

Table 2. Outcomes of user competence and participation

Macro Level
More transparency of the system
Reforms developed from the "bottom up"
Public discussion and determination of health care objectives and measures
Stimulated and improved quality of structures, processes and outcomes
Micro Level
Increased self-responsibility, improved health behaviour and more appropriate user behaviour
More pronounced individualization of treatment, opportunities for the more flexible use of medical alternatives and improvements in the quality and cost-effectiveness of care
Critical reflection of health care providers with respect to medical treatment concepts
Health care providers are forced to be equipped with up-to-date information on health care problems at all times
Better patient protection from malpractice and avoidance of duplicate, invasive and expensive tests
More patient responsibility in the management of their care, e.g. through avoiding consultations in case of insubstantial health dysfunctions through increasing competence and self management

Source: Modified from Advisory Council for the Concerted Action in Health Care 2001.

Demands on health information and perspectives

Today modern and computerised information systems in many countries perform health data on improved quality. WHO and other international agencies collect such data and offer them in on-line or off-line databases. Applied health data is manifold and contain health, social and socioeconomic indicators as well as features and the development of national health systems and other public health issues. Information systems and health monitoring tools got improved, but due to relaxation of control in countries of economic transition, especially former communistic countries, many data sets became less complete and less reliable. Communication between different agencies collecting or maintaining information is generally poor, even within the health sector (9), but to some extent this is the situation also in developed countries, e.g. in Middle Europe. Further investments and international cooperation are needed to ensure primary data collection in good quality.

Switching to the micro level, patient empowerment and evidence-based patient choice needs available health information in good quality. In accordance with the major importance of health information, the improvement of the quality of healthcare must transcend considerations of medical and technical diagnosis and

treatment processes by far; indeed, the focus must extend to include the quality of information being communicated to the patient.

Obviously not all of this information is good quality and only a small proportion is based on good evidence. Many provide inaccurate or confusing advice, and it may be hard to know which information to use and which to discard. And not many health information providers can claim that their information is easily accessible and, beyond this requirement, independent of outside interests, easy to understand for laymen and customized to the target group. The growth of Internet and consumer information has driven the development of such quality criteria and tools to judge health information, which can certainly be transferred to other media as well. The application and control of quality criteria can in principle be performed by:

- self-imposed commitments of the providers;
- controls by independent institutions;
- controls by state supervision; and
- assessment by the users themselves.

If the quality criteria are met, the provider will be awarded a certification visible to the user in terms of an appropriate label on the web pages. The most common global quality seal for medical information within the scope of a self-imposed commitment of providers is the "HON Code of conduct" developed in Switzerland and awarded by a Swiss body (www.hon.ch). HON (health on the net) Code signals compliance with certain rules in creating the pages. For instance, unless separately designated, recommendations are only given by qualified experts and trained medical or healthcare staff. All pages contain information on sources with HTML links and the information on the efficacy of therapies is supported by scientific evidence. If sponsors or other forms of financial support are available, the money providers are mentioned by name. However, the HON seal is meanwhile also being used by some providers without the latter actually having fulfilled the criteria. A more recent seal similar to the HON code is the "E-Health Code of Ethics".

Examples of quality controls by independent institutions are BIOME (www.biome.ac.uk) and MedCERTAIN (www.medcircle.org).

Healthfinder (www.healthfinder.gov), Canadian Health Network (www.canadian-health-network.ca), BIOME and NHS Direct Online (www.nhsdirect.nhs.uk) are global, state-sponsored institutions engaged in the control, assessment and quality improvement of information given to patients.

DISCERN (www.discern.org.uk) is a standardized evaluation instrument developed by British researchers together with practitioners and patients to exam-

ine information material on treatment choices but which can also be deployed for all information on health issues. DISCERN consists of 15 key questions plus an overall quality rating. Each of the 15 key questions represents a separate quality criterion – an essential feature or standard that is an important part of good quality information on treatment choices. Each question is rated on a 5-point scale ranging from No to Yes to help the user to decide whether the quality criterion in question is present or has been fulfilled by the publication. Question 16 is the overall quality rating at the end of the instrument (10).

Table 3. DISCERN-criteria to judge the quality of written information about treatment choices

SECTION 1. Is the publication reliable?

1. Are the aims clear?
2. Does it achieve its aims?
3. Is it relevant?
4. Is it clear what source of information were used to compile the publication (other than the author or producer)?
5. Is it clear when the information used or reported in the publication was produced?
6. Is it balanced and unbiased?
7. Does it provide details of additional sources of support and information?
8. Does it refer to areas of uncertainty?

SECTION 2. How good is the quality of information on treatment choices?

9. Does it describe how each treatment works?
10. Does it describe the benefits of each treatment?
11. Does it describe the risks of each treatment?
12. Does it describe what would happen if no treatment is used?
13. Does it describe how the treatment choices affect overall quality of life?
14. Is it clear that there may be more than one possible treatment choice?
15. Does it provide support for shared decision-making?

SECTION 3. Overall Rating of the Publication

16. Based on the answers to all of the above questions, rate the overall quality of the publication as a source of information about treatment choices.

Source: http://www.discern.org.uk/discern__instrument.htm (17 Apr 2005)

Health information services (including education, counselling and schooling) should use all forms of modern communication and distribute information for defined target groups. Knowledge and information are unevenly distributed

across the population. As a rule, people with higher education tend to have a better knowledge of health topics, are more likely to absorb information and can use and implement the latter relatively better for themselves. In addition, differences in attitudes, values and expectations play a decisive role regarding people's willingness to receive and acknowledge certain messages. Information packages therefore should be designed to reach groups of users according to cultural and socioeconomic backgrounds, language, age and sex (11,12).

Health information as an important health service determines health and has the potential to influence and enhance the performance of whole health care system. The objective must be to achieve a greater measure of citizens to have a right to speak and decide at all levels of the health care system.

EXERCISES

Task 1. Develop a role play by looking at everyday situations in the context of healthcare, e.g. during a doctor-patient interaction. After this, analyze the communication patterns and communication problems that have arisen and discuss structural methods within the group to avoid such problems from occurring (e.g. supplementing the training of health professionals, setting up national surveillance systems, developing information offers).

Task 2. Working in small groups, students compile a comprehensive information package on a selected health topic for a pre-determined, vulnerable population in their country. A further small group analyzes the usability of the information material on offer by focusing on the special requirements of the target group.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Health Care System's Influence on Health Information and Health Outcomes: Lessons from Germany**
Module: 8.3	**ECTS (suggested): 0.25**
Author(s), degrees, institution(s)	**Moormann Thomas, MPH** Department of Corporate Development Techniker Krankenkasse, Hamburg
Address for correspondence	Thomas Moormann Techniker Krankenkasse Headquarters Department of Corporate Development 22291 Hamburg, Germany Tel: +49 40 6909 2629 Fax: + 49 40 6909 8 2629 E-mail: Thomas.Moormann@tk-online.de
Keywords	Health information, health system, citizen, insured person, patient, health insurance fund, doctor, benefits, Germany
Learning objectives	After completing this module students and public health professionals should: • Be aware of chances and risks of health information in different allocation levels of health care and for different user groups; • Be able to identify deficits in health information and health com-munication and to propose solutions capable of being imple-mented; and • Be sensitised about the relevance in health terms of the quality of the doctor-patient relationship.
Abstract	A high quality of the available health information is the decisive precondition for citizens, insured persons and patients to be autonomous and make their own sound decisions. Patients lacking empowerment and not respected with regard to their request for autonomy will abandon a health care system funded by solidarity, raising questions concerning the future of social health insurance. The first steps for more transparency, opportunities for choice and decision-making in the German health system could contribute towards remedying losses of confidence in, and the quality of health care services.
Teaching methods	Group work and discussions in combination with research and literature studies.

Specific recommendations for teachers	Work under teacher supervision 60-70%, individual students' work 30-40%. Before beginning to deal with the topic, teachers should take some time to introduce students to the basic structures of the German health system and provide them with material and time for self-study of the relevant literature. The topic of health information, due to its enormous relevance in terms of health, should be viewed as an independent module within the health determinants; however, there is a certain overlapping with other health determinants, particularly health system / health services and social inequalities (cf. the articles in the book by V. Cucic, "Determinants of health", and B. Artnik, "Inequalities and ill-health"). The topic is also suitable for treatment in the context of comparisons of international health systems.
Assessment of students	Assessment could be based on a multiple choice questionnaire (e.g. quality criteria of a good doctor-patient relationship and preconditions for patient autonomy), case problem presentations (e.g. country studies) and oral examinations (e.g. articles about the impact of health information on populations' health).

HEALTH CARE SYSTEM'S INFLUENCE ON HEALTH INFORMATION AND HEALTH OUTCOMES. LESSONS FROM GERMANY

Thomas Moormann

Initial steps to more citizenship and consumerism in German health system

In recent years, the German health system and, in particular, the statutory health insurance bodies have registered a trend in the direction of increased orientation to the needs of citizens. Transparency, decision-making autonomy for the users of the health system as well as rights of citizens or patients are topics increasingly being dealt with by the media but are also increasingly being included as part of the demands and concepts of decision-makers in the health system. This health policy trend is being fuelled by at least two processes, one being the "information revolution" and the other the funding and control problems in the German health system.

The increasing spread of Internet use in Germany, meanwhile, 54% of the population 14 years and older are online regularly (1), and the increasing availability of health-related information, particularly on the Internet, have immensely boosted the needs of citizens for information and participation in the general health context. More and more patients expect to receive adequate information and to be accepted as partners on an equal footing, to be treated respectfully when ill and to receive therapy of the highest quality.

At the same time, the health system is suffering from persistent control problems and, consequently, patients experience partial excesses and deficits in health care and sometimes incorrect treatment. Moreover, inappropriately high increases in spending, uneconomical use of contribution funds and a decline in the importance of salary-dependent employment relationships and, therefore, lower contribution revenues, have led to funding problems amid higher contribution rates being imposed by health insurance funds. Policy-makers currently perceive a way out of the dilemma in encouraging transparency and ability of insured persons and patients to obtain information, to make their own decisions and have their own say. Each individual is to contribute toward an improvement in quality

and the economy of health care by making rational decisions in this regard. At the same time, the financing of benefits is to focus on what is considered to be necessities. For the insured and patients, this will mean a curtailment of benefits and they will increasingly need to make financial contributions of their own (2). These decisions were entrenched in statute law in the wake of the latest health reform as part of the *GKV-Modernisierungsgesetz – GMG* (Statutory Health Insurance Modernisation Act) effective as of 01/01/2004.

An expert opinion commissioned by the German government in the year 2000 concluded: "At present, the exchange of information is deficient with respect to medicine and the health care system on the whole …" (3). What is being criticised is the lack of quality reporting (quality of medical treatment), inadequate rights of patients and a lack of protection afforded to them in the case of errors in treatment, the lack of transparency of health care processes, dominance being exerted by experts and the lack of balance between patients on the one hand and medical practitioners, funding entities and industry on the other (4,5).

Before dealing with such topics as the deficits and opportunities concerning the use of health information in the German health system, first of all an outline is to be provided of the central features of the German health system.

Main features of German Health System

The German health system is highly complex and, viewed in economic terms, an attractive market that meanwhile generates some 240 billion euros in revenues each year. In 2003, a total of 11.3% of Gross Domestic Product, or 239.7 billion euros, was spent on health, of which the contribution-funded statutory health insurance (German acronym: GKV) accounted for the lion's share by far (136.0 billion, or 57%) (6). 85% of the German population is insured under the statutory health insurance, equivalent to 70.5 million people. 50.8 million are members paying their own contributions, and 19.7 million are co-insured as their family members without paying additional contributions. Some 10% of the population have private health insurance providing full cover, and for about 5%, the state pays the costs of medical treatment (7,8,9). According to a current estimate, up to 300,000 persons do not have any health insurance (10).

The essential elements of the German statutory health insurance are:

- Health insurance is mandatory for most of the population; only certain groups of persons (in particular, high net-worth individuals and civil servants) have the choice of opting for private health insurance;
- Sharing of decision-making powers between the *Länder* and the federal government;
- Corporatism and self-administration principle: corporate bodies negoti-

ate contracts with each other and health insurance funds raise their own financial resources (contribution rate);

- Structured health insurance system with 7 different types of health funds with a current total of approx. 280 health insurance funds on a non-profit basis;
- Strict separation of funding and benefits structures;
- Benefits-in-kind principle;
- Solidarity principle: contributions in proportion to income (up to an assessable income limit), but non-contribution-related utilisation of benefits;
- Parity in contribution funding between employees and employers (with a shift in favour of employers becoming effective as of 01/07/2005);
- Free choice of practitioner by the insured persons;
- Free choice of health insurance fund by the insured persons, with contracting mandatory for health insurance funds;
- Free choice of therapy by the physician;
- Service providers are essentially organised as part of the private sector;
- Separate structures in place between out-patient and in-patient treatment.

Systemic deficiencies – informational needs to improve population's health

The cases in which substantial improvements in standards for health information can be of relevance to the population in terms of health are to be explained below with the aid of examples taken from the German health system.

1. Health information at the macro level of health care

Aggregated health data for an improvement in health care planning

The procedures relating to benefits under the German health system have thus far not been subjected to systematic health reporting or evaluations. There were various reasons for this. Until fairly recently, benefits and claims data were only available in the form of millions of paper documents. A systematic evaluation was not feasible. Data have only recently been recorded in electronic format. For data protection reasons, in the past the funding entities received the data from out-patient medical treatment in the form of two separate data records prohibited from being consolidated. The first data record contained the personal data of insured persons. The second data record contained the diagnoses made by medical practitioners as well as the therapies affected or prescribed. Accordingly, the

information in question was only meaningful to a limited degree. In contrast, the certificates issued by the doctor relating to inability to work, the medications prescribed and the clinical data (e.g. diagnoses on admission to and discharge from hospitals, the specialist department of the hospital in question) were available in full. Therefore it was only possible to generate valuable, epidemiological and health policy related data analyses and information to a limited degree. Hence, little was known in the past about the morbidity of persons covered by statutory health insurance and of the population. Capacity planning within the scope of health care (locations of hospitals, number of beds, distribution density of physicians, procurement planning for large-scale medical equipment, etc.) therefore took place without actually measuring the demand among the population.

Two changes intended to improve the data basis, data exchange and data evaluation are currently being implemented as a measure of the current health reform. Since 2004, all contracting physicians of the statutory health insurance have been obliged to forward the following data concerning the insured persons to the health insurance funds for each case of treatment:

- health insurance fund, health insurance number and insurance status;
- indication of the doctor's number of the medical practitioner responsible for treatment or, following a transfer, of the physicians in charge of further treatment;
- type of utilisation (e.g. emergency);
- type of treatment;
- date of treatment;
- items charged, including diagnoses;
- costs of treatment; and
- additional payments required from patients (11).

As a second statutory measure, in future the health insurance funds and the associations representing the contracting physicians will transmit all data on benefits and claims to a central data processing agency. A precondition for this is the introduction scheduled for 2006 of a standardised health insurance number adopted by all health insurance funds in respect of all persons subject to statutory health insurance. In order to preclude identification of insured persons and medical practitioners, references are pseudonymised by a further central agency (a trust centre), but it remains possible for data on the insured and the medical practitioners to be obtained across different periods. This pseudonymisation is intended to prevent misuse of patients' data, e.g. by the funding entities themselves. The data processed and stored in this way may be made available for use by health insurance funds, associations of physicians contracting under health schemes, institutions responsible for health reporting on the part of the federal government and the individual German *Länder*, institutions engaged in health care research, universities and other independent scientific research facilities, the

new Institute for Quality and Economy in the Health System and higher-ranking public authorities. The potential purposes of use are likewise defined by law. These are:

- Control tasks of the collective contracting partners (corporations of funding entities and of medical practitioners);
- Improvement in the quality of health care;
- Planning relating to performance resources and capacities;
- Longitudinal section analyses across longer periods of time;
- Analyses relating to procedures of treatment;
- Analyses of health care activities in order to recognise misdirected developments and starting points for reforms (excessive, deficient and incorrect health care);
- Support regarding political decision-making processes for further development of the statutory health insurance; and
- Analysis and development of cross-sectoral forms of health care (11).

The consolidation of health care and billing data as described above, if utilised correctly, will yield substantial opportunities for key health and health care policy related planning and decision-making processes.

A further health reform measure that has been enacted is the introduction of an electronic health ID card for all persons covered by statutory or private health insurance starting in 2006. With the aid of comprehensive telematics-based infrastructure, all operators within the health system will be able to exchange data. Mandatory applications include electronic prescriptions and proof of health insurance when treatment is solicited in other EU countries. Health insurance funds must also facilitate the storage of other data in technical and organisational terms and offer this service to the insured. However, the insured person alone can decide whether these extended services are to be utilised or not, i.e. utilisation is voluntary. In particular, when using their electronic patient files, the insured will find a great deal of information that may help them make their own reasoned decisions of relevance to their health. At the same time, this would create the information base and, therefore, the preconditions for efficient integration of hitherto uncoordinated health care sectors and specific disciplines in the German health system. Specifically, the following applications will be available:

- Mandatory for health insurance funds and the insured person:
  - prescriptions for conveying physicians' orders;
  - proof of EU health insurance cover;
- Voluntary for the insured person:
  - medical data on emergency treatment;
  - patients' files (medical results, treatment reports and the like);

- letters from physicians (including results and treatment reports);
- documentation of pharmaceutical preparations as an overview of medications taken;
- receipts (data concerning services utilised and the preliminary costs thereof);
- patients' folder for data to be made available by the insured person (11).

Other applications, such as storage of patients' wishes, are also conceivable.

Excursus: Patient tracking – patients' data and economic interests

Notwithstanding this important initiative, the process of passing on patients' data raises the risk of data misuse unless the data are appropriately protected. The degree of sensitivity with which patients' data must be treated is reflected in the example of prescription data in Germany. The transmission of data is dealt with in the Social Security Code (§ 300 par. 2 SGB V). Pharmacies forward the prescriptions for medications collected from them along with personal data to so-called pharmacy data centres. These data centres forward the information to the health insurance funds for settlement purposes. This is the only use of personal data allowed by the legislature. The health insurance funds are strictly prohibited from evaluating the settlement data further in terms of the insured.♣

The data centres are allowed by law to pass on prescription data in anonymised form also for other purposes. Regular users include e.g. pharmaceutical companies that can purchase the records from the data centres. The process of anonymisation is also governed in the Social Security Code: hence, the term anonymisation is defined as a change of social security data in such a manner that the individual data on personal or factual situations can no longer be assigned to a natural person, or can only be assigned subject to a disproportionately high degree of effort, cost and labour (12). This does not completely rule out identification of a person. If the term anonymity is given a wider interpretation, the data will additionally contain socio-demographic information, e.g. age, gender, postal code of the place of residence, date of birth or a medical practitioner ID No. Depending on the type and volume of this information, it is conceivable that concrete persons can actually be traced.

Moreover, the intervals at which data are anonymised make a substantial difference as far as usability is concerned. If, for instance, the anonymisation takes place in one step in respect of prescriptions for a whole year, the medication of specific, concrete and anonymous cases can be tracked throughout that year.

♣*At the Techniker Krankenkasse, Germany's third-largest health insurance fund with 5.8 million insured persons, potential abuse is ruled out thanks to automatically deployed data protection personnel. Each order for data evaluation must be approved by such data protection personnel before being processed. Approved data evalua-tions are then anonymised as a matter of principle.*

Data supplied along with the relevant medication history are much more attractive to potential users. Whether the data are subsequently used to optimise the medications on offer or as a marketing tool solely depends on the decision of the respective purchaser of the data in question. A data anonymisation per quarter would be comparatively less attractive to the users. The public is not aware which of these anonymisation processes is used in practice.

In addition, there are problematic links between pharmaceuticals companies and medical practitioners. Physicians frequently possess a surgery software intended to facilitate the selection of medications for certain diagnoses. Generally, all pharmaceuticals companies distribute programs of this kind. When performing a search, these programs frequently point to the medications produced by their own pharmaceuticals company first, before moving on to those from other producers, which – like sponsored Internet search engines – can also exert an influence on the behaviour of users, in this case on the medications prescribed by doctors. It is also technically possible during regular online updates of this surgery software to determine the prescription behaviour of physicians and to use such information for marketing and distribution purposes.

The recording, supply and use of data therefore must always be weighed against the requirements relating to data protection. Data misuse due to personal data becoming freely marketable, a situation at least sometimes reported to prevail in the U.S. and the United Kingdom, must be rendered as improbable as possible.

2. Health Information at the micro level of health care

Biased health information tends to worsen chances relating to health

Health information is ubiquitous in all the media since it ranks high in public interest and can boost viewer statistics and circulation immensely. Health issues account for a wide range of exposure in magazine reports and talk shows on television and radio broadcasts, in magazines and newspapers, and on the book market. These media are also used, perhaps especially, by commercial providers of medical technology and, in particular, pharmaceutical products in order to place their product information. Of course, they also spread on a large scale via the Internet. Other sources of generally non-commercial health information are various advisory centres and telephone consultancy services.

Despite the growing volume of media and health-relevant information, the doctor-patient dialogue still plays a central role for most patients. Physicians frequently represent the only source of information, particularly for medication issues (13), and the doctor is the institution that always considered most trustworthy (14). After all, most health care decisions are taken not on the Internet, but in doctors' surgeries. For instance, more than 80% of spending on statutory health insurance is attributable to decisions of medical practitioners (15).

For this reason, doctors are not only a key target group for performance management on the part of the funding bodies, but at least as interesting for lobby work by pharmaceutical and medical technology companies. This was confirmed in a survey of 62 randomly selected general practices in Berlin, in the course of which the volume and nature of handed out print material and information brochures were investigated, and its importance in practice established by means of an interview. Most of the printed information dealt with metabolic and cardiovascular disorders, and 94% of the material was supplied by the pharmaceutical industry; similarly, 84% of the material was displayed in waiting rooms. Only some of this information was sourced to independent and non-commercial institutions or health insurance bodies (16).

According to health policy, third parties are to be prevented from exerting an influence on advanced training for medical practitioners in future. In the past, pharmaceutical companies have funded the travel expenses for doctors to attend advanced training courses. For this reason, it was embodied in law according to the GMG, effective as of 2004, that obligatory advanced training for medical practitioners are to be free of any economic interests. Product-related events are no longer recognised as advanced training. If doctors do not receive adequate advanced training, they risk cuts in remuneration and their licence to practise may be revoked (17). The key role of doctors (particularly family practitioners) as contact persons, confidantes, sources of guidance through the health system and as advocates of their patients' interests can only be credibly exercised if they remain independent of third-party influences, and can ensure transparency in terms of the quality of their actions (4).

Chronically ill people are also of particular interest to the pharmaceuticals industry since their spending on medication holds the promise of substantial sales revenues. For instance, it costs more than 20,000 euros per annum to treat a person suffering from rheumatism (18). For this reason, self-help groups frequently receive recommendations for treatment from the pharmaceuticals industry.

A problem in many western societies and health systems, including Germany, is the "medicalisation" of health care and normal, everyday life. Using various methods, the media, doctors, pharmaceutical companies and patient groups solicit or encourage new needs for diagnostic and therapeutical processes all the way to inventing new illnesses. In the Anglo-Saxon language world, this phenomenon is known as "disease mongering". Examples of this are shown below:

- Ordinary processes or ailments as medical problems (e.g. baldness, pre-menstrual syndrome);
- Mild symptoms as portents of serious disease (e.g. irritable bowel syndrome);
- Personal or social problems as medical ones (e.g. social phobia and other anxiety disorders);

- Risks conceptualised as diseases (e.g. osteoporosis, hypercholesterolemia);
- Disease prevalence estimates framed to maximise the size of a medical problem (e.g. erectile dysfunction, overweight, hypertension, soft tissue rheumatism) (19,20,21);
- Beauty operations (e.g. liposuction, breast enlargements, nose corrections, corrections to vaginal labia).

In Germany, the number of diseases diagnosed has doubled since 1975, and the therapies available have trebled (22), without public health having deteriorated. Each year, approx. 400,000 beauty operations are carried out in Germany, frequently by physicians lacking the required additional training (23).

Information elicited with certain interests in mind can trigger incalculable and unjustifiable automatisms: side effects and complications, professional errors on the part of doctors, unnecessary anxieties and suffering due to erroneously positive diagnoses (e.g. screening measures conducted on healthy people). Apart from the direct, health-related impacts, they can also cause financial losses to the statutory health insurance or to self-payers. The constantly scarce resources for health care and for medical and pharmaceutical research are thus diverted into areas previously of no relevance as far as the health of the population is concerned.

Unbiased patient information reinforces patients' autonomy

The need to deal with the lack of scientifically secured, state-of-the-art and financially independent patient information is a central task of the *Institut für Qualität und Wirtschaftlichkeit im Gesundheitswesen – IQWiG* (Institute for Quality and Economy in the Health System) newly established in 2004. The foundation, established as an independent facility even from state control, is to supply independent, practically relevant and high-quality health information in generally comprehensible language. Briefing on health issues and information from the institute are intended to extend the range of available choices and the autonomy of patients, to improve the quality of medical care and help reduce costs.

The institute operates according to methods of evidence-based medicine and uses a systematic process to filter the most reliable results of medical studies, particularly from controlled studies, and evaluates this information. Both the status of scientific evidence and its uncertainties are to be expressed.

The following content is be taken into account by the institute:

- Briefings on the disease or ailment, including anatomy, causes, symptoms, disease progression, complications,

recovery, relapses and groups of persons affected;
- Prevention and screening measures, including nutrition and lifestyle;
- Self-management;
- Diagnostic and therapeutic processes, including medications along with detailed information on the benefits and drawbacks and the costs involved;
- Psychological and social aspects, including experience with the disease, its impacts on family and friends, and remedies and help available;
- Evaluation of evidence-based guidelines for major diseases in epidemiological terms.

A "balanced encyclopaedia of evidence-based patient information" is to be established in various stages, in German, English and other languages frequently spoken in Germany. An Internet-based information platform is to be created for patient information as well as a reasonably priced patients' magazine. A database is to inform citizens of illnesses and treatment options available, with patient knowledge being enhanced by sources of information designed to improve the knowledge and understanding of health and evidence-based information. In addition, regular and advanced training of medical practitioners is to be subjected to scrutiny (24,25,26).

The doctor-patient relationship influences the information status of the patient and the medical outcome of treatment

Being part of the German health system, doctors are obliged by law to inform and brief their patients comprehensively. A prerequisite for more patient autonomy and joint decision by doctors and patients is information that is well-founded and informative: information that details the pros and cons of medical procedures and also describes health care processes and alternatives, thus providing the user with a basis for making informed decisions. Furthermore, this information is necessary to increase patient autonomy and joint decisions by doctors and patients. Very few health care providers currently meet this demand (27), and this applies particularly to the doctor-patient relationship in Germany. This picture extends to include the explanations of a medical practitioner who wants to educate patients in a book and especially emphasises the dangers of an excess of information and enlightenment:

*"… zuviel Wissen macht krank. … der Beipackzettel selbst krank machen kann: Die Warnung vor einer Nebenwirkung wird zur sich selbst erf*üllenden *Prophezeiung"* (18). (… too much knowledge makes people ill… the instruction leaflet itself can do so: the warning of a side effect becomes a self-fulfilling prophecy).

Even today, the doctor-patient relationship is often shaped by the traditional pattern of the paternalistic (28), i.e. someone's will being imposed on others, and is experienced accordingly as a "prevented dialogue" (29), even if the paternal, commanding role of physicians is no longer considered contemporary in science and in the public eye today. The ideal increasingly is the patient who has a say in the matter and can make his or her own decisions. The process of *partnerschaftliche Entscheidungsfindung* (reaching decisions in a partnership) is the German counterpart of "shared decision-making" developed in the 1990s. Patients are included with their opinions, values and preferences in each phase of the process, without the patients being expected to understand the connections in scientific terms. They receive all the available medical information on their condition but are also asked about own experiences, observations, expectations, values and assumptions. Their personal circumstances of life are taken into consideration, treatment alternatives are discussed, and an alternative is jointly selected. The doctor provides help by contributing objective approaches to the frequently emotional aspects of the patients. Finally, during treatment, the medical practitioner ensures that the patient understands them and can implement all measures optimally (30). Within the scope of shared decision-making, patients know a great deal more about their disease and its treatment, they have more realistic expectations of the course of treatment, they are more reliable in implementing the therapy principles and are more consistent in taking the necessary medications and, on the whole, are more satisfied with their treatment. Quite often this also improves the efficacy of treatment (31).

The patient has two fundamental needs, one being protection from high and mighty providers (information lead, more money, better lawyers) and the other an autonomous, self-determined process of overcoming the disease. Patient support always moves between these two poles (32). The wish for full information and active participation in decision-making processes varies quite sharply among patients, both inter- and intra-individually, depending particularly on such factors as age, gender, socio-demographic aspects, the illness, the stage thereof and individual coping strategies (33). These findings need to be taken into account, and the information flow adjusted accordingly.

There will always be patients who do not wish to be actively included in decisions relating to diagnostic and therapeutic processes. In view of the growing lack of transparency of diagnostic and therapeutic processes, this will also become increasingly difficult. Yet deficits in communication have been proved to exhibit undesirable effects such as a disturbed fiduciary relationship all the way to a hiatus in the doctor-patient relationship as well as deficient medical outcomes, also on account of lacking compliance (34,35). What is responsible for this, among other things, is the fact that training of medical practitioners in Germany tends to focus on theory rather than practice (26). What is essential and indispensable, therefore, is the need to reinforce communicative and psycho-social skills in the

training of medical practitioners and that of other service providers as well. No matter how good training is, it will only pay off if it is possible to significantly extend the duration of a doctor-patient conversation. In Germany, known as the country of brief talks, consultation ends after an average of 7.6 minutes, placing the country right at the end in a comparative, international study on patient-doctor interaction in six European countries: Switzerland 16.0 min.; Belgium 15.2 min.; Netherlands 10.1 min.; United Kingdom 9.4 min.; Spain 7.8 min; Germany 7.6 min (36). An increase in the duration of consultation talks is only likely to be achieved if the high frequency per person of visits to doctors in Germany can be reduced.

The German government interprets the results of the model projects on shared decision-making sponsored as of 2001 as evidence of the need and acceptance of shared decision-making in Germany. In the individual projects, essentially three strategies were deployed:

- Educational and training measures to promote active and communication skills of medical practitioners;
- Development of scientifically founded patient information and decision-making aids for patients; and
- Patient training sessions to prepare for the consultation talks and decision-making as well as to establish patient skills.

In order to be able to apply the results to everyday medical practice, the government will now set additional funds aside for implementation accompanied by scientific methods (37).

Information gaps increase financial and health risks of patients when contracting for additional private benefits

Income-earning opportunities of contracting medical practitioners under the statutory health insurance have deteriorated in the past ten years. In the year 2000, for instance a general practitioner earned an average of 108,000 euros (revenue less costs of running a surgery), and an orthopaedic specialist earned 133,000 euros per annum (38). In comparison, average gross income of employees was in the region of 37,320 euros, with workers in the industrial sector earning 28,236 euros in 2001 (39). The main reason for the declining incomes is the steady increase in the past of the number of medical practitioners, which significantly exceeded growth of the sectoral budget available for medical treatment of out-patients.

A potential source of additional income for contracting medical practitioners is private treatment of patients outside the statutory health insurance. There are

two ways of doing this. *Firstly,* by treating patients with private health insurance. The services rendered are billed to the patient, who receives a refund, either wholly or in part, from his or her insurer. In the process, private health insurers accept significantly higher prices than those under the statutory health insurance, which means that private patients are substantially more lucrative for doctors on average. *Secondly,* contracting medical practitioners can render private services to patients under the statutory health insurance at their request, known as "services at the request of the person obliged to pay", also referred to as individual health services (German acronym: IGeL) since the end of the 1990s. Services are to be borne privately if, according to state-of-the-art medical practice, they are not necessary in terms of required medically indicated treatment and, in addition, are not part of the legally binding catalogue of services of the health insurance funds.

A new development regarding these private services has been that several medical practitioners actively offer these additional diagnosis and treatment methods to patients rather than relying on requests from patients (40). The range of services offered is quite wide, including health services relating to travel, lifestyle and wellness medicine, anti-aging measures, screening and environmental medical examinations.

According to a representative survey taken in May 2004 among 3,000 insured persons of statutory health insurance from the age of 18, within the preceding 12 months almost every fourth insured person (approx. 16 million) under the statutory health insurance utilised or was offered such a service. In the process, the offers in question were not dependent on the health condition (subjective assessment of health) and not on the age of the patients. Instead, it was patients with a higher income and standard of education and generally women who most frequently stated they had been offered additional private services. The most frequent individual services offered were measurements of internal eye pressure by eye specialists as well as ultrasound examinations and supplementary early cancer detection examinations by gynaecologists, followed by blood and laboratory analyses as well as prescriptions of medications, remedies and auxiliary treatments (41). On the whole, gynaecologists, ear, nose and throat specialists and orthopaedic specialists are considered to be especially successful at selling IGeL services (40).

IGeL services are frequently justified by citing increased sophistication and expectations of the insured, yet the process of active advertising promotes the creation of new requirements on the part of patients. Meanwhile a second health market has developed, accompanied by intense marketing with the aid of business consultants and communication trainers, sales congresses, training seminars, video spots in doctors' waiting rooms, brochures and leaflets for surgeries, magazines as well as information available for download from the Internet (41).

Additional services accounted for privately can become problematic if:

- Non-indicated services are offered by the medical practitioner, arguing that they are necessary in medical terms;
- The services are imposed on the patient;
- To the patient, the dividing line between necessary and unnecessary medical treatment is not clear;
- The doctor exploits the fiduciary relationship with the patient to sell the latter the additional services in question;
- The additional services are already part of the statutory catalogue of services, with a shift thus taking place from statutory to private services;
- An additional service offered is subject to a danger of health risks which outweigh the achievable benefits (e.g. injections of vitamin and tonics or gristle-protecting substances or cosmetic surgery on adolescents);
- The processes applied are not effective;
- There is no transparency with regard to alternative offers and prices;
- The quality of the service rendered is not controlled, is undocumented and unknown;
- Suitable measures are offered at inappropriately high prices;
- The processes are not expedient and their inclusion in the catalogue of services has already been rejected (e.g. screening examinations on healthy persons, or pseudo-scientific methods used in oncology);
- Offering additional private services reduces the time available for consultation talks and necessary health care services and prolongs waiting periods.

There are indications that these issues are in line with daily practice, at least in part. Representatives of the medical profession themselves have criticised the lack of transparency in quality and costs of services as well as the practice of offering potentially dangerous services. The complication rate for IGeL services was also determined to be completely unknown (40). In a written survey taken among 1,000 women from the age of 14 on their experiences with gynaecologists, 25% stated that they had been offered additional private services (IGeL services), mostly including early cancer detection screening, e.g. mammography. 55% of the respondents indicated that they were dissatisfied with medical consultancy. Gynaecologists' surgeries were being inundated with technology and tests – yet the briefing given to patients concerning the consequences and risks were frequently deficient and sometimes even entailed a clear breach of law (42). The German government's representative on behalf of patients reported numerous cases in which services were billed privately and either refunded by the health insurance funds or which were not appropriate (43).

Information deficits widen social inequality in health care

In the case of treatment payable by the statutory health insurance, a ceiling is imposed on individual prices per case settled. In contrast, prices of private treatments are charged according to special private schedules of prices. These consist initially of fixed prices, which are multiplied by an increase factor depending on the effort involved in treatment. This multiplication factor ranges from 1.0 to 3.5, and sometimes is even higher. Up to 2.3, no justification is necessary vis-à-vis the patient, and the bandwidth starting from 2.4 is reserved for cases calling for above-average effort (44). The medical practitioner defines the exact factor, but the patient is entitled to negotiate the price. In actual fact, such price negotiations seldom take place, and in the traditionally paternalistic doctor-patient talks based on the benefits-in-kind principle, talks about prices of treatment are new and uncommon.

Additional private services occur particularly often in cases involving patients under the statutory health insurance receiving artificial dentition. Since the beginning of 2005, new remuneration rules have been in place to delineate statutory from private artificial dentition services; a distinction is drawn in principle between standard treatment (*Regelleistungen*), similar treatment (*Gleichartige Leistungen*) and dissimilar treatment (*Andersartige Leistungen*). In principle, and independently of the selected, actual treatment, the health insurance funds grant a fixed surcharge of 50% of the average costs of dentists and dental technicians in standard treatment. (If patient provides of regular dental check-ups, the fixed bonuses are raised by 20% or 30% of the euro amounts.) What is part of standard treatment was previously defined by the joint federal committee (*Gemeinsamer Bundesausschuss – G-BA*) and is intended to reflect what is medically necessary and adequate.

Services beyond standard treatment are charged privately. These are generally referred to as "similar treatment". If the services differ completely from standard treatment, the complete services ("dissimilar treatment") are charged exclusively according to the private schedule of prices, with the cost of standard treatment being refunded to the insured by the health insurance fund. In cases of similar or dissimilar treatment, the patient receives a private invoice from the dentist based on a prior arrangement with the dentist. At this moment, the patient is not aware as to whether the dentist has charged an appropriate price since the patient has no information on the usual and appropriate price-benefit ratio and on any treatment alternatives. In such cases, many health insurance funds offer advisory services, but the situation remains very complicated as far as patients are concerned. A good status of information, and good communication and negotiating skills can have a positive impact on own treatment solicited. It is all the more important in particular to support patients with a lower standard of education and lower incomes.

An innovative alternative to this less than transparent situation is a new company with a virtual market place on the Internet. Based on medical results already determined and on an existing therapy and cost plan or quotation from a dentist, patients with Internet access are in a position to obtain alternative cost quotations from other dentists in their region. Both patients and dentists initially remain anonymous. After five days, the patient receives the three most favourable cost estimates for selection. If the patient has made no choice within 10 days, the process is terminated. There is no commitment on the part of patients to opt for a cost estimate given by a particular dentist. If the patient decides in favour of an offer, the contact data are exchanged between the patient and the dentist. After treatment, the dentist and patient give ratings to each other. In return for the use of the market place, the company receives a certain remuneration from the dentist, based on a price list. The patients are called upon to pay a nominal charge of 2.50 to 7.50 euros per instance used. The company wants to make prices and services transparent and comparable so that the best combination of price and evaluation profile of the dentist in the patient's region receives the award for treatment. In an unusual manner, this market place shows just how much the health system is still lacking in transparency and patient-friendliness at present. Perhaps offers of this kind will also contribute towards making the complicated system better and more easy to understand (45).

Outlook

Citizens can only be expected to exhibit intelligent user behaviour if the quality of the increasingly extensive services on offer is adequately documented and made accessible to them in a readily comprehensible form (4). The examples ranging from sub-standard to dangerous health information show that health-related decisions play a very important role; this applies both to planning decisions and to health care decisions at quite different levels of the health system. There simply is no alternative to launching an offensive to foster transparency in the German health system as evidenced by the very limited effectiveness of past reforms of the German health system, which have failed to prevent today's crisis relating to finance and responsibilities.

Concerns that excessive transparency and information available on problems regarding medical treatment might be detrimental to the reputation of the system as a whole and to people's confidence in service providers and institutions are unfounded. To have confidence in a service, people do not necessarily need to believe in the sheer perfection of the service. Transparency and responsibility alone already contribute towards confidence building (24). In contrast, confidence is lost if operators under the system – and this applies both to funding entities and to service providers) – exploit their information lead over patients and other parties concerned in order to gain economic advantages. Patients lacking

in empowerment and whose request for autonomy is not respected will abandon a solidarity-funded health care system and will raise doubts concerning the future of a social health insurance system.

In the wake of the latest health reform, German health policy-makers have taken the first steps in the direction of more transparency and opportunities for choices and decision-making empowerment of citizens, insured persons and patients. If the reforms are consistently implemented, numerous parties affected should witness discernible cultural changes. This may contribute towards changing traditionally paternalistic health system in Germany, which is geared to the needs of providers rather than users, but further efforts will need to be made.

Some observers do not assess this trend as a paradigm change but as an attempt by political decision-makers to justify the increase in patients' own contributions and in benefit curtailments (15). However, the health policy motive will not be of decisive importance if this trend should ultimately contribute to more transparency and accountability, health citizenship, increased health literacy and empowerment (46) in the interests of the New Public Health. The health sciences should proactively accompany further developments with care and endorse them accordingly.

EXERCISES

Task 1. In groups, students collect information on the quality of medical treatment in a selected region and discuss the chances and access channels of the various population groups to such information.

Task 2. Analyse status of health citizenship, population access to health information, quantity and quality of health information in your own country.

Task 3. Perform research on independent patient information in your country, sort the information according to topics, media used and the institutions issuing them, and discuss the results with the full class.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH **A Handbook for Teachers, Researchers and Health Professionals**	
Title	**Health and Well-being of Vulnerable Peoples in South - Eastern Europe**
Module: 8.4	**ECTS (suggested): 0.50**
Author(s),degrees, institution(s)	**Edward J. Eckenfels** Emeritus Professor Rush University Medical Center Chicago, Illinois **Peter DeGolia, M.D.** Associate Professor Metrohealth Cleveland, Ohio
Address for Correspondence	Edward J. Eckenfels 5344 S. Hyde Park Blvd. Chicago, Illinois 60615 U.S.A. Tel.: 773-667-5986; 773-667-6986 E-mail: ed_eckenfels@rush.edu
Keywords	Public health, vulnerable populations, health care system, systems design
Learning objectives	After completing this module students and public health professionals should: • Conceptualize a model for addressing the health care needs of vulnerable populations; • Assess current problems of an existing health care system; • Design essential features of an ideal health care system; and • Identify obstacles than need to be address for making this approach feasible.

Abstract	Using vulnerable populations in SEE as a base, this module offers a model for addressing issues and needs that are fundamental for improving the health of the people under consideration. The proposed approach is framed in terms of a serious critique of the existing system, contrasting that critique with an ideal model for improving the system, and anticipating the obstacle and barriers that must be overcome. This model is based on the principles and methods of public health not only as a free-functioning discipline but as a foundation in the learning and development of future health professionals. The model include four interrelated components: 1) a blueprint for an attainable plan for improving the health of vulnerable people in SEE and to help them to have some control over their own lives; 2) an assessment of the problems in the current health care system related to the elderly, children and unemployed, and the poor, as well as the refugees, displaced persons, war victims and Roma population; 3) essential features of an ideal health system for SEE, which should be: multifaceted with multiple levels of operation; interdisciplinary with combination of various disciplines in a team approach; holistic in the delivery of medical services to all potential users of the system; as well as the process of intervention to be implementable at community level, grass-roots level and be self-perpetuating, and must be subject to evaluation; and 4) an awareness of the obstacles that must be addressed to develop such a system, first of all the archaic and inflexible medical educational system, the ineffective and inefficient health care system, and lack of standard methods for organizing population data.
Teaching methods	A review of the basic components of this paper can be conducted in a lecture, but, more effectively, in a series of small group discussions. The key learning attribute is the exercise which should be undertaken with rigor and imagination.
Specific recommendations for teachers	The exercise should be grades like an essay or paper with important feedback from the teacher. Ideally, students should discuss their papers in a small group seminar.
Assessment of students	The final mark should be derived from assessment of the theoretical knowledge (oral exam), contribution to the group work and final discussion, and quality of the seminar paper.

HEALTH AND WELL-BEING OF VULNERABLE PEOPLES IN SOUTH EASTERN EUROPE

Edward Eckenfels, Peter DeGolia

Preamble

The aim of this module is to present a modest but practical approach for addressing the needs of vulnerable populations in Southeastern Europe (SEE).

The model on which this module is based follows four interrelated components: 1) a blueprint for a plan that is attainable; 2) an assessment of the problems in the current health care system; 3) essential features of an ideal health care system for SEE; and 4) an awareness of the obstacles that must be addressed to develop such a system.

The foundation of a reasonable plan

To be effective, an approach to helping vulnerable people must be open and flexible, i.e., heuristic. Too often, public health professionals become so obsessed with measurement, they lose sight of what they are trying to accomplish. As Soros points out, *"There are some objectives that can be measured by quantitative indicators such as mortality and literacy, but it would be limiting and distorting to confine the objectives only to those that have quantitative indicators" (1).*

In addition, proposed projects for addressing emerging health problems like vulnerability tend to be either too broad or too specific. The conceptual scheme we have devised is more middle range-practical without losing sight of the human condition that is at stake.

We also try to keep in mind a synthesis between an awareness of the complexity of the issues we are trying to tackle (as described in the section on the components of an ideal system and the section that identifies the problems that need to be addressed) and the reality of what can be done as quickly and as effectively as possible (as outlined in the eldercare model and applied to other vulnerable groups in the companion paper). We further believe that this dialectic will become clear in the course of what we are presenting.

In sum, our plan is multifaceted-there is a paradigm, a method for using the

model's concepts for addressing a particular problem (the health of vulnerable people), and a system for deriving components that are applicable to the specific situation (improving their health and well-being). Moreover, what is of greatest significance is to help the vulnerable people of SEE to have some control over their own lives.

The vulnerable populations of South-Eastern Europe (2)

All of the people of SEE are vulnerable. This is the result of many decades under an oppressive, rigid, bureaucratic Communist regime, sanctions imposed from the West, and little opportunity for improving one's status through education and occupation. All of the catastrophes of the 1980s and 1990s-war, ethnic cleansing, corruption—stem from that system. Moreover, the full impact of that situation, and its accompanying disasters, are far from over. But there are particular groups—the truly vulnerable—who are especially susceptible to disease and illness. And these groups are growing rapidly. For example, the more typical groups--the elderly, children, the unemployed, and the poor—have been joined by the emergence of refugees, refugee returnees, displaced persons, war victims (invalids), demoralized soldiers, and Romas (gypsies).

When it comes to common demographic characteristics certain patterns emerge. First, the population is aging. This is due, partly, to a decline in people 45 years of age and under. Multiple factors account for this decline. For example, the reduction in birth rates in all of the countries that were formerly the Socialist Republic of Yugoslavia is a function of the forced migration of fertile women and pre-school children. Many young men died in the wars in Bosnia, Croatia, and Kosovo. There are also large numbers of disabled people in most of these countries. In the war-torn places many of them are victims from these conflicts. Unemployment is extremely high, as much as 40% in some places. Where there is unemployment there is poverty, and the majority of these populations live at or below internal estimates of the poverty line.

An important geographical factor is that most of the SEE countries have a few large urban areas with the rest of the land mass rural. The greatest population density is found in the few big cities, mostly in the capitals, resulting in a fairly even distribution with about half of the populations urban and half rural. Because of the current economic climate, there is a large migration from the rural areas to the cities based on the unfounded notion that there is work in the cities. The situation is compounded by the frequent movement of refugees and displaced persons from one place to another. Although refugee camps have sprung up in many countries, it is very hard to keep accurate counts of these mass movements.

The Stability Pact for South Eastern Europe is attempting to address this problem in a cooperative and integrated manner (3). The December 2001 conference on Public Health and Peace held in Skopje, Macedonia in which a declaration was drawn up by representatives of over 15 countries is one example (4). Therefore, with these and similar existing data, we are proposing a multifaceted approach for addressing the health problems of vulnerable peoples with an initial focus on the plight of the elderly.

Components for an "ideal" system

The components of a health care system that we have selected provide a framework for conceptualizing major levels of integration. We contend that an awareness of such levels allows one to delineate problems that hamper the system's functioning and, at the same time, serves as a basis for anticipating obstacles that can interfere with proposed interventions.

It must be multifaceted

No program to help the vulnerable can be effective without taking into account multiple levels of operation. The training and education of the persons required to perform the service must go hand-in-hand with the practice. A learning-service focus incorporates these two essential elements. Furthermore, an administrative structure is needed to integrate these two components in an efficient and effective manner. Such experiential learning can only be judged through its applicability. That is, by demonstrating that it is working from the response of the vulnerable group being served. Furthermore, the results of this program must be made available to others who are struggling with similar problems. The value of the intervention becomes even clearer by its ability to be replicated. In sum, programs designed to help vulnerable populations must work on multiple levels simultaneously in which the process is consistently accessed, outcomes are codified, and the findings are disseminated to colleagues.

It must be interdisciplinary

Effective interventions aimed at decreasing vulnerability require a combination of knowledge and skills. This is best demonstrated by a team approach that involves such disciplines as medicine, nursing, and social work not only in the actual service provisions but in the training process as well. Other disciplines also play a significant role in the design, execution, and evaluation of the program. Epidemiologists and biostatisticians provide the database necessary to anticipate the magnitude of the situation (e.g., the number, gender, ages, and distribution of the elderly) and ways of determining the effectiveness of the interventions (e.g., access, treatment,

and follow-up). Social scientists can also play an important role providing insights into the role played by culture, ethnicity, and socioeconomic status.

It must be holistic

On a local, regional, and national level, interdependence must be promoted and interdependence requires cooperation. These same principles operate when it comes to interventions in the health sphere. A lot of misunderstanding of this essential feature has lead to fragmentation, redundancy, and inefficiency in the delivery of medical services to all potential users of the system. Any approach to reaching the multitudes of vulnerable peoples throughout SEE must be based on cooperation, collaboration, reciprocity, and, in short, partnerships.

A major hurdle in this regard is the gap that exists been the academic and clinical practice of medicine. Bickering, territoriality, and elitism must be resolved so all the important players in the process are on the same wavelength. To facilitate this process, new and open organizational structures need to be established whereby participants understand their duties, respect those of others, and work in harmony to achieve the desired goal. Other important components are the government and the legal system under which resources are distributed, funds are allocated, and patients' rights are protected.

Recognizing that a project to help vulnerable peoples requires a holistic perspective if it is to work leads a better understanding of how important that perspective is to health care reform in general.

It must be subject to evaluation

There is also a need to determine just how effective the intervention actually is. Regardless of how innovative a project is, planning and implementation functions best when the process follows the acceptable format of program design that includes aims and objectives, data collection, outcomes, and a report that can be used in the making of policy. This latter point cannot be overstated. Unless the findings are utilized in making health care policy, they remain just another study of interest but no practicality. It is important to keep in mind that empirical data and humanistic efforts are not in conflict. Demographic, mortality and morbidity, and economic data are essential to sustain a humane and just system.

It must be implementable

By implementable here, we are referring to a process that has relevance on the most basic levels. More specifically, it reaches the population with the greatest need; it can function at the community-level; it has the approval and cooperation of individuals at the grass-roots level; and, because of the realization of the need for strong civic arrangements to keep it functioning, it is self-perpetuating.

This process is deceptive and complicated. Ethnic and cultural strife still exist. In some regions physical conflicts emerge periodically and could become full-scale conflicts once NATO troops leave. Human rights and social justice guaranteed by legal protection are practically nonexistent in some areas. Finding ways of overcoming these prejudices is essential if adequate health care is to be provided. The need to emphasize the health of all the people as a way of promoting a better and lasting quality of life is the driving force behind real attempts at reform.

Obstacles that need to be addressed

We have selected four problems out of many, that we feel have particular significance for the types of activities we are recommending. Moreover, they serve as a background for framing our model of eldercare.

The medical educational system is archaic and inflexible

The importance of the relationship between how health care professionals are trained and how they practice their professions in indisputable. In most countries of SEE, however, the education of physicians has gone on without any systematic plan for improvement. Using vulnerable populations as an example of the current crisis in health care, it becomes clear that the health care education system is not responding adequately to need. The most highly trained and skilled advanced doctors are concentrated in the academic health centres, which tend to be located in the capital cities. These institutions, as part of the main university, are the chief source of training and education. As such, they tend to "cream off" the best students who stay on to teach and do research. In addition, there is a strict hierarchy, based on status and position that is very exclusionary with the professors and department chairs on top. Primary care and family physicians are looked down upon. One indication of this attitude is the belief found among many university faculty members, that there is no need for primary care providers since all of the health care can best be provided by the existing system.

Little interest is given to the practice of medicine outside the walls of the academic health centre. Misdistribution of physicians would be even worst if some governments hadn't been able, by way of proscription, to place some doctors in less desirable regions, primarily rural settings. There is also a complete lack of

any interdisciplinary team training, which is essential for reaching vulnerable populations. This state of affairs leads not only to separateness but competition. The curriculum tends to be rigid and fact-laden. Health management skills are omitted. There is little patient education, if any, taught. The core values of the profession are taken for granted. No concern is given to leadership training. In short, the existing educational system continues to function as a rigid hierarchy of power and domination that is not geared to deal with the imminent and emerging health problems that are the consequence of war, chaos, and deprivation.

There is a concern among many medical educators that the medical education systems need to be reformed from top to bottom. Although the basic sciences and pathophysiology are excellent, tired and bored professors teach them in over-crowded and decaying lecture halls. Lip service is given to social medicine and community health. Ambulatory care experiences are limited. A population health perspective is missing. (Those who are interested in these disciplines must go to institutions—schools of public health—that specialized in these fields for further training). It has been suggested that reforming the educational environment can begin by introducing such pedagogical innovations as problem-based learning, evidence-based medicine, and electronic information systems. These methods have been shown to improve the learning and development of future health professionals (5).

Clinical services suffer from the same problems

There is a maldistribution of health care providers. The specialists are concentrated in the urban medical centres whereas there is an overall lack of primary care providers who are most often in the more rural areas. When it comes to referrals, communication, and collaboration, there is little or no clear relationship between primary care practitioners and specialists. Such a system suffers from fragmentation. Adding to the seriousness of the situation is the fact that, as a group, health care providers are practicing under the worst possible conditions which include: an acute shortage of resources, materials, and equipment, long hours and ridiculously low pay all of which have a strong effect on morale and self-esteem.

There is also a serious lack of the appropriate mix of personnel at all levels. A conflict continues to exist between the “academics” and the “practitioners”. Similar hostilities exist within and among institutions and result in a lack of cooperation, especially in those situations where it is most needed. Such an environment is demoralizing, depleting, and unproductive, leading to fragmentation and cost ineffectiveness.

The health care system is ineffective and inefficient

When viewed in the broadest sense, the organization and structure of the health care delivery system doesn't look too bad. There is a good ratio of hospital beds to population, about 3.5 to 1,000 patients in most countries; occupancy rates run around 70%, and the average length of stay is about 10 days. But the reality of the situation is quite different. Quality of care in hospitals, ambulatory care settings, and clinics is quite variable. Again, this reflects how the personnel are trained, where they work, and the kind of population they serve.

The old bureaucratic system of Communist countries, with its inflexibility, rewarded people not so much for their competence as for their political identity. These systems tended to be self-perpetuating, politically motivated, and corrupt, leaving many skilled people out.

The ideal of universal health care has broken down. This was already happening in the 1990s. Moreover, because of the deeply entrenched bureaucracy and exclusiveness, a two-tiered system of care has emerged. Since hospitals and medical staff were incredibly underfunded, they began seeking private patients.

The outrageously low salaries of health professions certainly contributed to the situation. Under these conditions, no one seems to have the energy, will, or responsibility to make sure those without health care can get it. The situation is compounded by a blatant maldistribution of funds and resources. Even a cursory look at how the system functions reveals great gaps and redundancies in the services being provided.

The typical Health Insurance Law, in theory, provides medical services through three types of insurance plans: compulsory, supplementary, and voluntary. However, inequity of funding is not uncommon because of conflicts between regional and centralized mechanisms of control. In other words, how much an institution received depended on where it is in the political sphere, and who their benefactors are. In short, financial constraints and lack of an integrated approach has resulted in unequal access to health resources and fragmentation of services.

There is a lack of any standard methods for organizing population data

Like their health care practitioner counter-parts, public health and social medicine professionals are well trained and extremely competent. However, when it comes to data collection, analysis, and reporting, they are very handicapped by lack of resources and personnel. They have done an excellent job organizing the data they have. They would, nonetheless, be the first to admit that the data must be interpreted with caution. This is due to a number of factors.

First, there is no standardized system for making comparisons (to address this problem there is currently a proposal to employ internationally recommended in-

dicators). Second, there is a great variability in the quality of the data collected. Vital statistics are unreliable and vary by country. It is very difficult to ascertain health status from existing information as well as determine social-economic status. Point prevalence indicators on mortality, let alone morbidity, are frequently more estimates than actual counts. Third, crude and outmoded data collection techniques are more the rule than the exception. A special concern is how to find particular cohorts, i.e., where are they? Refugees and displaced people are frequently in flux. To find them requires careful concentration and personnel to follow-up on any hints of where they might be found. For epidemiological purposes, a close to accurate count is needed to serve as a denominator in any analysis and projections.

If one had to pick one particular focus, it would be the need for a broad, systematic overview of the current state of health and well-being in SEE. Current assessment tends to be narrow and self-serving, for example, "How can we think of anything else when our own needs are so overwhelming?" Our motto, in response to this, is "The health of the public is a catalyst for peace and development". In other words, political leaders, policy makers, and health professionals must realize that improving health care for everyone raises their standard of living including education, jobs, food, clothing, housing, and life style.

Finally, there is one beacon of light that shines through this maze of problems and issues: public health. Not only is this discipline the conduit for understanding the social determinants of health and illness, but its principles and methods are fundamental to all health care providers in the practice of their profession. In short, it enables them to treat the whole person in the social context of their life.

EXERCISES

Task 1: Go to the Healthy People 2010 website (www.healthypeople2010.gov) and review the report in general. After the review, go the sections: Objectives for Improving Health (Part A: Focus Areas 1-14) and (Part B: Focus Areas 15-28). Pick two focus areas from each part (a total of four) and, on the basis of the format of this paper, do the following:

- Apply each objective to your community, region, or country with a brief rationale for the objective;
- Describe what is needed to achieve each objective;
- List major obstacles that have to be overcome to achieve the objectives;
- Provide specific tasks to be undertaken to overcome these obstacles;
- Write a brief summary of your conclusions.

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RECOMMENDED READINGS

1. Health Services Research: An Anthology, Kerr L. White, Editor-in-chief, Pan American Health Organization, WHO, Scientific Publication No. 534, 1992.

This 1081 page anthology is a superb compendium of a broad range of research studies, articles, and essays that touch on almost every aspect of health services research.

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HEALTH DETERMINANTS IN THE SCOPE OF NEW PUBLIC HEALTH A Handbook for Teachers, Researchers and Health Professionals	
Title	**Health Determinants in the Health Policy of the European Union**
Module: 8.5	**ECTS (suggested): 0.50**
Author(s), degrees, institution(s)	**Rostislava Dimitrova, MD** Chief Health Policy Advisor National Assembly of the Republic of Bulgaria **Bernard Merkel, PhD** Head of Health Strategy Unit DG SANCO, European Commission
Address for correspondence	Bernard Merkel European Commission Rue de Geneve 1 Brussels Country Belgium Tel: + 32 2 299 21 00 Fax: + 32 2 295 13 63 E-mail: bernard.merkel@cec.eu.int
Keywords	European Union, Public Health, Determinants, Tobacco, Life styles, Health status
Learning objectives	After completing this module students and public health professionals should (for example): • Aware of the development of eu public health policy and its legal aspects; • Recognise problems facing eu; • Increase knowledge of possible eu instruments and approaches in this field; • Understand the eu role in health; • Differentiate national and eu competences; and • Improve understanding of eu integration process.
Abstract	This paper sets out the history of EU public health policy development over the last twenty years, concentrating particularly on the approach taken to tackling disease prevention and health determinants. It shows how the changing legal basis for EU-level action influenced the kinds of initiative and approaches taken by the European Commission in proposing a succession of actions and programmes. Finally, it emphasises the problems that have to be dealt with at EU level, in particular the enormous differences between the situations in Member States.

Teaching methods	Teaching should be mainly by interactive seminars on basis of students having studies set texts about EU policy developments. Possible questions for seminar discussions and exercises: What actions are possible at EU level? Are health determinants best tackled at local, national or supra-national level? Does this depend on the kind of determinant? What are the possible strategic approaches and actions that can be taken? What success criteria can be used?
Specific recommendations for teachers	It is recommended that this module is organised within 0.50 ECTS.
Assessment of students	Assessment should be based on seminar papers, discussions and oral presentations.

HEALTH DETERMINANTS IN THE HEALTH POLICY OF THE EUROPEAN UNION

Rostislava Dimitrova, Bernard Merkel

Historical review of the development of the European health policy

A historical review of the development of health policy at European level and of the legislative base for its implementation shows that the EU has made significant progress in its efforts to undertake common actions towards better health outcomes for European citizens. It is notable that progress has been made despite a growing but still quite limited legal competence – and even a limited political competence. In view of fact that health is a mixed competence (i.e. one shared between Member States ands the EU (strictly speaking the European Community) a strict integrationist approach based on harmonisation of national laws and systems is not applicable in health at European Union level. The European Union has instead therefore had to proceed by finding ways in which to identify common issues and goals and to increase cooperative actions between Member States, to stimulate and encourage action and to establish consensus, often on the basis of 'soft law' (recommendations, conclusions, and guidelines) which are not binding but which have some persuasive force.

The approach taken to tackle health determinants typifies this broader approach and also reflects the gradually evolving position the different stages of the development of the EU legal base in health.

Health policy at EU level stems originally from the health and safety provisions in he ECSC and Euroatom Treaties, and later from internal market considerations, where free movement of people and goods required some degree of coordination in public health. The first actions were implemented in the 1980s. Despite the absence of a clear legal base, significant health policy initiatives were taken in several areas: notably programmes on cancer, drug abuse and on HIV/AIDS (1). These were accompanied by initiatives on pharmaceuticals, research (2), and social security and health insurance for people travelling to other EU Member States

The Maastricht Treaty (Art. 129) made public health an official competence for the first time. It stated that "the EU shall contribute towards ensuring a high level of human health protection by encouraging cooperation between Member states and,

if necessary lending support to their action. Action shall be directed towards the prevention of diseases, in particular the major health scourges, drug dependence, by promoting research into their causes and their transmission, as well as health information and education". Health protection requirements shall thus form a constituent part of other policies.

The Maastricht Treaty (Art. 129)

PUBLIC HEALTH
Article 129
1. The Community shall contribute towards ensuring a high level of human health protection by encouraging co-operation between the Member States and, if necessary, lending support to their action.
Community action shall be directed towards the prevention of diseases, in particular the major health scourges, including drug dependence, by promoting research into their causes and their transmission, as well as health information and education.
Health protection requirements shall form a constituent part of the Community's other policies.
2. Member States shall, in liaison with the Commission, co-ordinate among themselves their policies and programmes in the areas referred to in paragraph 1. The Commission may, in close contact with the Member States, take any useful initiative to promote such co-ordination.
3. The Community and the Member States shall foster co-operation with third countries and the competent international organizations in the sphere of public health.
4. In order to contribute to the achievement of the objectives referred to in this Article, the Council:
- acting in accordance with the procedure referred to in Article 189b, after consulting the Economic and Social Committee and the Committee of the Regions, shall adopt incentive measures, excluding any harmonization of the laws and regulations of the Member States;
- acting by a qualified majority on a proposal from the Commission, shall adopt recommendations.

The new powers were important in that they enabled a strategic EU response to public health challenges for the first time, and it was thus possible to move beyond carrying out a number of one-off and diverse actions and begin framing an overall coherent approach. However, the legal provisions were nonetheless very limited. First, they put the main focus on public health, and in turn this was defined as essentially actions on prevention and promotion rather with the implicit exclusion of anything on treatment, care and rehabilitation. Second, there was a strong focus on particular diseases which was itself a limitation. Finally, the Article contains a strong statement insisting that nothing should be done that went

against the responsibilities of states for their health systems. In this way Member States were both opening the way for EU-level initiatives and trying to delimit carefully the scope of such action.

In November 1993, the European Commission published its response to the new health provisions in its Communication on the Framework for action in the field of public health'. This document identified eight areas for action, which were each be the subject of specific but interlocking programmes. The new approach was generally welcomed and over the next few years these programmes were gradually introduced. Six of these were disease- specific: Cancer, Drugs, AIDS and other communicable disease, Accidents and injuries, Pollution-related diseases and rare diseases. More radically, and in line with concepts being promoted particularly by the WHO and embedded for example in the WHO Ottawa Charter 1986, the Commission also proposed two further horizontal programmes. The first was on Health Promotion, education and training, which focused on promoting healthy life styles and behaviour, particularly in the areas of nutrition, alcohol consumption, tobacco and drugs, and also on medicine and medication. The second was on Health Monitoring, which covered the areas of health data and indicators, and epidemiological surveillance of communicable diseases.

This more horizontal approach was also to some extent reflected in the cancer programme. In recognition of the strong link between cancer and lifestyles, a special part of the "Europe against Cancer" action plan is dedicated to alcohol consumption, diet, and most importantly, active and passive tobacco smoking. This ran in conjunction with some early EU legislation on tobacco (3) which led to more substantial legislation on tobacco advertising and warning labels (4).

These eight programmes created the basis for effective and substantial EU action on public health. However, they could be criticised because they were small-scale, and did not cover the whole field adequately or in a fully coherent and logical manner. For example, heart disease could be addressed only indirectly via the horizontal programmes, whereas cancer had its own programme.

The Amsterdam Treaty 1997 provided the stimulus to develop a more solid and comprehensive EU public health strategy since it expanded the provisions of the previous Treaty (Article 129). The new Article (152) stipulates that " a high level of human health protection shall be ensured in the definition and implementation of all Community policies and activities" It also states that legally binding measures action can be taken on a range of issues, including blood, tissues and substances of human origin, and stresses co-operation between Member States.

The Amsterdam Treaty (Art.152)

PUBLIC HEALTH

Article 152 (ex Article 129)

1. A high level of human health protection shall be ensured in the definition and implementation of all Community policies and activities.
Community action, which shall complement national policies, shall be directed towards improving public health, preventing human illness and diseases, and obviating sources of danger to human health. Such action shall cover the fight against the major health scourges, by promoting research into their causes, their transmission and their prevention, as well as health information and education.
The Community shall complement the Member States' action in reducing drugs-related health damage, including information and prevention.
2. The Community shall encourage cooperation between the Member States in the areas referred to in this Article and, if necessary, lend support to their action.
Member States shall, in liaison with the Commission, coordinate among themselves their policies and programmes in the areas referred to in paragraph 1. The Commission may, in close contact with the Member States, take any useful initiative to promote such coordination.
3. The Community and the Member States shall foster cooperation with third countries and the competent international organisations in the sphere of public health.

4. The Council, acting in accordance with the procedure referred to in Article 251 and after consulting the Economic and Social Committee and the Committee of the Regions, shall contribute to the achievement of the objectives referred to in this Article through adopting:
(a) measures setting high standards of quality and safety of organs and substances of human origin, blood and blood derivatives; these measures shall not prevent any Member State from maintaining or introducing more stringent protective measures;
(b) by way of derogation from Article 37, measures in the veterinary and phytosanitary fields which have as their direct objective the protection of public health;
(c) incentive measures designed to protect and improve human health, excluding any harmonisation of the laws and regulations of the Member States.
The Council, acting by a qualified majority on a proposal from the Commission, may also adopt recommendations for the purposes set out in this Article.

5. Community action in the field of public health shall fully respect the responsibilities of the Member States for the organisation and delivery of health services and medical care. In particular, measures referred to in paragraph 4(a) shall not affect national provisions on the donation or medical use of organs and blood.

Programme of Community action in the field of public health (2003-2008)

In light of the new legal base, the Commission proposed a public health programme which would unify and build upon the eight previous programmes. This six-year programme was adopted in September 2002 (5), and runs from 2003 - 2008. It represents a major step forward for the implementation of public health actions at EU level. It provides for the integrated development of a strategy aimed on the one hand at ensuring a high level of health protection in all Community policies and actions and, on the other, at supplementing and coordinating policies and actions carried out by the Member States in the field of health surveillance and information systems, combating transmissible diseases and disease prevention.

It takes essentially a horizontal approach being based upon three strands of action. The first of these is improving health information with the aim of ensuring that the EU has an adequate basis on which to make policy by working to establish indicators and to improve coverage and comparability of health data throughout the EU. The second is responding rapidly to health threats by building up European capacity for surveillance and strengthening cooperation and interchange. Thirdly, there would be a strand of action explicitly devoted to tackling health determinants. In this way there would be a clean break with a disease - centred approach. Diseases representing major burdens in terms of morbidity and mortality would be addressed by mean of their underlying determinants, including life-style, socio-economic issues, environment and genetic factors.

The programme is now underway and is proving to be very successful in influencing the health policy agenda and in fostering a huge range of activities involving all 25 Member States, together with the three EFTA countries and the accession and candidate countries. However, the programme and other health policy measures of the EU still do not provide a fully adequate and comprehensive response to the new challenges being faced. For one thing the programme has limited funding and its annual project budget is heavily over-subscribed. For another as it was conceived before the large enlargement of the EU in 2004 it does not necessarily reflect the needs and concerns of the ten new Member States which generally face more serious health problems than the 15, and still less those of the accession and candidate countries. Finally, in practice, it is not proving easy to tackle the burden of disease simply through a horizontal determinants approach. There is a strong argument that such an approach has to be complemented by specific actions focused on preventing or reducing the impact of particular diseases where national efforts alone are likely to be insufficient.

The position in the enlarged EU in relation to health status shows how wide are the gaps between the ‘best’ and the ‘worst’ countries. And this central issue of significant health inequalities provides the context for further development of

health policy at EU level. The following examples show the extent of the problem:

- Life expectancy for men in EU-25 varies from 64.8 (Latvia) to 78 years (Sweden) (6);
- The incidence rate of **lung cancer** varies 5 fold between EU countries (7) (5 times higher in Hungary (102 per 100,000) than in Sweden (21);
- The incidence rates of **ischemic heart disease** for women are almost 8 times higher in the Slovak Republic than in France (7);
- Example of a **communicable disease related to poor socio-economic conditions**: the incidence rate of **tuberculosis** varies 17 fold between EU countries (8) (17 times higher in Lithuania than in Sweden (86/100,000 people in Lithuania, 5.1 in Sweden).

A key factor to be considered in policy development is the changing disease pattern in Europe - characterised by the **increasing burden of avoidable diseases** related to life-style and addiction, for example tobacco smoking, alcohol consumption, drug use, and nutrition,, the environment, or to socio-economic factors, which requires a coordinated European response.

In addition we are also seeing the renewed spread in Europe of threats such as HIV as well as a realisation of the necessity to tackle the large burden of mental illness, both by improving treatment and care and by boosting preventive interventions.

In this context, in July 2004, the Commission launched a reflection process/ consultation entitled "Enabling good health for all, a reflection process for a new EU health strategy".

This process generated a major debate in the EU and beyond with close to 200 contributions mainly from national authorities, NGOs, universities, citizens and companies. A number of Ministries of Health participated in the reflection process. The largest proportion of participants represents European or national NGOs active in the field of health. Approximately 1/4 of all respondents including Ireland, Sweden, the Netherlands, Germany, the UK, Lithuania Malta and Poland urged the EU to **pro-actively promote health and prevent illness.** Measures proposed include the need to focus on children and teenagers, to implement a nutrition/obesity strategy, to tackle smoking and alcohol, to address a wide range of issues affecting health and to act on important diseases including cancer, respiratory and cardiovascular diseases.

Proposal for a new Programme of Community action in the field of Health and Consumer protection 2007-2013 (9)

Following this consultation the Commission made a proposal in April 2005 for a new Programme from 2007-2013. The strategy and programme proposal bring together and extend the current EU Public Health Programme and the current programme in support of EU consumer policy. Applying the joint approach in consolidating two programmes into one, the Commission aims to achieve synergies between health and consumer policies.

The new Programme includes provision for the reinforcement of the health determinants strand and to introduce a new strand on disease reduction to complement it, thus achieving synergies between health promotion and diseases prevention.

Promoting good health will require a number of actions. This includes tackling both the life style factors and addictions that undermine health (e.g. smoking, alcohol, unhealthy diets) and broader socio-economic and environmental health determinants. The overall approach to pursue this objective consists of a series of Community strategies to tackle the most important determinants, such as nutrition and obesity, alcohol abuse, tobacco smoking and drugs (10) as well as HIV/AIDS (11) and reproductive health.

Socio-economic factors such as poverty and working conditions will be addressed by actions to disseminate best practice and to integrate health inequality issues in other policies. Environmental actions will build on the environment and health action plan 2004-2010, and focus on indoor air quality, environmental tobacco smoke and health outcomes linked to the environment.

As many problems originate in childhood, a life-cycle approach will be used to focus on young people's health. In addition, actions on the impact of ageing on health and healthcare demand will be proposed.

Lastly, the Commission will develop thematic platforms bringing together Member States and stakeholders and different actions on specific determinants.

The complementary work on disease reduction will focus on a number of diseases, including mental illnesses, cancer and cardio-vascular diseases, which represent a major share of the EU disease burden. Action to tackle such diseases can be taken at EU level when this provides added value to national actions or when cross-border action is justified in terms of efficiency, as with rare diseases. Actions to be taken include support for primary prevention eg in relation to information and education as well as secondary prevention e.g. improvement of screening and early detection programmes through exchange of good practice, platforms, studies and networking. Synergies are envisaged with the 7th Framework Programme for Research which will begin in 2007.

To help reduce accidents and injuries, preventive actions, campaigns and a strategy focusing on particular risk groups and situations will be proposed.

It is also worth noting that measures targeting specific diseases, in particular mental diseases and HIV/AIDS may also help reduce discrimination/stigma against **vulnerable EU citizens** suffering from these diseases. In turn, this may, indirectly, facilitate their access to employment or at least their acceptance in society.

Health action under the two strands "health determinants" and "preventing diseases" aims to help reduce illness, which leads not only to an increase in quality of life for citizens, but also to potential savings in national healthcare costs.

- National authorities in EU-15 spend 135 billion euros every year on **cardiovascular diseases** (12) including 8 million disability adjusted life years lost (13);

- National authorities in EU-15 spend €102 billion on the direct and indirect costs of **respiratory diseases** (14);

- The cost of **mental health** alone is estimated at 3% to 4% of GDP (15).

At a time when the continuous growth in healthcare costs is increasing pressure on national public authorities and raising the need for cost-efficiency measures, analysis e.g. on the cost-effectiveness of prevention and promotion measures can help Member States realise important savings.

Against this background activities in relation to health infrastructure, promotion and prevention will now be able to be covered by the EU structural funds. This is set out in Art 4 (8) of the proposed regulation on the European Regional Development Fund (14 July 2004.) being discussed in the context of the financial perspectives exercise 2007 -2013.

Conclusion

EU health strategy is relatively new and still in the process of development. From the early small-scale and one-off initiatives it is evolving into something much more comprehensive and strategic. This reflects a number of parallel trends and developments: the gradually consolidating legal base, the enlargement of the EU with the consequent requirement to reorient action to fit the needs of all Member States, and not least the growing awareness that the EU could play a key role in tackling deep-seated health problems to complement the efforts of the individual states.

One element in this evolution of policy has been the added weight given to consideration of how to tackle health inequalities and the burden of disease. This has led first to putting a greater emphasis on taking a horizontal approach and looking to find intersectoral ways to promote health and prevent disease. More recently, however, a more differentiated approach has been adopted attempting to complement the efforts of Member States by both taking horizontal action addressing a range of health determinants with more tailored initiatives aimed either at prevention of specific diseases or at limiting their impact. And on top of this making more use of the various economic instruments of the EU, notably the structural funds.

It remains to be seen how successful this new approach will prove.

EXERCISES

Task 1: Are health determinants best tackled at local, national or supra-national level? Does this depend on the kind of determinant?

Task 2: What are the possible strategic approaches and actions that can be taken to tackle the health determinants at European level?

RECOMMENDED READINGS

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EXTENDED LIST OF AUTHORS

Artnik Barbara, DMD, MSc
Department of Public Health, Faculty of Medicine,
Zaloska 4 SI-1000 Ljubljana, Slovenia
Tel.: + 386 1 543 7540, Fax: + 386 1 543 7541
E-mail: barbara.artnik@mf.uni-lj.si

Bambra Clare, BSocSci, MA, PhD
Lecturer in Public Health Policy, University of Durham, England, UK

Brand Angela, Dr. Med., MPH
Professor of Social Medicine & Public Health,
Director of the German Center for Public Health Genetics (DZPHG),
University of Applied Sciences,
Kurt-Schumacher-Str. 6, D-33615 Bielefeld, Germany
Tel.: +49 521 10 67 864, Fax: +49 521 16 37 09
E-mail: angela.brand@fh-bielefeld.de

Brand Helmut, Dr. Med., MSc, MFPH
Director of the Institute of Public Health,
Northrhine-Westphalia (lögd), Bielefeld, Germany

Brumen Vlatka, MD, PhD
Assistant Professor, Occupational Medicine Specialist,
Medical College University of Zagreb, 3 Šalata, 10000 Zagreb, Croatia
E-mail: vlatka.brumen@snz.hr

Bulat Petar, MD, PhD
Professor, Institute of Occupational Health,
Deligradska 29, 11000 Belgrade, Serbia and Montenegro
Tel.: +381 11 3065 685, Fax: +381 11 643 675
E-mail: petar.bulat@med.bg.ac.yu

Burazeri Genc, MD, MPH
Department of Public Health, Faculty of Medicine, University of Tirana,
Rr. "Dibres", No.371, Tirana, Albania
Tel.: +355 4 240401, Fax: +355 4 257420
E-mail: gburazeri@yahoo.com

Butchart Alexander, MA, PhD
Coordinator, Prevention of Violence,
Department of Injuries and Violence Prevention,
World Health Organization, Geneva, Switzerland
Tel.: +41 22 791 4001, Fax: +41 22 791 4332
E-mail: butcharta@who.int

Csiki Irma Eva, MPH
Senior researcher, Associate lecturer at the University and Pharmacy,
Department of Monitoring and Planning the Professional Activity,
Institute of Public Health, 1-3 Dr Leonte Str., 050463 Bucharest, Romania
Tel.: + 40 21 318 36 20 ext. 185, Fax: + 40 21 312 3426
E-mail: csiki@ispb.ro

Cucić Viktorija
Cingrijina 13, Belgrade, Serbia and Montenegro
E-mail: Ecucic@EUnet.yu

Dabrock Peter, Dr. Theol., MA
Professor, Social Ethics & Bioethics,
Philipps-University Marburg, Marburg, Germany

DeGolia Peter, MD
Associate Professor, MetroHealth System, 2500 MetroHealth Drive
Cleveland, Ohio, OH 44109-1998, U.S.A.
Tel.: 216 778-8087, 216 778-8788
E-mail: pdegolia@metrohealth.org

Dimitrova Rostislava, MD
Chief Health Policy Advisor,
National Assembly of the Republic of Bulgaria, Sofia, Bulgaria
Tel.: +359 2 808031
E-mail: rostislava@yahoo.com

Djikanovic Bosiljka, MD
Assistant professor, Institute of Social Medicine,
School of Medicine, University of Belgrade,
Dr Subotica 15, Belgrade, Serbia and Montenegro
Tel.: +381 11 643 830, Fax: +381 11 659 533
E-mail: bosiljka_djikanovic@yahoo.com

Donev Doncho, MD, PhD
Professor, Institute of Social Medicine,
Joint Institutes, Faculty of Medicine, University of Skopje,
50 Divizia 6, 1000 Skopje, Republic of Macedonia
E-mail: donev@freemail.org.mk

Dyakova Mariana, MD, MPH
Assistant professor, Department of Preventive medicine,
Faculty of Public Health, Medical University - Sofia,
8 Bialo More Str, 1527 Sofia, Bulgaria
Tel./Fax: +359 2 9432127, +359 2 9310421
E-mail: dr_dyakova@abv.bg

Eckenfels Edward J., Emeritus Professor
Rush University Medical Centre,
5344 S. Hyde Park Blvd., Chicago, Illinois 60615, U.S.A.
Tel.: 773 667 5986, 773 667 6986
E-mail: ed_eckenfels@rush.edu

Elkeles Thomas, Professor Dr.
University of Applied Sciences, Department of Health and Nursing,
Brodaer Street 2, D-17033 Neubrandenburg, Germany
Tel.: +49 395 5693-417/403, Fax: +49 395 5693-497
E-mail: elkeles@fh-nb.de

Fimka Tozija, MD, PhD
Assoc. Professor of Social Medicine,
Republic Institute for Health Protection,
50 Divizija No 6, 1000 Skopje, Macedonia
Tel.: + 389 23 125 044 ext. 110, Fax: +389 23 223 354
E-mail: ftozija@mt.net.mk

Fox Debbie, BA, SRN, SCM
Research Associate in Public Health,
University of Liverpool, Liverpool, L69 3GB, England, UK

Galan Adriana, IT Specialist
Institute of Public Health Bucharest
1-3 Dr. Leonte Street, 76256 Bucharest, Romania
Tel.: +4021 2249228 ext.188, Fax: +4021 3123426
E-mail: agalan@ispb.ro

Genchev Gencho, PhD
Associate Professor, Medical Faculty, Medical University
Department of Social Medicine and Health Management,
8 Bialo More Str, Sofia, Bulgaria
Tel.: +359 887731964, Fax: + 359 29432159
E-mail: gen137@mail.bg

Georgieva Jenia
Department of Preventive Medicine,
Faculty of Public Health, Medical University of Sofia,
8 Bialo More Str, 1527 Sofia, Bulgaria
Tel.: +359 2 9815062, Fax: +359 2 9432127
E-mail: jeanager@omega.bg

Georgieva Lidia, MD, PhD
Associate Professor
Department of Preventive Medicine and Epidemiology,
Faculty of Public Health, Medical University - Sofia,
8 Bialo More Str, 1527 Sofia, Bulgaria
Tel.: +359 888 266431, Fax: + 359 2 9432216
E-mail: lidia@omega.bg

Gjorgjev Dragan, MD, PhD
Professor, Republic Institute for Health Protection,
50 Divizija 6, 1000 Skopje, Republic of Macedonia
Tel.: +389 2 3147 053, Fax:+389 2 3223 354

Ilić Jelena, MD
Postgraduate student, Institute of Hygiene and Medical Ecology,
School of Medicine, University of Belgrade,
Pasterova 2, Belgrade, Serbia and Montenegro
Tel.: +381 11 3285 887, +381 64 110 85 76
E-mail: jelenil@yahoo.com

Karadzinska-Bislimovska Jovanka, MD, PhD
Professor of occupational health,Institute for Occupational Health,
WHO Collaborating Centre, Skopje, Macedonia

Kendrovski Vladimir, MD, PhD
Assoc. Prof, Republic Institute for Health Protection,
50 Divizija 6, 1000 Skopje, Republic of Macedonia
Tel.: +389 2 3147 053, Fax:+389 2 3223 354
E-mail: kendro@mt.net.mk

Kochubovski Mihail, MD, PhD
Assoc. Prof, Specialist of hygiene and environmental health
Republic Institute for Health Protection
50 Divizija 6, 1000 Skopje, Republic of Macedonia
Tel.: +389 2 3125 044 ext.119, Fax: +389 2 3223 354
E-mail: kocubov58@yahoo.com

Kovačević Lana, MD
Andrija Stampar School of Public Health
Rockefellerova 4, 10 000 Zagreb, Croatia
Tel.: +385 1 4566 996, Fax: +385 1 4590 275
E-mail: lana.kovacevic@snz.hr

Laaser Ulrich, Dr. Med, DTM&H, MPH
Professor, Section of International Public Health (S-IPH)
Faculty of Health Sciences, University of Bielefeld
POB 10 01 31, D-33501 Bielefeld, Germany,
Tel.: +381 11 3065410 / +49 173 9000374 (mobile), Fax: +381 11 3065410
E-mail: ulrich.laaser@uni-bielefeld.de or ulrich.laaser@eurohealth.co.yu

Matejic Bojana, MD, MSc
Assistant professor, Institute of Social Medicine
School of Medicine, University of Belgrade
Dr Subotica 15, Belgrade, Serbia and Montenegro
Tel.: +381 11 643 830, Fax: +381 11 659 533
E-mail: bojana_boba@yahoo.com

Merkel Bernard, Dr., PhD
Head of Health Strategy Unit, DG SANCO, European Commission,
Rue de Geneve 1, Brussels, Belgium
Tel.: + 32 2 2992100, Fax: + 32 2 2951363
E-mail: bernard.merkel@cec.eu.int

Minov Jordan, MD, Mr Sci
Institute for Occupational Health
WHO Collaborating Centre, Skopje, Macedonia

Moormann Thomas
Techniker Krankenkasse Headquarters
Department of Corporate Development, 22291 Hamburg, Germany
Tel.: +49 40 6909 2629, Fax: + 49 40 6909 8 2629
E-mail: Thomas.Moormann@tk-online.de

Pekmezovic Tatjana, MD, PhD
Associate Professor, Institute of Epidemiology, School of Medicine
Visegrdska 26A, Belgrade 11000, Serbia & Montenegro
Tel.: +381 11 3615768, Fax: +381 11 3615768
E-mail: pekmezovic@sezampro.yu

Popova Sashka, MD, PhD
Professor, Deputy-Dean, Faculty of Public Health
Medical University – Sofia, 8 Bialo More Str, Sofia 1527, Bulgaria
Tel.: +359 2 946 1976, E-mail: popov@intech.bg

Powles John, MB, BS, MA
Department od Public Health and Primary Care
Institute of Public Health, Robinson Way, Cambridge CB2 2SR, UK
Tel.: +44 1223 330 310, Fax: +44 1223 330 330
E-mail: jwp11@cam.ac.uk; http://www.phpc.cam.ac.uk/powles/

Pranjić Nurka, MD, PhD
Associate Professor, Department of Occupational Medicine
Tuzla School of Medicine, University of Tuzla
75000 Tuzla, Bosnia and Herzegovina
Tel.: +387 35 320 600, Fax: + 387 35 300 600
E-mail: pranicnurka@hotmail.com

Risteska-Kuc Snezana, MD, Mr Sci,
Teaching Assistant, Institute for Occupational Health
WHO Collaborating Centre, Skopje, Macedonia

Roshi Enver, MD, PhD
Department of Public Health, Faculty of Medicine,
St. "Dibres", No.371, Tirana, Albania,
Tel.: +355 4262782, Fax: +355 4257420
E-mail: e_roshi@yahoo.com

Sbutega-Milošević Gorica, MD, PhD
Professor, Institute of Hygiene and Medical Ecology, School of Medicine,
University of Belgrade Pasterova 2, Belgrade, Serbia and Montenegro
Tel.: +381 11 2432 833, Fax: +381 11 3612762
E-mail: sbutege@drenik.net

Schröder Peter, Dr. Phil., MA
Health Policy and Planning, Institute of Public Health
Northrhine-Westphalia (lögd), Bielefeld, Germany

Scintee Silvia-Gabriela, MD, MSc, PhD
Institute of Public Health Bucharest
1-3 Dr. Leonte Street, 76256 Bucharest, Romania
Tel.: +4021 2249228 ext.188, Fax: +4021 3123426
E-mail: gscintee@ispb.ro

Scott-Samuel Alex, MBChB, MCommH, FFPH
Senior Lecturer in Public Health, University of Liverpool
Division of Public Health, Whelan Building Quadrangle
Liverpool, L69 3GB, England, UK
Tel.: +44 151-794-5569, E-mail: alexss@liverpool.ac.uk

Shipkovenska Elena, MD, PhD
Professor, Deputy-dean of the Faculty of Public Health
Medical University-Sofia, 8 Bialo More Str, 1527 Sofia, Bulgaria
Tel./Fax: +3592 9432127, E-mail: e.shipkovenska@doctor.bg

Spiroski Mirko, MD, PhD
Institute of Immunobiology and Human Genetics (IIBHG)
Faculty of Medicine, University "St. Kiril & Metodij"
Ul. "50 Divizija" No. 6, P.O. Box 60, 1109 Skopje, Republic of Macedonia
Tel.: +389 2 3110 556, Fax: +389 2 3110 558
E-mail: mspiroski@yahoo.com

Stikova Elisaveta, MD, PhD
Professor, University "St. Cyril and Methodius" Medical Faculty
Ul. 50 Divizija bb, 1000 Skopje, Macedonia,
Tel.: + 389 2 3147-052, E-mail: estikova@ukim.edu.mk, estikova@gmail.com

Tavanxhi Nertila, MD, Ms.C. – UNAIDS, Geneva, Switzerland

Terzic Zorica, MD, MSc
Assistant professor, Institute of Social Medicine, School of Medicine
University of Belgrade, Dr Subotica 15, Belgrade, Serbia and Montenegro
Tel.: +381 11 643 830, Fax: +381 11 659 533
E-mail: vlazo970@yahoo.com

Ungurean Carmen, MD, MPH
Department of Strategies and Forecasts in Public Health
Institute of Public Health Bucharest,
1-3 Dr Leonte Str., 050463 Bucharest, Romania,
Tel.: +40 21 318 36 20 ext.185, Mobile: +40 788 36 37 85
Fax: + 40 21 312 3426, E-mail: carmen@ispb.ro

Vodenicharov Tzekomir, MD, PhD, DSc
Professor, Dean of the Faculty of Public Health,
Medical University – Sofia, 8 Bialo More Str, 1527 Sofia, Bulgaria