Institute of Public Health of Serbia

„Dr Milan Jovanović Batut"

Health of Population of Serbia

Analytical Study 1997–2007

Belgrade, 2009

Institute of Public Health of Serbia
„Dr Milan Jovanović Batut"
Dr Subotica 5, Belgrade
www.batut.org.rs

Health of Population of Serbia – 1997-2007 Analytical Study

Acknowledgment
We acknowledge our appreciation to all our colleagues and associated of the Institute of Public Health of Serbia, Statistical Office of the Republic of Serbia, National Employment Office, and Ministry of Interior of the Republic of Serbia who helped us in compiling this study.

The 1997-2007Analytical Study - Health of Population of Serbia was funded from the 2008 General Interest Programs of the Ministry of Health of the Republic of Serbia.

Chapters or sections	Authors
Changes in the Health Care System	J. Grozdanov, DMS
Population	I. Ivanovic, MD
Socio-economic Conditions	A.Vuksa, BEc.; S. Dimitrijevic, BEc, DMS
Drinking Water	T.Knezevic, DMS; D. Jovanovic, MD
Air	Prof. V. Damjanov, DMS
Foodstuffs and Items of General Use	D. Jovic, MD; D. Nikosavic, MD
Solid and Liquid Waste	N. Nikolic, MSc; K. Spasovic,MD
Eating Habits, Diet and Nutritional Status	J. Gudelj-Rakic, MD, MSc
Smoking	A. Dzeletovic, DMS
Use of Alcohol and Psychoactive Substances	A. Dzeletovic, DMS
Chronic Non-communicable Diseases	D. Miljus, MD, MSc; Z. Bozic, nutritionist
Cardiovascular Diseases	N. Mickovski, MD, MSc
Malignant Diseases	D. Miljus, MD, MSc; S. Zivkovic, MD
Diabetes	I. Rakocevic, MD; S. Plavsic, MD
Mental Health Disorders	N. Mickovski, MD, MSc; S. Plavsic, MD
Chronic Non-communicable Respiratory Diseases	J. Jankovic, MD; Z. Bozic, nutritionist
Injuries	D. Miljus, MD, MSc; S. Zivkovic, MD
Road Traffic Injuries	S. Zivkovic, MD; D. Miljus, MD, MSc
Suicides	N. Mickovski, MD, MSc; S. Plavsic, MD
Communicable Diseases	M. Kanazir, MD; G. Loncarevic, MD; N. Milic, MD; D. Simic, MD
Health of Children	Dj. Kisin, MD; B. Kilibarda, MD
Health of School Children and Adolescents	Prof. S. Jovic, MD
Health of Adult Population	M. Vasic, MD, DMS
Health of Female Population	B. Kilibarda, MD; Dj. Kisin, MD
Dental Health Care of Children, School Children and Adults	V. Korac, MD, MSc
Hospital Morbidity and Utilization of Hospital Care	M. Vasic, MD, DMS
Organization of Health Care Services	J. Grozdanov, MD, DMS
Human Resources	M. Krstic, MD

Preface

The Health of Population of Serbia, 1997-2007 Analytical Study is the third in a series of publications on health of the population of Serbia after studies of health status of the population in 1990 and 1997 covering the periods 1979-1988 and 1986-1996. It was undertaken in order to summarize years of trends of main indicators pertinent to the area of public health, by the areas that taken together define and affect protection and promotion of health of the Serbian population. It is a part of a continuous process of monitoring of health of our population aimed at providing the information that may support decision makers and professionals working in the area of public health.

Among numerous publications that provided information on health of the population (perception of health, behavior and life styles associated with health risks, nutrition, socio-economic health determinants and use of health services of the public and private sectors) in this period, the following were also used: National Health Survey in Serbia (2000 and 2006), Burden of Diseases Study in Serbia (2003) and Living Standard Measurement Study in Serbia (2002 and 2007).

The main sources of data used in this publication are official data generated by the national statistics of the Republic of Serbia (without pertinent data for Kosovo and Metohija), i.e. institutions conducting statistical studies pursuant to the law and programs of statistical research, as well as mandatory health statistics – The Statistical Office of Serbia, Institute of Public Health of Serbia and Health Insurance Fund of Serbia, as well as sources in international organizations – EUROSTAT (Statistical Office of the European Communities) and WHO Health For All database.

The selected quantitative indicators pertaining to demographic and socio-economic features of the population, morbidity and mortality, life styles, environmental factors that affect health, use of health care, organization and operation of health care services were used to illustrate trends over the studied period and comparisons of Serbia with other countries.

Institute Director

Tanja Knezevic, MD, DMS

Preface

Table of Contents

Changes in the Health Care System of Serbia

Changes in the political, social and economic systems affecting the Central and Eastern European countries in the nineties, initiating the process of transition of the social systems, reached Serbia a decade later. The last decade of the previous century in Serbia was scarred by wars, sanctions of the international community and adverse effects they left, eventually leading to the collapse of all segments of the society, including health care, as well.

By the nineties access to health care was relatively uniform, it was markedly subsidized and the population had trust in its institutions. However, the health care system was cumbersome, expensive, inefficient and more than due to change. In Serbia at the time, like in all countries in transition worldwide, as well as in developed countries, people aspired to a system aimed at more successful, efficient, fair and better quality response to increasing needs of the population for health care under the conditions of always limited resources!

Failure to initiate the reform and sanctions of the international community had dire impact on health care: means necessary for maintenance of health institution and equipment were lacking, supply of drugs and medical devices was hindered by huge problems, health insurance generated massive debt, and in 1992 the Health Care Law was enacted introducing a highly centralized system of funding and managements in the health care system.

Over all these years, owing to continuous assistance of UNICEF and other international organizations, not only materially, but also through successful implementation of numerous programs, one of the areas in which the health care standards were maintained on a satisfactory level was health care of children (1). This is substantiated by indicators of mortality rates for children under 1 year of age per 1000 live births (infant mortality rate) and children under 5 per 1000 live births (mortality rate for children under 5 yrs of age) that had constant positive trends over the years, but still remained significantly higher than in highly developed countries of the European Union (2).

After 2000, massive humanitarian aid, donations in the form of technical assistance for rehabilitation and modernization of health care facilities and equipment, updating of operational technologies and capacity building in all parts of the health care system, including loans under favorable conditions were used to recover the Serbian health care system. Substantial funds from the National Investment Plan were also used for the same purposes (1).

What were the hallmarks of the Serbian health care system?

In addition to significant aging, health status of the population was affected by adverse socio-economic trends in the last decade of the previous century. Health potential of the nation was exhausted so that during the time of socio-economic recovery prompt termination of negative health indicators and their desired improvement cannot be expected soon, particularly because of all associated difficulties brought about by transition of the state and society.

Out of all health disorders, the population of Serbia is burdened most with non-communicable diseases: cardiac ischemia, cerebrovascular diseases, ling cancer, affective disorders (unipolar depression) and diabetes that account for almost two thirds of the total burden of diseases (3). In Serbia every other death is attributed to cardiovascular diseases and one in five to malignancies.

In the study presented below it was impossible to provide a comprehensive and detailed spectrum of all activities of the Serbian health policy after the changes in October 2000. We nevertheless presented a brief overview of the development, i.e. decisions, strategies and efforts of the health sectors, with support of other sectors of the society, to maintain and promote health of the population.

Taking that health of the population reflects social progress and that measures of social progress have to include health, that healthier people are more productive, that better health reduces needs for health care, that people recognize health as one of the top life values, the Government of the Republic of Serbia and Ministry of Health adopted a series of important multi-sectoral and health-related strategic documents, national programs and activities: 2002 Serbian Health Policy; Strategy of Health System Reform by 2015 with Action Plan; 2003-draft; Population Protection Program from Communicable Diseases 2002-2010 (2002); Serbian Poverty Reduction Strategy (2003); Strategy for Integration and New Powers to Rome within the Roma Decade (2004); National Plan of Action for Children (2004); 2005-2010 Anti HIV/AIDS Strategy (2005); Tobacco Control Strategy of the Republic of Serbia (2005); National Tuberculosis Health Care Program (2005); National Millennium Development Goals in the Republic of Serbia (2006); Strategy of Development of Young People's Health (2006); 2006-2025 National Strategy on Aging (2006); National Mental Health Strategy (2006); National Strategy Against Drugs and Alcohol (2007- draft); Strategy to Provide Sufficient Quantities of Safe Food (2007-draft); Public Health Strategy (2007-draft) (4,5).

In the health care system, providing health services in the area of diagnostics, treatment and rehabilitation of diseases and injuries accounts for the main part of service providing that is of major importance for the population and uses most of the resources. Therefore, in Serbia the main activities and series of initiatives were targeted to this part of the system. Improvement of health service providing, i.e. improvement of effectiveness, efficiency, particularly through integrated and coordinated health service providing, and quality of health care from the broadest level to the smallest units – individual posts, have involved positive amendments of the legislation and policies relating to quality of health care incorporating measurements of

the health service beneficiaries/users to provide for response to the population expectations of the health care system; comprehensive measures of patient care; registration and licensing of new drugs (wide spectrum of regulatory mechanisms have been enacted to improve the quality and efficiency of medication, but also to curb costs, e.g. by substitution of drugs by well-known manufacturers for less expensive generics); methods of quality assurance and training programs for quality assurance and management in health institutions; accreditation of health institutions; guidelines for good clinical practice and development of IT systems.

Decentralization and strengthening of local communities were put in place in order to support some of the functions in the health care system, such as health care service providing on the primary level in primary health care centers.

Also, a broad spectrum of measures have been implemented towards better information of users based on increased participation and representation in health service providing by introducing ombudsman for patients' rights or providing information on the importance of their responsibility and interest in own health.

Yet another direction in these changes related to restructuring of human resources where a substantial number of primarily administrative and technical staff have been substituted to balance the shortage of health professionals, primarily doctors and nurses. Also, a substantial contribution to management of the health care system was achieved by establishment of chambers of physicians, nurses, pharmacists, dentists and biochemists promoting the requirements for pursuing respective occupations (not only by continuous education as a part of the re-certification process/licensing), protection of interests of health professionals and improvement of health care.

In Serbia, in addition to developed private sector clear-cut borders between the public (state) and private health sector were still present with some attempts to make them less sharp. However, this did not imply lack of effort towards promotion of quality and assessment of professional work in both these sectors. Accordingly, the Ministry of Health has exercised its powers so it is now to be expected that intensification of operation of the chambers of doctors and other related chambers will result in more prominent improvement.

Since the health care system may only respond to the pertinent duties and requirements if it is able to provide resources needed to operate, in the context of this review the following should be mentioned, as well: Although in the studied decade the principle of health care funding was the same as in the previous fifty years, from the state health insurance (contributions) and allocations from the state budget for uninsured persons and capital investments, the reform of the health care system nevertheless implies a shift from funding the capacities to funding the services. Accordingly, the 2005 Health Care Law defined various forms of annual agreements for health service providing with health institutions from the Plan of Network of Public Health Institutions. The innovations include capitation (mode of payment in primary health care) and Diagnosis Related Groups –DRG (mode of payment in hospital health care) the practical implementation of which will be preceded by results of pertinent projects with international

organizations. Introduction of the new in addition to the current modes of payment of health services and all other changes will strengthen the influence of the Health Insurance Institute on success, quality and effectiveness of health service providing.

Health Promotion

In several preceding decades, perceptions of health and diseases have changed significantly, whereby attention of the society increasingly shifted towards life styles and other health-related risk factors. Health has become something that any person bears personal responsibility for, neither more nor less than the state and society in general, since unhealthy life styles are not isolated, but closely related to social and physical environments in which people live (7).

Effectiveness of the model of intensive, integrated approach to promotion of health-responsible behavior relating to persons and environment by involvement of health and other governmental and non-governmental organizations, profit and non-profit ones, local communities, media and individuals that has been implemented in Serbia is illustrated best by decrease of the smoking prevalence in the general population. This approach is contained in the national programs of health promotion continuously implemented ever since 2000 in the Republic of Serbia, where its institutional form is reflected in national offices for tobacco control, HIV/AIDS, and prevention of non-communicable diseases.

It is also worth noting that in public (state) primary health care institutions systematic preventive activities have been intensified by, e.g. broadening the spectrum of such services through better use of the current infrastructure, establishment of prevention centers for adults to detect and control individual risk factors.

Legislation

The legislative framework of health care has been improved by new pieces of legislation: The Law on Medicines and Medical Devices (Official Gazette of the Republic of Serbia, no. 84/04), Health Care Law (Official Gazette of the Republic of Serbia, no. 107/05), Health Insurance Law (Official Gazette of the Republic of Serbia, no. 107/05), Law on Chambers of Health Professionals (Official Gazette of the Republic of Serbia, no. 107/05), Law on Population Protection from Communicable Diseases (Official Gazette of the Republic of Serbia, no. 125/04) and Law on Sanitary Surveillance (Official Gazette of the Republic of Serbia, no. 125/04).

References:

1. Bajec J, Krstic G, Pejin-Stokic Lj, Penev G. (Economics Institute, Belgrade, Republic of Serbia). Social protection and social inclusion in the Republic of Serbia. Report. European Commission, Directorate–General for Employment, Social Affairs and Equal Opportunities, Unit E2; May 2008.
Available at http://ec.europa.eu/employment_social/spsi/studies_en.htm#western_balkans

2. WHO. Health for all DB.
Available at http://www.euro.who.int/hfadb

3. Atanasković-Marković Z, Bjegović V, Janković S, Kocev N, Laaser U, Marinković J, et al. The Burden of Disease and Injury in Serbia. Belgrade: Ministry of Health of the Republic of Serbia; 2003.

4. Government of Republic of Serbia [Main page on Internet]. Documents (in Serbian).
Available at http://www.srbija.gov.rs/vesti/dokumenti.php?id=2430

5. Ministry of Health of Republic of Serbia [Main page on Internet] (in Serbian).
Available at http://www.zdravlje.sr.gov.yu/

6. Simic S. Decentralizacion of Health Care System. Towards Health Care Reform in Serbia. PALGO Center; Belgrade: 2006.
Available at http: //www.palgo.org/files/leaflet/brosura_reforma-javnog-zdravstva.pdf

7. PHSF 2006: Care for health [Document on Internet]. Bilthoven: RIVM.

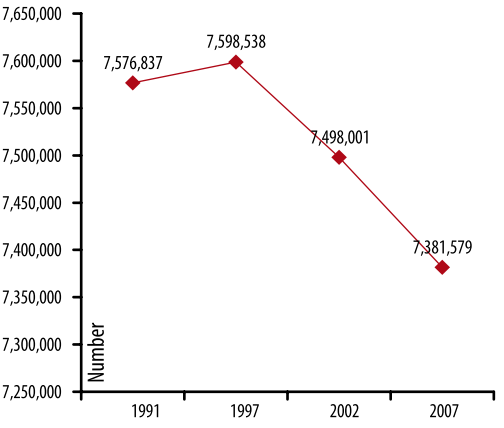
I Population, Living Conditions and Life Styles

Population

In the last decade the population of Serbia lives longer, ages increasingly and is decreasing.

In the period 1948-1991 all censuses of the Republic of Serbia registered continuous rise in the population. According to the data obtained by the new methodology of the census and assessment of the population introduced by the Statistical Office of the Republic of Serbia, including the retroactive data evaluation for 1991, fall in the overall population of Serbia was registered from 7,576,837 (in 1991) to 7,498,001 (2002). In 2007, the estimated population of the Republic of Serbia was 7,381,579 (3,588,957 males and 3,792,622 females), which represents an 1.6% decrease from the number established on the preceding census (2002), i.e. 2.9% from the 1997 census (7,598,538) (Figure 1).

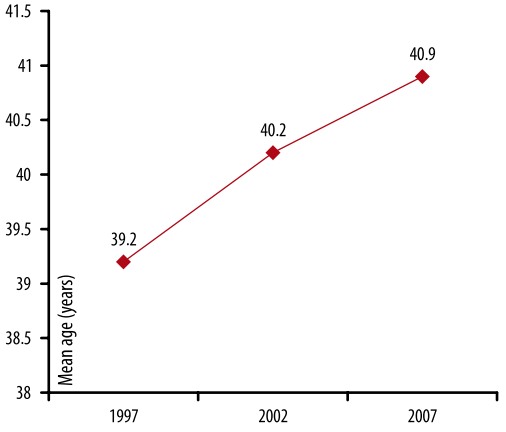
Figure 1. Population, Serbia, 1991, 1997, 2002 and 2007



Source: Statistical Office of Republic of Serbia

In the studied period, the average age of the population rose from 39.2 years (38.0 men and 40.4 women) in 1997 to 40.9 (39.6 men and 42.2 women) in 2007 (Figure 2).

Figure 2. Mean age of the population, Serbia, 1997, 2002 and 2007



Source: Statistical Office of Republic of Serbia

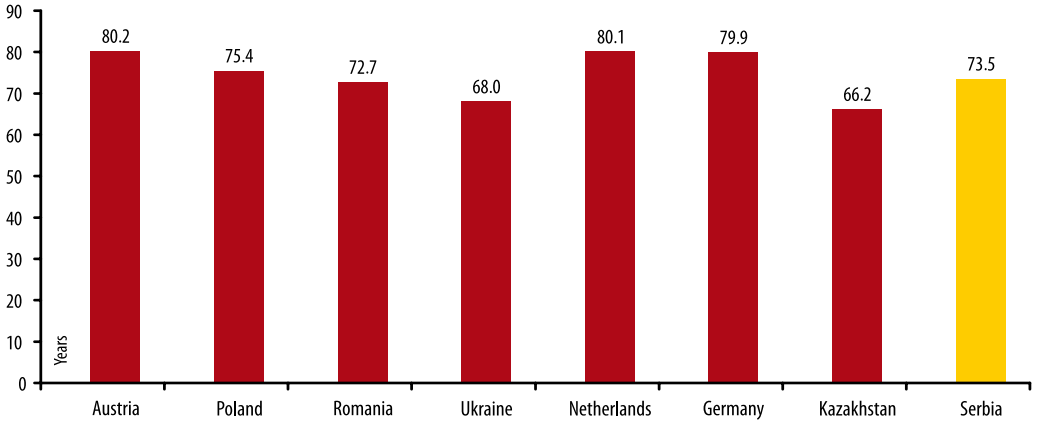
Life expectancy at birth in the Republic of Serbia in the period 1997 through 2007 for men and women alike has shown a mild rising trend. In 2007, the life expectancy in the Republic of Serbia was 70.7 years for men and 76.2 for women, while in 1997 the numbers were 69.6 and 74.6 for men and women, respectively.

Based on the World Health Organization (WHO) data, life expectancy at birth in the Republic of Serbia that was 73.5 in 2006 was substantially below the corresponding values in some European countries: 80.2 in Austria, 80.1 in Holland, 79.9 in Germany. At the same time, the values were similar to those reported in Poland (75.4) and Romania (72.7), and much higher than in Ukraine (68.0) and Kazakhstan (66.2 years) (Figure 3).

In the studied period, the number of live births also fell from 79,716 in 1997 to 68,102 in 2007, i.e. the fall of live births per 1000 population from 10.7 in 1997 to 9.2 in 2007.

Over the same period, the mortality rate of the population of Serbia rose. In 1997 the number of deaths was 98,068, as compared to 102,805 in 2007, so that the mortality rate per 1000 population rose from 12.9 in 1997 to 13.9 in 2007.

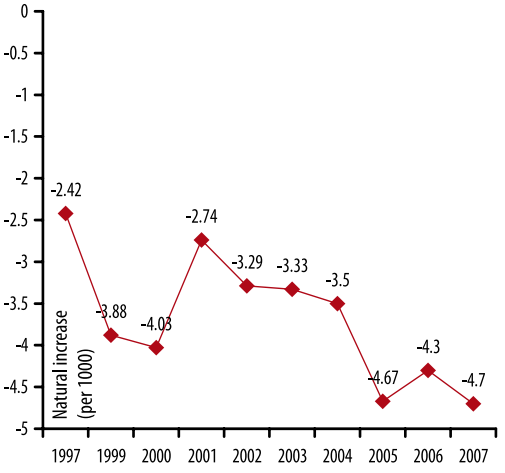
Figure 3. Life expectancy at birth, Serbia and selected European countries, 2006



Source: Health for all" database, WHO, http://data.euro.who.int/hfadb/

The studied period is also characterized with persistent negative birth rate showing negative values and fall from -2.4/1000 in 1997 to -4.7/1000 in 2007 (Figure 4).

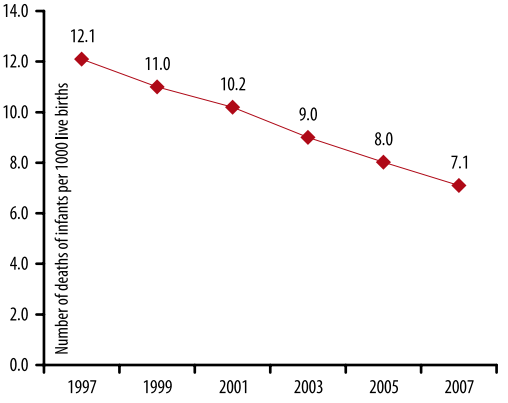
Figure 4. Natural increase rate, Serbia, 1997–2007



Source: Statistical Office of Republic of Serbia

The infant mortality rate as an important and sensitive indicator of health status and health care of the population as well as socio-economic and related conditions in the Republic of Serbia has been showing a persistently falling trend. Over the studied period, the infant mortality rate fell from 12.1/1000 live births in 1997 to 7.1/1000 live births in 2007 (Figure 5).

Figure 5. Infant mortality rate, Serbia, 1997–2007



Source: Statistical Office of Republic of Serbia

Socio-economic Conditions

The studied period after 2000 was marked by positive trends in a series of socio-economic indicators such as the rise in gross domestic product, relative monetary stability and increased allocations for health expenditures. However, the low GDP level and high unemployment rate are serious hindering factors for sustainable health care funding.

Socio-economic conditions and population health are inseparably and intricately connected.

The selected indicators are one of the possible illustrations of socio-economic conditions in Serbia over the studied period.

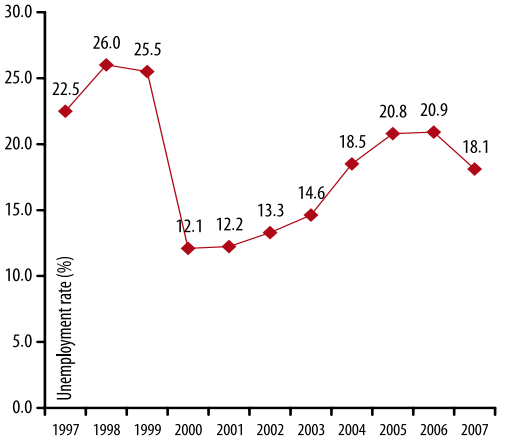
Employment and unemployment

Over the period 1997-2007 the employment rate in Serbia varied without a recognizable rising trend. The total number of employed persons in Serbia, after the 2007 Workforce Survey conducted by the Statistical Office of the Republic of Serbia was 2,655,736, accounting for 51.5% employment rate. In 2006, the rate was somewhat lower (49.8%), and also the lowest in comparison with the average employment rates (64.5%) in all 27 European Union (EU) countries.

In the studied period, the fall of employment was accompanied with the rise in unemployment. The unemployment rate had a rising trend over the studied period, with some oscillations (Figure 6). Sharp fall of unemployment rate in 2000 mostly resulted from adjustment of methodology of the Workforce Survey with the latest recommendations and definitions of the International Labor Organization and EUROSTAT, enabling international comparisons in the area of labor statistics.

In 2007 the total number of unemployed persons in Serbia, following the aforementioned source, was 585,472, and the corresponding unemployment rate was 18.1%. In the same year, Serbia had the highest unemployment rate in comparison with the Euro zone countries and countries in the neighborhood (Figure 7).

Figure 6. Unemployment rate, Serbia, 1997–2007



Source: Statistical Office of the Republic of Serbia

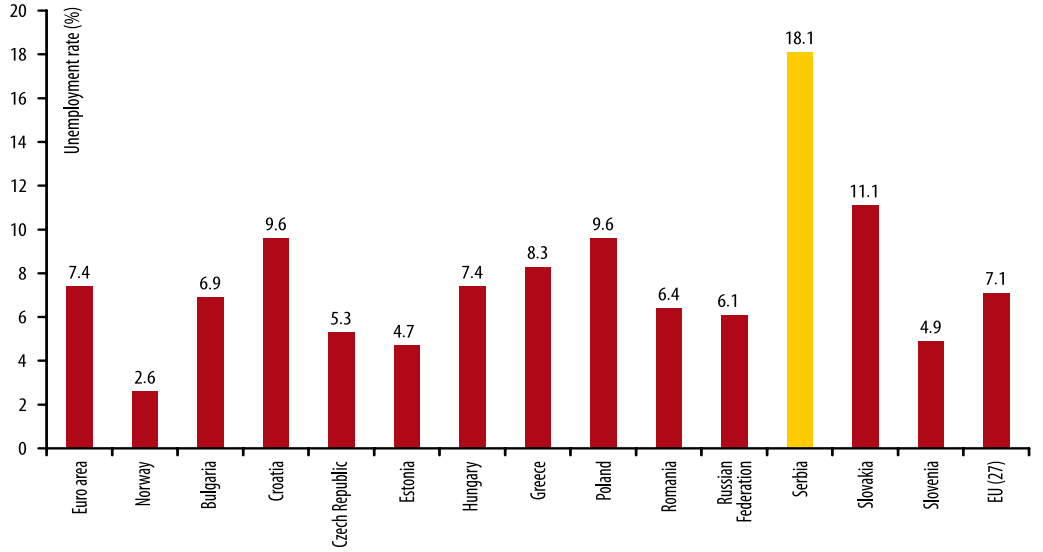
When surrounding countries are concerned, the EUROSTAT data suggest that some have higher unemployment rates that Serbia: Bosnia and Herzegovina (47.7% in 2006) and Macedonia (34.9% in 2007).

Inflation

In the studied period, 1997-2007, the inflation rate as the average annual rise of retail prices showed a falling trend after 2001, helping achieve relative price stability under the conditions of market liberalization and fiscal system reform (Figure 8).

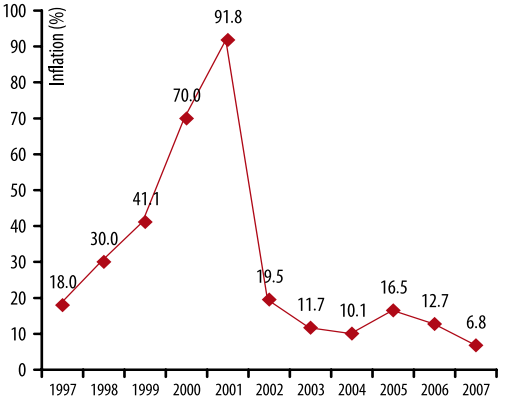
In comparison with the EU and surrounding countries (with marked differences among them), inflation in Serbia, measured by the average annual rise of retail prices was markedly high (Figure 9).

Figure 7. Unemployment rate in Serbia, European Union and selected European countries, 2007



Source: Eurostat, http://epp.eurostat.ec.europa.eu; UNECE, http://w3.enece.org/pxweb/Dialog/; Statistical Office of the Republic of Serbia; http://webrzs.stat.gov.rs/axd/index.php

Figure 8. Inflation – annual average rate of change of consumer prices, Serbia, 1997–2007



Source: Statistical Office of the Republic of Serbiae

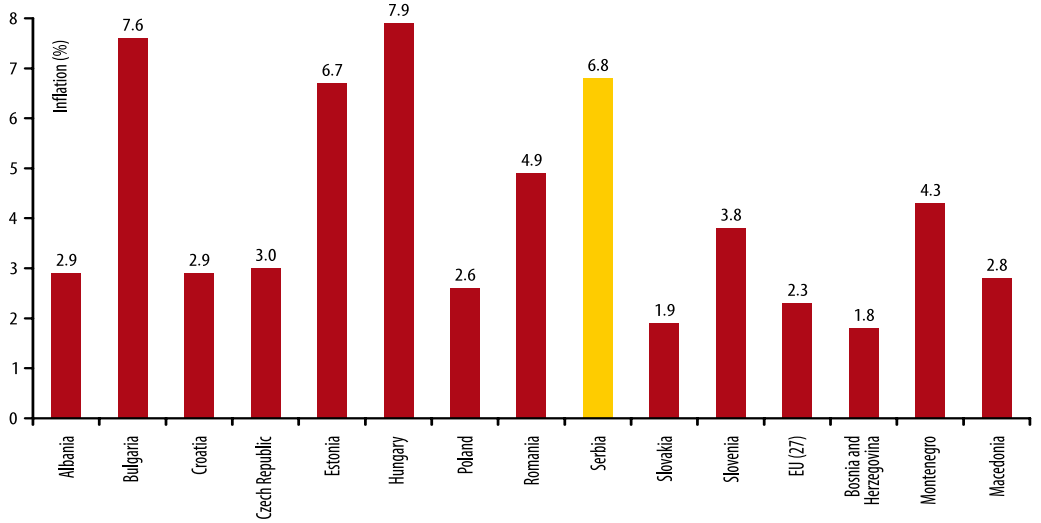
Gross Domestic Product (GDP) per capita

After 2001, the Serbian gross domestic product showed a stable growth. The real GDP rise in 2007 was 7.5%, where GDP per capita reached USD 5458 (EUR 3934). According to the value of this indicator, Serbia was classified in the upper group of medium developed countries (Figure 10).

The effects of transitional stagflation however, were so great that Serbia has not yet reached the level of economic development of 1990; instead, in 2007 it was still at about 80% of its 1990 GDP value. Contrary to Serbia, in most neighboring countries the transition recovery period lasted till 2004.

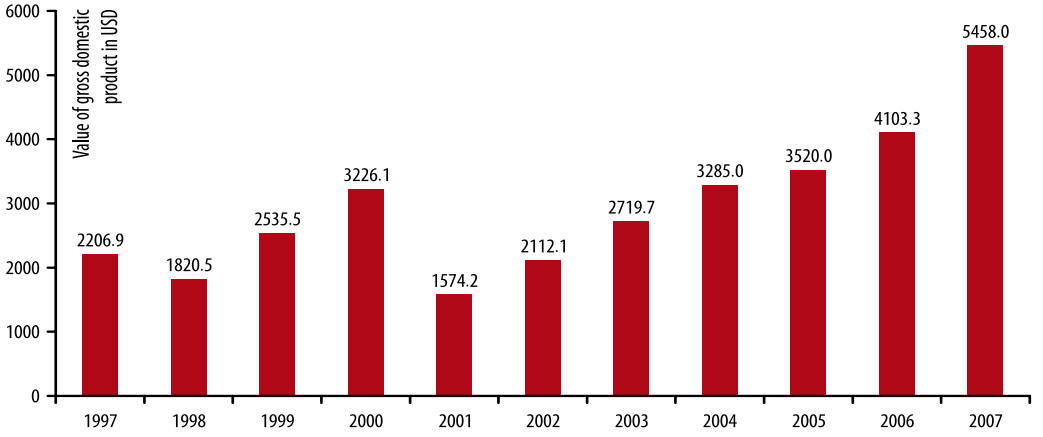
Comparison of the Serbian GDP with either EU countries or countries in the neighborhood through either current prices (GDP index) or more appropriate indicator used for international comparison, such as purchasing power parity (PPS index) clearly identifies low standard of living of the Serbian population in 2007. The EU index (27 countries) is estimated at 100 (Figure 11).

Figure 9. Inflation in Serbia, European Union and selected European countries, 2007



Source: Eurostat, http://epp.eurostat.ec.europa.eu; UNECE, http://w3.unece.org/pxweb/Dialog/; Statistical Office of the Republic of Serbia, http://webrzs.stat.gov.rs/axd/index.php

Figure 10. Gross domestic product (GDP) per capita in USD, Serbia, 1997–2007

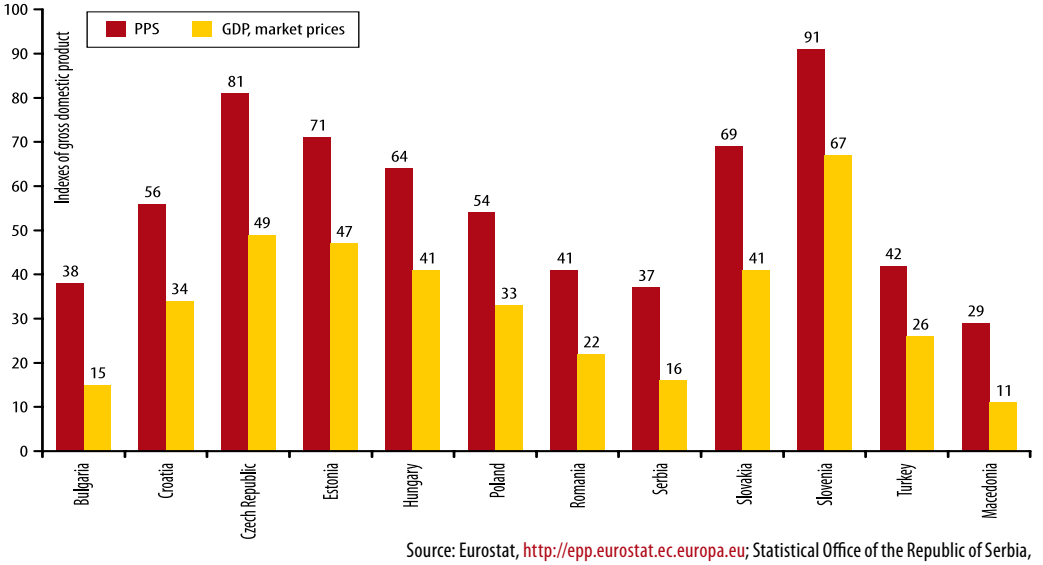


Source: Statistical Office of the Republic of Serbia, http://webrzs.stat.gov.rs/axd/index.php; National Bank of Serbia, http://www.nbs.rs; Ministry of finance of the Republic of Serbia, http://www.mfin.sr.gov.yu

Human Development Index (HDI)

The Human Development Index (HDI) is a complex indicator, one of indicators of quality of life and interdependence of economic and social developments. It ranges between 0 and 1, where values closer to 1 indicate higher quality of life. In Serbia, the HGI values had a rising trend since 2001 (0.768), reaching 0.8109 in 2005. Subsequent analyses of this indicator

Figure 11. Index of GDP in Purchasing Power Standards and at market prices, per capita in Serbia and selected European countries, 2007 (Index EU-27 = 100)



Source: Eurostat, http://epp.eurostat.ec.europa.eu; Statistical Office of the Republic of Serbia, http://webrzs.stat.gov.rs/axd/index.php; RDB, http://www.razvoj.sr.gov.yu

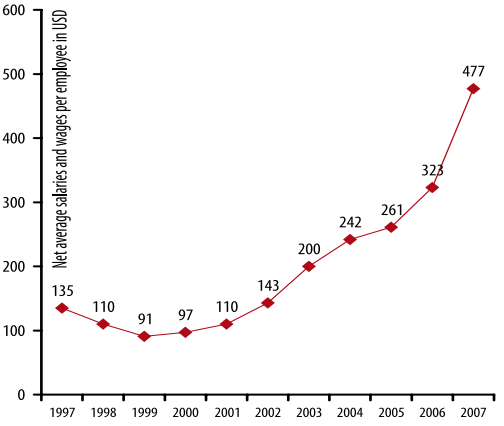
show that the main factor of better quality of life is the economic component of the overall development, i.e. growth of income per capita.

Thus, HDI ranks Serbia fifth in the South-Eastern Europe, and relatively highly on the worldwide level in terms of human development (Figure 12).

Population income

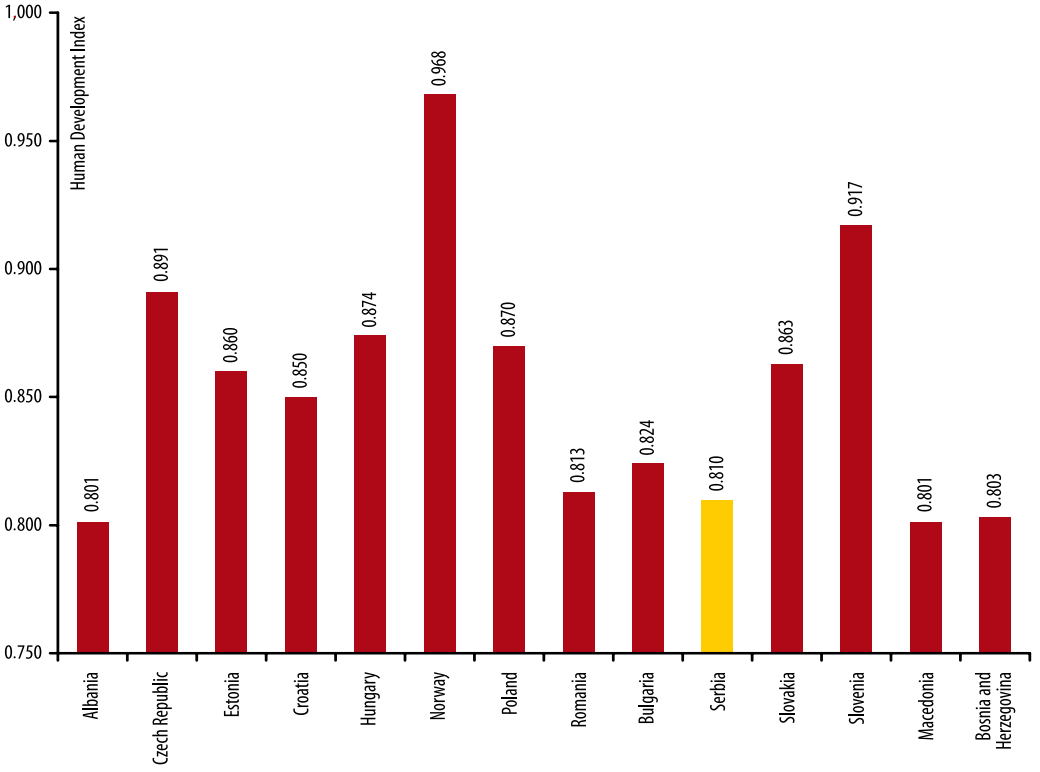
Since 1999 salaries had a rising trend, particularly marked in the last two of the studied years. In 2007 the average net salary was USD 477, i.e. EUR 347 (Figure 13).

Figure 13. Net average salaries and wages per employee in USD, Serbia, 1997-2007



Source: Statistical Office of the Republic of Serbia

Figure 12. Human Development Index in Serbia and selected European countries, 2005



Source: Health for all database, WHO, http://data.euro.who.int/hfadb/

Population consumption

In the 2007 structure of the overall personal consumption of households in the Republic of Serbia, the food including nonalcoholic beverages predominated with 40.3%, as a logical hallmark of countries with lower standard. However, the 1997 share of expense for food was 46.4%. In 2007, the expenses for food were followed by housing cost (14.7%), transportation (10.3%), and other, while the cost of health care accounted for 4.2% of household expenses (Figure 14).

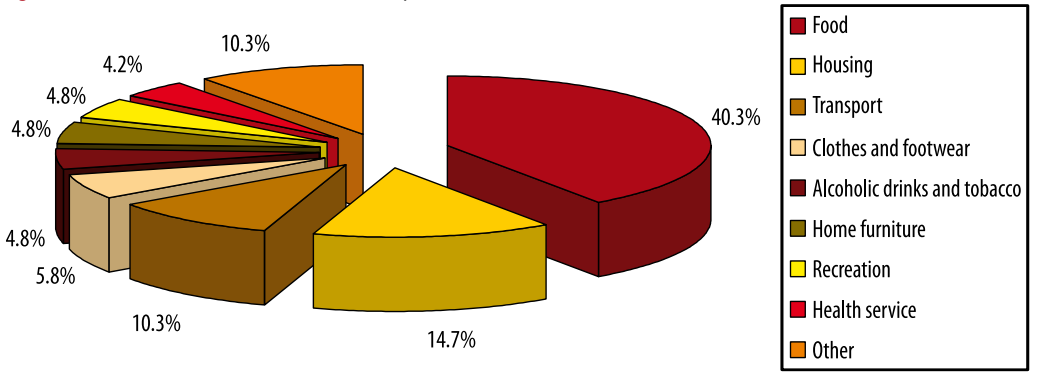
Expenses for health care per capita

The initial years of the studied period (1997-2001) were marked by major oscillations in allocations for health care, particularly in the light of par value expressed in USD. The influence of monetary instability should be taken into account, as well as the difference between the official exchange rates (that we used) and the market values of foreign currencies. After 2001, allocations for health care by the Health Insurance Fund (HIF) showed a constant, stable growth, reaching the value of USD 336 per capita in 2007 (Figure 15). According to results of the survey "Population Health Survey in Serbia, 2006" conducted by the Ministry of Health of the Republic of Serbia in cooperation with the Institute of Public Health, in 2006 the average amount of the "out of pocket" expenses for health care per capita was RSD 14,696.7, i.e. USD 219.

Share of expense for health care in Gross Domestic Product

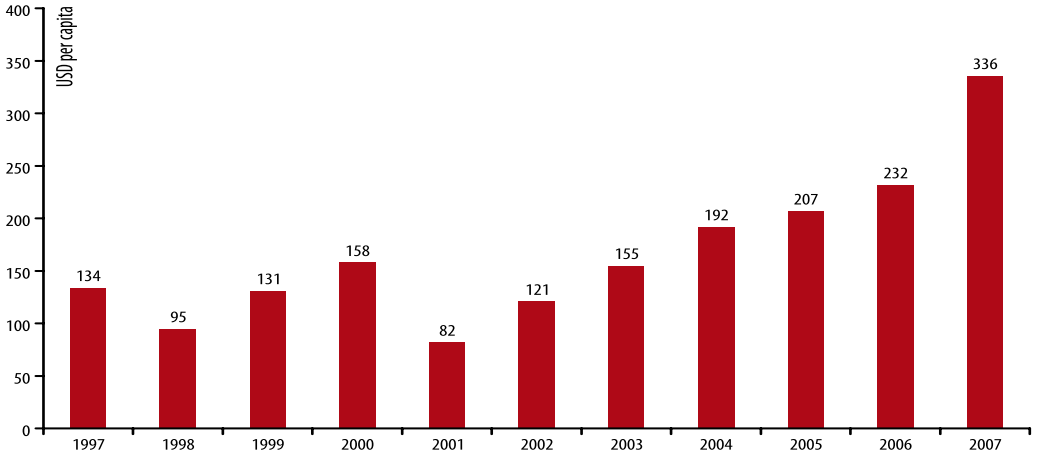
The share of expense for health care in gross domestic product shows a relatively stable level over the studied period (Figure 16).

Figure 14. Structure of individual household consumption, Serbia, 2007



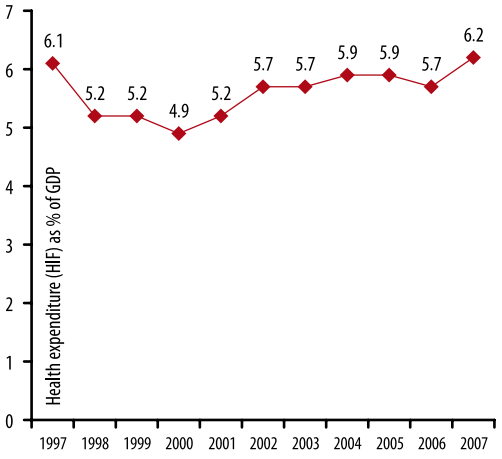
Source: Statistical Office of the Republic of Serbia

Figure 15. Health expenditure (HIF) per capita in USD, Serbia, 1997-2007



Source: Health Insurance Fund, http://www.rzzo.sr.gov.yu/;
Statistical Office of the Republic of Serbia, http://webrzs.stat.gov.rs/axd/index.php; National Bank of Serbia, http://www.nbs.yu

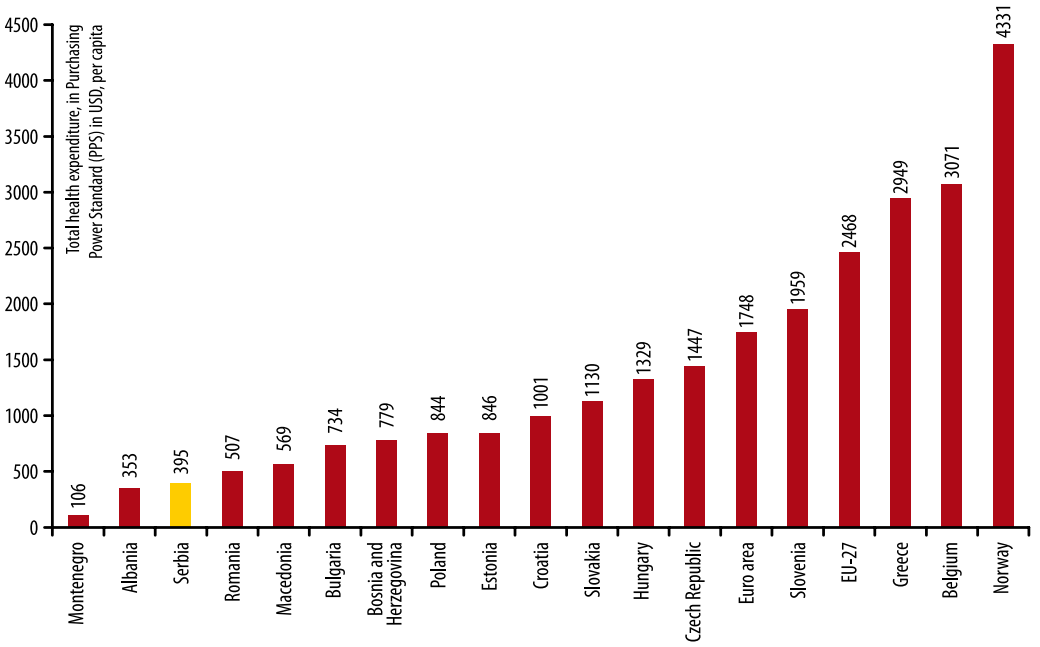
Figure 16. Health expenditure (HIF) as % of GDP, Serbia, 1997-2007



Source: Health Insurance Fund, http://www.rzzo.sr.gov.yu/;
Statistical Office of the Republic of Serbia, http://webrzs.stat.gov.rs/axd/index.php

Data on allocations for health care in USD by the Purchasing Power Standard (PPS) in 2005 shows relatively low expenditures for health care in Serbia in comparison with other studied European countries (Figure 17).

Figure 17. Total health expenditure, in Purchasing Power Standard (PPS) in USD, per capita, in Serbia and selected European countries, 2005



Source: Health for all database, WHO, http://data.euro.who.int/hfadb/hfadb/

Safety of drinking water in the period 1997 through 2007 shows a mild improving trend, while the parameters of unsafety have remained unchanged over the years.

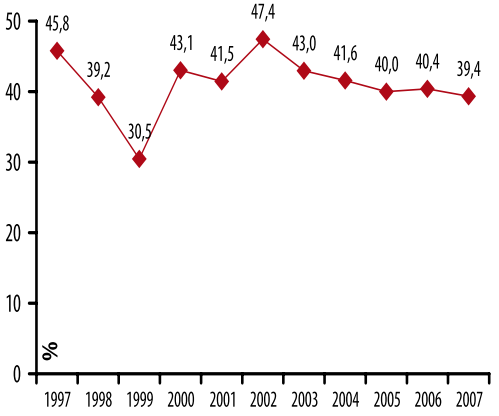
Safe drinking water is one of the main prerequisites of good population health in any country. Records of indicators of the quality of drinking water supplied to urban settlements in the Republic of Serbia are filed with the Public Health Institute of Serbia.

Pursuant to the data obtained from the 2006 Population Health Survey in Serbia, 95.2% of the Serbian population are connected to water supply in the house, i.e. apartment, while 99.1% used safe sources of drinking water, which is a significant improvement over 2000 (1). The high percentage of connections to the water supply system and accessibility of drinking water ranks our country together with Germany, Finland, France, Denmark, United Kingdom, Austria, Slovakia, Czech Republic, etc., where accessibility rate in 2004 reached 100%. The group of countries includes also Albania (water supply accessibility rate 96%, connection to the system 69%), Bosnia and Herzegovina (water supply accessibility rate 97%, connection to the system 85%), Romania (water supply accessibility rate 57%, connection to the system 49%), whose values were somewhat lower in comparison with the 2006 survey conducted in our country (2).

Results of testing of water samples from the urban water supply systems in the Republic of Serbia in the period 1997-2007 illustrate that the quality of drinking water differs by the districts, and depends on the source of water, composition of the soil and technical-technological treatment used for water processing (3). Physico-chemical quality of water represented as the percentage of urban water supply systems with chemical param-

eters of water safety non-compliance in over 20% of the water samples shows an improving trend in the period 2002-2007 by about 8% (Figure 18).

Figure 18. Percentage of urban water supply systems with chemical contamination, Serbia, 1997–2007



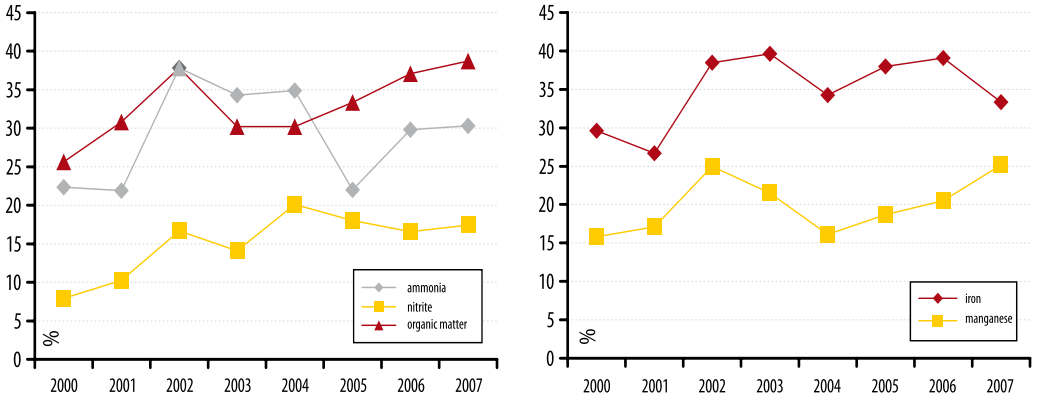
Source: Institute of Public Health of Serbia – Annual report on the drinking water safety from the urban water supply systems in Republic of Serbia

The most common parameters of physico-chemical unsafety of water are increased turbidity and color, elevated levels of iron, manganese, ammonium, nitrates, nitrites and increased consumption of potassium permanganate, which have remained unchanged over the years (3) (Figure 19).

In the period 2000-2007 the percentage of urban water supply systems with most common causes of chemical unsafety registered ammonium in 29.1%, nitrites in 15.1%, organic matter (consumption of potassium permanganate) in 33.0%, iron in 34.9% and manganese in 20.0% (3).

The data available in the Annual report on the drinking water safety suggest that lead, cadmium, zinc, copper, nickel, chromium and mercury are not found in any excessive concentrations in the drinking water of the controlled urban water supply systems (following the Rulebook guidelines), while elevated levels of total arsenic are most commonly found in the geoFigureic region of the Pannonian plane, ranging from 0.9% to 23.1% (3). In order to establish impact assessment of

Figure 19. Percentage of urban water supply systems with most common chemical contaminants, Serbia, 1997–2007

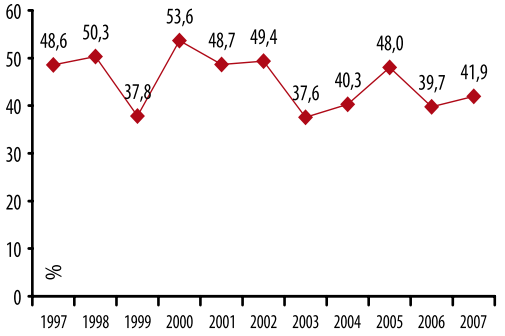


Source: Institute of Public Health of Serbia – Annual report on the drinking water safety from the urban water supply systems in Republic of Serbia

arsenic and other chemical contaminants in the drinking water on health, it is necessary to conduct specific epidemiological studies in our population.

In the last 11 years the percentage of urban water supply systems with more than 5% of microbiologically unsafe samples was 45.1%, on the average (Figure 20).

Figure 20. Percentage of urban water supply systems with microbiological contamination, Serbia, 1997–2007

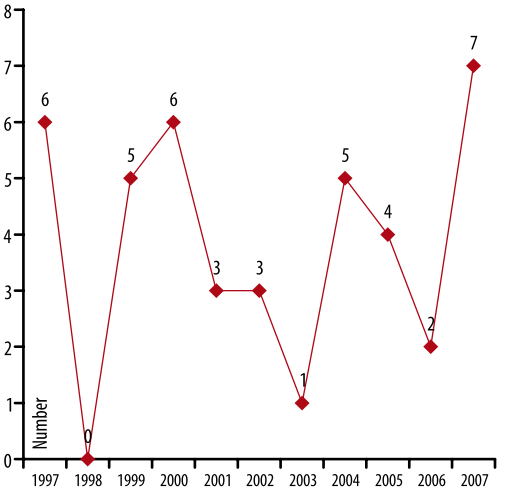


Source: Institute of Public Health of Serbia – Annual report on the drinking water safety from the urban water supply systems in Republic of Serbia

The most common causes of unsafety were aerobic mesophilic bacteria that do not affect health, but indicate (in) adequacy of water chlorination and contact with external environment.

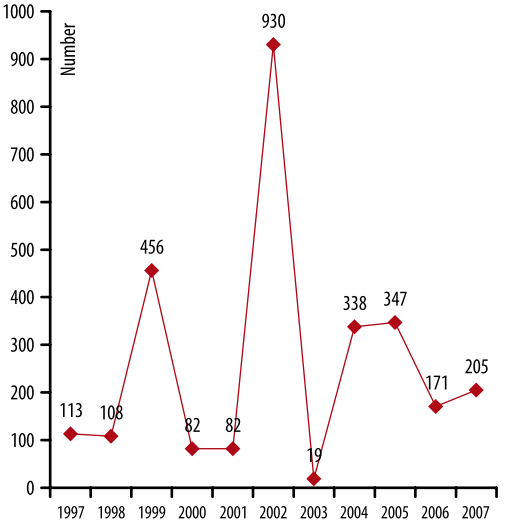
In the studied period, outbreaks of water born diseases due to microbiological contamination of water from the urban water supply systems were not recorded. The occurrence of water born diseases with fewer affected persons, 4 per year on the average over the studied period, resulted from the use of microbiologically unsafe water from small/local water supply systems or individual wells (Figures 21&22) (3). These were public water supply facilities that do not belong to the public water supply companies, so that due to lack of funds and absence of responsible persons (owner) it was impossible to provide public health control of water supply for the population supplied from these facilities. Pursuant to the current Book of Rules on Hygienic Safety of Drinking Water, monitoring of all public water supply facilities supplying water to over 5 families or 20 persons should be put in place.

Figure 21. Number of water born diseases outbreaks, Serbia, 2001 – 2007



Source: Institute of Public Health of Serbia – Annual report on the drinking water safety from the urban water supply systems in Republic of Serbia

Figure 22. Number of cases in outbreaks of water born diseases, Serbia, 2001 – 2007



Source: Institute of Public Health of Serbia – Annual report on the drinking water safety from the urban water supply systems in Republic of Serbia

In comparison with some neighboring countries, much higher number of microbiologically unsafe samples on the country level was recorded in Montenegro (about 13%). Croatia has values similar to ours (approximately 5%), while the level of physico-chemically unsafe samples was lower in Montenegro and Croatia than in our country by about 13% (4,5).

References:

1. WHO. Joint Monitoring Programme for Water Supply and Sanitation. Water and Sanitation data query tool. 2004.
   Available at:
   http://wssinfo.org/en/watquery.html

2. Ministry of Health. National Health Survey Serbia, 2006 - Key findings. Belgrade: Ministry of Health; 2007.

3. Institute of Public Health of Serbia. Annual report on drinking water safety from the urban water supply systems in Republic of Serbia, Belgrade: Institute of Public Health of Serbia; 1997-2007.

4. Institute of Public Health of Croatia. Health Statistical Yearbook of Croatia, 2006., Public water supply in Croatia [WEB page]. Zagreb: Public Health Institute of Croatia; November 2007.
   Available at:
   http://www.hzjz.hr/publikacije/hzs_ljetopis/index.htm.

5. Institute of Public Health of Montenegro. Health Statistical Yearbook of Montenegro. [WEB page]. Podgorica: Institute of Public Health of Montenegro; 2007.
   Available at:
   http://www.ijz.cg.yu/Index.php?action=publikacija%20 2005

Air is an important health risk factor in the Republic of Serbia. One in five citizens of Serbia could be informed on the level of sulfur dioxide exposure, and one in ten could be informed on the corresponding level of exposure to nitrogen dioxide.

Sulfur dioxide and black smoke are indicators of main air pollution in the Republic of Serbia. In the period 1997-2006 they were systematically recorded pursuant to the regulations in force (1,2,3).

Sulfur dioxide

The number of settlements and measurement locations covered by the data on levels of sulfur dioxide in the local network of urban stations on the territory of Serbia in the period 1997-2006 are presented in Table 1 (6). Noticeably, the number of settlements and measuring sites to record the sulfur dioxide level of air pollution is on the rise.

The mean annual level of sulfur dioxide which had been monitored regularly in the local network of urban stations is published for Belgrade, Ivanjica, Kostolac, Kragujevac, Kraljevo, Kruševac, Leskovac, Lučani, Niš, Novi Sad, Pančevo, Pirot, Smederevo, Subotica, Užice, Čačak and Šabac. In the studied period no settlement had exceeded the annual mean emission limits value (LVE) of 50μg/m3, as stipulated in the local regulations (3).

Table 1. Number of settlements and measuring stations covered by the data on levels of sulfur dioxide in the local network of urban stations, Serbia, 1997-2006

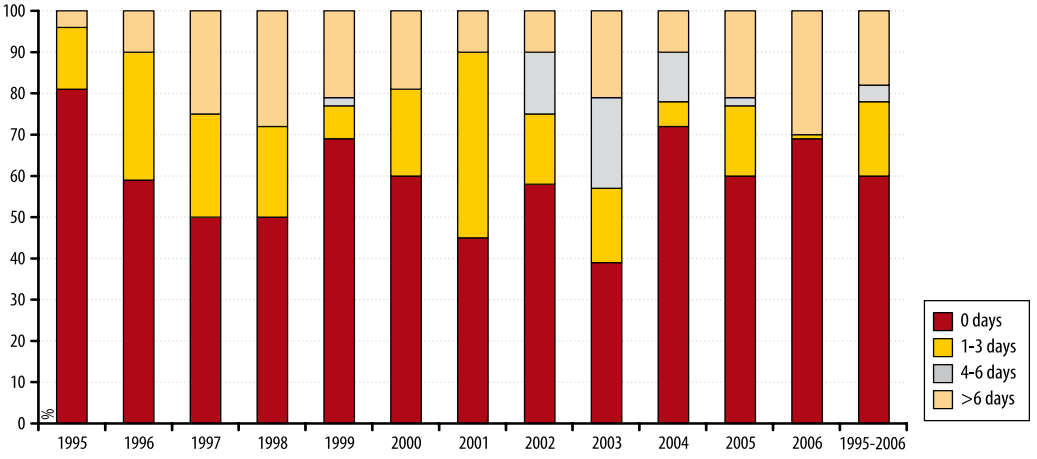
Indicator	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Number of settlements	21	27	26	15	20	21	21	23	23	31
Number of measuring stations	91	89	102	60*	88	94	94	111	94	102

* Data for the settlements Bor, Zajecar, Sombor, Kikinda, Zrenjanin - not included
Source: Institute of Public Health of Serbia

In the studied period, the share of population covered by the measurement sites to process the data on the levels of sulfur dioxide varied with a rising trend (4,5). The results of 2006 sulfur dioxide measurements covered 18.4% of the total population of Serbia. It means that the data on exposure to sulfur dioxide were available for two out of ten citizens.

Review of exposure of the population to different rates of sulfur dioxide excess daily levels in Serbia for the overall period 1995-2006 in comparison with the EU regulations (125μg/m3) substantiates that about 60% of the population covered by the network of measurement sites from which the results were processed were not affected by any excess, while about 18% were exposed to excess levels for more than 6 days per year (Figure 23) (4).

Figure 23. Percentage of the population exposed to varying frequencies of exceeding daily emission concentration of sulfur dioxide of 125μg/m3, Serbia, 1995–2006



Source: Ministry of Environment and Spatial Planning, Environmental Protection Agency of the Republic of Serbia, The report on the condition of the environment in Republic of Serbia for the year 2006

Black smoke

The number of settlements and measurement sites in the local network of urban stations on the territory of the Republic of Serbia from which the data on the black smoke levels were measured had risen over the period 1997-2006 (Table 2) (6).

The mean annual value of soot concentration has been monitored systematically in the local

Table 2. Number of settlements and measuring stations covered by the data on levels of black smoke (soot) in the local network of urban stations, Serbia, 1997-2006

Indicator	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Number of settlements	21	27	26	15	20	21	21	26	25	29
Number of measuring stations	91	89	102	60	88	96	93	104	100	109

Source: Institute of Public Health of Serbia

network of urban stations that was the same as the network for monitoring the sulfur dioxide levels (17 sites). Over the studied period, not a single settlement registered excess of the allowed mean annual limit for over five years in the local network of urban stations of 50μg/m3, as stipulated in the local regulations (3).

Pollutants indicating specific pollution

Specific pollutants monitored in Serbia include non-organic and organic substances primarily reaching the air from industrial sources and motor vehicles or occur in the atmosphere as a result of interactions.

The number of settlements and measurement sites for which the data on concentration of pollutants in the local network of urban stations on the territory of the Republic of Serbia (1997-2006) are obtained continued to rise, after a mild fall (2000-2005) (Table 3).

Nitrogen dioxide

Nitrogen dioxide was continuously monitored, for over five years, in seven settlements in the Republic of Serbia (Table 4). In 2006, the annual mean emission limit value (LVE) of 60μg/m3, as stipulated in the local regulations was exceeded only in the vicinity of the Vreoci Power Plant.

The results of 2006 nitrogen dioxide levels covered 19.9% of the population of Serbia (4). The 1995-2006 excesses of the nitrogen dioxide mean annual emission limits value, pursuant to the EU regulations (40μg/m3) show that abut 10% of the population covered by the network of measurement sites were exposed to such excesses (Figure 24) (4,5).

Table 3. Extent of specific toxic substances monitoring in the network of health service measuring stations, Serbia 1997-2006

Indicator	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Number of settlements	14	14	17	8	12	10	10	11	16	18
Number of measuring stations	75	80	88	43	44	36	46	49	56	74

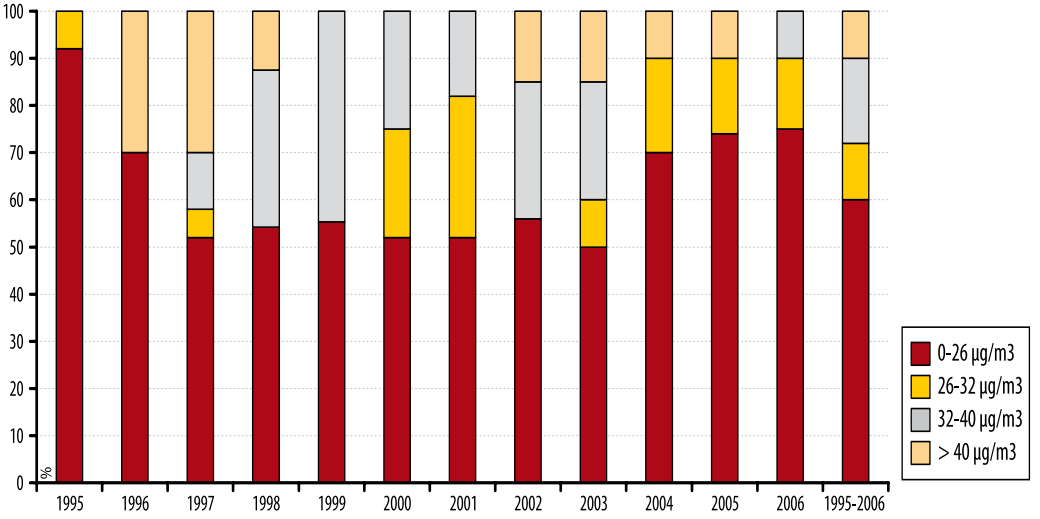
Source: Institute of Public Health of Serbia

Table 4. Annual mean level of nitrogen dioxide (μg/m3) in the network of health service measuring stations, Serbia 1997-2006

Settlement	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Belgrade	21.0	37.0	34.6	28.7	21.2	21.2	43.5	28.6	31.0	26.1
Vreoci	42.3	11.7	-	-	-	7.5	43.5	38.4	40.8	62.1
Kragujevac	-	14.2	-	-	-	-	22.6	45.8	24.6	39.3
Krusevac	28.8	28.4	37.6	-	26.0	16.9	14.4	10.9	13.5	15.8
Novi Sad	32.2	-	-	-	-	14.0	12.0	9.0	6.0	11.1
Pancevo	-	-	12.0	-	12.0	19.0	-	26.0	24.5	24.0
Subotica	0.2	3.9	10.0	10.5	-	8.7	11.4	9.5	12.9	13.4

Source: Institute of Public Health of Serbia

Figure 24. Percentage of the population exposed to levels of nitrogen dioxide exceeding the annual emission concentration of 40 µg/m3, Serbia, 1995-2006



Source: Ministry of Environment and Spatial Planning, Environmental Protection Agency of the Republic of Serbia, The report on the condition of the environment in Republic of Serbia for the year 2006.

Suspended particles

Suspended particles (PM10) were systematically recorded only in Belgrade (Table 5). The processed results showed major excesses of daily values, particularly in winter months (in 48% of cases the daily values exceeded the EU limit of 50µg/m3) (4)

Table 5. Annual average levels of particulate matter (PM10 , µg/m3)* in the network of Republic of Serbia Health Service stations, Republic of Serbia 1997-2006

Settlement	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Belgrade	106.9	-	519.9	-	120.4	169.0	196.7	218.4	175.4	211.6
Grabovac	-	-	-	-	91.4	129.9	126.9	225.4	174.5	280.0
Mladenovac	-	-	-	-	97.7	87.3	165.0	176.2	94.9	132.5
Novi Sad	-	-	-	-	-	-	-	207.0	-	171.5
Pancevo	-	-	-	-	-	-	-	160.0	172.0	209.5

* GVE (guidelines value of emission, by domestic norms)-70,0 µg/m3
Source: Institute of Public Health of Serbia

References:

1. Environmental Protection Law. Official Gazette of the Republic of Serbia, No. 135/04

2. The Air Quality Control Program 2006-2007 (in Serbian). Official Gazette of the Republic of Serbia, No. 23/06.

3. Manual for border values, emission measuring methods, measuring station set up criteria and data recording (in Serbian). Official Gazette of the Republic of Serbia, No 54/92.

4. The report on the condition of the environment in Republic of Serbia for the year 2006 (in Serbian). Ministry of Environment and Spatial planning, Serbian Environmental Protection Agency, Belgrade 2007, p:51-70
Available at:
http://www.sepa.sr.gov.yu/download/Izvestaj_o_stanju_zivotne_sredine_2006.pdf

5. Environmental indicators in Republic of Serbia-Short Guide. UNDP and Serbian Environmental Protection Agency, Belgrade 2007, p:12.
Available at:
http://www.sepa.sr.gov.yu/download/Indikatori.pdf

6. Institute of Public Health of Serbia. The report on air pollution in the network of health service stations in Republic of Serbia (in Serbian), Belgrade: Institute of Public Health of Serbia; 1997-2000
Available at:
http://www.batut.org.rs

The period 1997-2007 is characterized with increased scope of control and falling trend of food unsafety, as well as increased control (in scope and content) of reduction of microbiological unsafety of items of general use.

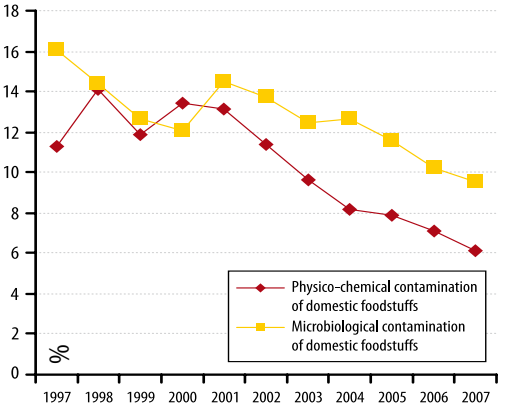
Proper nutrition as one of the most important factors for maintenance and promotion of health, in addition to proper selection, optimal intake of nutrients implies also adequate supply of sufficient quantity of food for each person. However, neither sufficient supply of food, nor correct selection of foodstuffs is relevant unless they are safe and of proven quality, i.e. they have to be health safe. Food and foodstuffs are safe if they pose no risk for human health, i.e. if they are not contaminated with physical, chemical and biological agents. Both, foodstuffs and items of general use must fulfill food safety criteria for.

Results of food safety control

In the studied period, the scope of microbiological control in the Republic of Serbia reached the volume approximating the one stipulated in the Law on Health Safety of Foodstuffs and Items of General Use (Official Gazette SFRY, no. 53/91), annual work plans and recommendations (from 5.6 samples/1000 population per year in 1997 to 11.2 samples/1000 population per year in 2007). The scope of physico-chemical control was increased 1.8 times (Table 6) over the studied period. In 1997 the number of samples per 1000 population was 4.5 rising to 7.9 in 2007. The trends registered for domestic foodstuffs

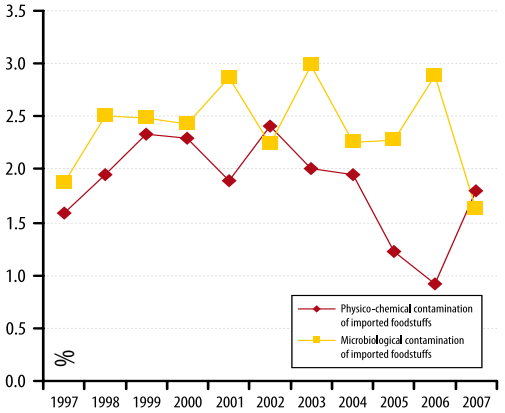
suggest a significant fall of microbiological and physico-chemical safety in the studied period (Figure 25). The same trend is characteristic of microbiological safety of imported foodstuffs, while after an initial fall of their physico-chemical unsafety, rise was recorded again in 2007 (Figure 26).

Figure 25. Percentage of contaminated foodstuffs samples of domestic origin by the type of examination, Serbia, 1997–2007



Source: Institute of Public Health of Serbia, Reports on health safety of foodstuffs and items of general use

Figure 26. Percentage of contaminated foodstuffs samples from imports according to the type of examination, Serbia, 1997–2007



Source: Institute of Public Health of Serbia, Reports on health safety of foodstuffs and items of general use

Control checks are dominated by microbiological tests and tests of content of nutrients that define biological value of foodstuffs. Within the physico-chemical control of the foodstuffs, particularly of the domestic origin, only a small number of samples were subjected to complete examination. Most common causes of microbiological contamination were findings of (conditionally) pathogenic bacteria and saprophytes exceeding the set limits, and physico-chemical contamination is usually associated with inadequate contents and organoleptic characteristics (Table 7).

Results of health safety control of items of general use

In the Republic of Serbia control of health safety of items of general use was significantly increased in the studied period. The trends of unsafety of these samples suggest mild rise of physico-chemical unsafety of imported products and major fall of general microbiological unsafety of items of general use (Table 8). Although the main cause of microbiological contamination of items of general use that are covered by this type of tests relate to findings in the group "Other", the true cause is impossible to identify. The reason for this lies in the recording methodology applied so far, whereby different causes of microbiological contamination are presented together (*Pseudomonas aeruginosa*, *E. coli*, *Proteus species*, and total number of aerobic mesophilic bacteria) (Table 9). Amendments to the methodology are expected in near future. Most common causes of physico-chemical unsafety are inadequate contents and organoleptic characteristics (Table 10).

Table 6. Number of controlled and contaminated foodstuff samples by the type of tests, Serbia, 1997–2007

Year	DOMESTIC PRODUCTION				IMPORT			
	Physico-chemical tests		Microbiological tests		Physico-chemical tests		Microbiological tests	
	Number of controlled samples	Number of contaminated samples	Number of controlled samples	Number of contaminated samples	Number of controlled samples	Number of contaminated samples	Number of controlled samples	Number of contaminated samples
1997	24,425	2762	40,984	6562	19,843	313	14,058	265
1998	27,870	3930	44,745	6461	20,223	395	10,618	267
1999	25,638	3055	34,235	4342	10,322	241	9277	231
2000	29,527	3959	41,637	5015	9939	229	7284	176
2001	30,182	3968	48,745	7068	20,264	384	14,200	407
2002	35,258	4009	51,865	7138	13,318	321	10,476	234
2003	33,869	3258	55,748	6962	9985	201	8348	250
2004	36,367	2988	65,262	8270	26,531	521	15,111	342
2005	34,946	2755	69,543	8053	28,914	355	12,779	292
2006	35,394	2525	72,733	7448	23,707	215	11,002	317
2007	36,380	2247	74,709	7158	23,216	416	9253	150

Source: Institute of Public Health of Serbia

Table 7. Percentage of foodstuff samples with physico-chemical and microbiological contamination, Serbia, 1997–2007

Year	MICROBIOLOGICAL CONTAMINATION (%)					PHYSICO-CHEMICAL CONTAMINATION (%)							
	Salmonella	Coagulase-positive Staphylococcus	Yeast and mold	Insects and parasites	Other	Pesticides	Additives	Lead	Cadmium	Mercury	Arsenic	Composition	Organoleptic characteristics
1997	0.14	2.71	1.19	0.07	9.90	0.07	3.51	0.18	0.39	0.11	0.06	6.94	2.91
1998	0.12	1.86	1.10	0.16	9.54	0.02	4.74	0.06	0.30	0.27	0.00	8.58	2.04
1999	0.21	1.84	1.00	0.22	8.16	0.00	4.50	0.25	0.32	0.08	0.04	9.60	2.33
2000	0.26	2.13	1.19	0.17	8.56	0.01	6.27	0.15	0.20	0.06	0.00	11.00	1.65
2001	0.76	1.66	1.57	0.15	9.67	0.00	3.87	0.19	0.27	0.10	0.08	10.15	2.09
2002	0.06	1.73	1.44	0.19	8.90	0.07	5.42	0.23	0.28	0.18	0.09	10.29	1.08
2003	0.08	1.71	1.57	0.23	8.71	0.00	2.38	0.11	0.50	0.09	0.13	9.00	1.67
2004	0.08	1.70	1.31	0.16	8.25	0.00	0.72	0.19	0.31	0.05	0.06	6.76	1.03
2005	0.07	1.90	1.11	0.19	7.64	0.00	0.57	0.13	0.19	0.04	0.01	5.82	0.95
2006	0.06	1.76	0.71	0.15	6.99	0.04	1.08	0.09	0.27	0.04	0.06	5.05	1.16
2007	0.04	1.85	1.26	0.07	6.05	0.00	0.80	0.16	0.31	0.01	0.09	5.14	1.16

Source: Institute of Public Health of Serbia

Table 8. Number of controlled and contaminated samples of items of general use by the type of tests, Serbia, 1997–2007

Year	DOMESTIC PRODUCTION						IMPORT					
	Physico-chemical tests			Microbiological tests			Physico-chemical tests			Microbiological tests		
	Number of controlled samples	Number of contaminated samples	% of contaminated samples	Number of controlled samples	Number of contaminated samples	% of contaminated samples	Number of controlled samples	Number of contaminated samples	% of contaminated samples	Number of controlled samples	Number of contaminated samples	% of contaminated samples
1997	1732	48	2.8	2445	112	4.6	5193	53	1.0	1137	24	2.1
1998	1245	36	2.9	2709	328	12.1	5379	129	2.4	1302	38	2.9
1999	1385	46	3.3	1826	314	17.2	4859	29	0.6	901	12	1.3
2000	1802	52	2.9	3073	669	21.8	4782	33	0.7	1357	32	2.4
2001	1634	19	1.2	3081	397	12.9	8733	177	2.0	2467	41	1.7
2002	5096	413	8.1	5096	413	8.1	9896	145	1.5	4230	112	2.7
2003	2281	63	2.8	3748	494	13.2	8984	175	2.0	2078	14	0.7
2004	2368	47	2.0	3754	445	11.9	14,026	258	1.8	3290	33	1.0
2005	2727	69	2.5	2068	85	4.1	14,158	313	2.2	3494	14	0.4
2006	3318	117	3.5	2444	58	2.4	15,932	372	2.3	3854	68	1.8
2007	3562	130	3.7	3051	122	4.0	20,713	586	2.8	4561	19	0.4

Source: Institute of Public Health of Serbia

Table 9. Percentage of samples of items of general use not in compliance with microbiological standards, Serbia, 1997–2007

Year	DOMESTIC PRODUCTION (%)				IMPORT (%)			
	Salmonella	Coagulase-positive Staphylococcus	Yeast and mold	Other	Salmonella	Coagulase-positive Staphylococcus	Yeast and mold	Other
1997	0.16	0.33	0.08	4.09	0.00	0.00	1.41	0.79
1998	0.07	0.55	0.78	0.52	0.00	0.00	2.30	1.46
1999	0.00	0.00	1.37	16.87	0.00	0.00	0.89	1.33
2000	0.00	0.33	0.75	21.15	0.00	0.00	0.00	2.36
2001	0.00	0.10	1.07	12.14	0.00	0.00	1.22	0.77
2002	0.00	0.04	0.51	7.46	0.00	0.00	0.05	2.32
2003	0.00	0.45	1.01	3.12	0.00	0.00	0.24	0.43
2004	0.00	0.37	0.80	10.95	0.00	0.06	0.15	0.82
2005	0.00	0.53	0.24	4.06	0.00	0.00	0.03	0.37
2006	0.04	0.12	0.37	2.00	0.26	0.57	0.31	1.19
2007	0.00	0.00	0.10	1.54	0.00	0.00	0.04	0.21

Source: Institute of Public Health of Serbia

Table 10. Percentage of samples of items of general use not in compliance with physico-chemical standards, Serbia, 1997–2007

	PHYSICO-CHEMICAL CONTAMINATION (%)											
Year	Total	Composition	Organoleptic characteristics	pH	Total migration	Specific migration	Lead	Cadmium	Mercury	Arsenic	Pesticides	Other
1997	1.46	0.13	0.33	0.97	0.24	2.16	0.47	0.23	0.00	0.00	0.15	2.48
1998	2.49	0.21	1.14	0.21	0.97	0.58	0.91	0.00	0.00	0.10	0.00	1.98
1999	1.22	1.30	0.09	0.43	0.00	0.00	0.32	0.07	0.00	0.00	0.00	2.39
2000	1.29	1.38	0.19	1.57	0.13	0.00	0.39	0.42	0.61	0.15	0.00	1.67
2001	1.89	0.00	0.37	0.09	0.65	0.10	0.48	0.44	0.00	0.00	0.00	1.93
2002	1.53	0.41	0.75	0.32	0.38	0.27	0.53	0.17	0.05	0.05	0.00	1.71
2003	2.11	0.81	0.57	0.14	0.35	0.39	0.52	0.20	0.00	0.00	0.00	4.28
2004	1.86	0.45	0.84	0.36	1.05	0.35	0.52	0.22	0.03	0.01	0.00	1.91
2005	2.26	0.59	0.95	0.31	0.93	0.99	0.32	0.26	0.02	0.01	0.00	2.21
2006	2.54	0.59	1.01	0.30	0.96	0.54	0.36	0.14	0.03	0.05	0.00	2.39
2007	2.95	0.50	1.21	0.33	0.71	0.98	0.49	0.23	0.03	0.02	0.00	3.16

Source: Institute of Public Health of Serbia

References:

1. Institute of Public Health of Serbia: Annual reports on health safety of foodstuffs and items of general use, Belgrade (in Serbian): Institute of Public Health of Serbia; 1997-2007.

On the territory of Serbia, the problem of disposal of liquid and solid waste is reflected in their origin and content, mode of collection, transport, disposal and processing, as well as use of effective technological solutions of waste processing and pertinent legislation.

Liquid waste

Liquid waste generated in households, industry and agriculture may violate the quality of environment, particularly surface waters, ground waters and accumulations they flow into. They have a major impact on changes in physico-chemical features of the surface and ground waters, as well as their microbiological, biochemical and biological characteristics. Therefore, they present a health risk factor for the population and a problem with drinking water treatment and processing.

Sewerage connections. In 2006 in Serbia 92.2% of households were connected to the sewerage system (1). In the same year, sanitary way of disposal of household waste (implying flush toilet with connection to sewerage system or septic tank) was available to 87.7% of the population. If, in addition to the above, the improved mode of disposal of waste water included no-flush toilet with water sealed pit and outdoor latrine, the percentage of Serbian population who had improved way of disposal of waste water from the household reached 99.1% (2,3).

In 2007 in the Republic of Serbia about 75% of urban population and only 9% of the rural population were connected to the public sewerage system (4).

Quantity of waste water. In 1999-2005 in Serbia the quantity of waste water from settlements rose (Table 11) (5).

The total quantity of waste water produced on a daily level in industry rose from 6.5 million cubic meters in 2000 to 9 million cubic meters in 2004. About 75% of inorganic waste water was produced in 10 out of 250 existing

Table 11. Amount and origin of waste water from the settlements (thousands m3), Serbia, 1999, 2004 and 2005

Year	Total amount of waste water from the settlements	Origin of waste water		
		Households	Industry	Other
1999	369,677	244,063	106,876	18,728
2004	374,411	255,834	107,114	11,463
2005	388,763	269,746	106,798	12,219

Source: Waste water from the settlements; Environment, http://webrzs.statserb.sr.gov.yu/axd

industrial plants in Serbia (6). Within the 2007 study of industrial waste waters conducted by public health care institutions in Serbia, it was established that out of 604 studied plants, 20% had flow rate under 10m3/h. These data (regardless of their covering a small number of plants) are important because they suggest continuous, but minor environmental pollution caused by industry (7).

Industrial waste waters flow into the sewerage systems, superficial waters, lagoons, septic tanks or combination of these receptacles. Between 47% and 57% of the total number of waste water flows studied by public health institutions in Serbia (2005-2007) were discharged into the sewerage system. Broken down by industries, it appears that most of discharges of waste waters originate from food processing and chemical industries. In the course of 2007 when industrial waste waters were studied comprising 604 plants, it was found that 740 are discharged into different receptacles (7).

Waste water processing in Serbia is on a low level. Only 8% of households that are connected to the sewerage had systems for processing with the primary (mechanical) and secondary treatment, while plants with tertiary treatment were not available at all. The largest cities, Belgrade and Novi Sad did not have plants for waste water processing (8). Pursuant to the 1999, 2004 and 2005 data the number of settlements equipped with overall waste water processing was increased. In Serbia, the amount of waste water undergoing processing rose from 16.5% in 1999 to 24.9% in 2005 (5). In the period 2005-2007 the network of public health institution studied industrial waste waters noting that most of plants discharged their waste water without previous purification (Table 12) (7).

Table 12. Treatment of industrial waste water, Serbia, 2005–2007

Year	Number of industry plants			
	Total	Treated waste water	Untreated waste water	No data
2005	267	100	167	-
2006	495	187	278	30
2007	604	252	310	42

Source: Ecomaps 2005, 2006,2007, http://www.batut.org.rs

In the period 2003-2006 different ways of waste water processing were reported, biological or mechanical purifications. However, vast majority (75%) of municipalities with 81% population they accommodate did not have any water purification plants (9). In 2002 Serbia had 37 sanitary plants for waste water processing: 7 for the primary treatment and 30 for secondary and biological treatments (7 were over 30 years old). In 2007 twenty municipalities (16% of the population) had waste water processing plants. It is estimated that only 13% of all factories for water treatment are satisfactory. Only 12% of the communal waste waters were treated. The industrial sector had 120 larger facilities for treatment of industrial and waste waters from mines. The amount of treated industrial waters fell from 11% (2000) to 3% (2004) (8).

References:

1. Statistical Office of Republic of Serbia. Living standard measurement study – Serbia 2002–2007. Belgrade: Republic Office, 2008.

2. National health Survey, Serbia 2006. Final report. Ministry of Health of the Republic of Serbia; Belgrade: 2007.
Available at:
http://www.batut.org.rs

3. Millenium Devlopment Goals Indicators [Main page on Internet].
Available at:
http://www.undp.org/mdg/

4. The report on the condition of the environment in Republic of Serbia for the year 2007 (in Serbian). Ministry of Environment and Spatial planning, Serbian Environmental Protection Agency, Belgrade: 2008.
Available at:
http://www.sepa.sr.gov.yu

5. Statistical Office of the Republic of Serbia. [Main page on Internet] Environment. Waste waters from settlements.
Available at:
http://webrzs.statserb.sr.gov.yu/axd

6. The report on the condition of the environment in Republic of Serbia for the year 2006 (in Serbian). Ministry of Environment and Spatial Planning, Serbian Environmental Protection Agency, Belgrade: 2007.
Available at:
http://www.sepa.sr.gov.yu

7. Institute of Public Health of Serbia. [Main page on Internet] Ecomaps 2005, 2006, 2007.
Available at:
http://www.batut.org.rs

8. State of Environment – Republic of Serbia – Second review. Ministry of Environment and UE Commission for Environmental Policy; Belgrade: 2007.
Available at:
http://www.ekoplan.gov.rs/php/index.php

9. State of Environment in Serbia, 2002. Ministry of Environment and UE Commission for Environmental Policy; Belgrade: 2003.
Available at:
http://www.ekoplan.gov.rs/php/index.php

Solid waste

Inadequate management of solid waste is one of more serious problems from the point of view of environmental protection in Serbia. It is characterized with a large amount of generated waste and inadequate collection and displacement, technology of disposal and inadequate position of the society in general. Number and improper location of landfills are a huge issue. Most of the landfills correspond more to "dumpsites"; they accommodate mixed types of waste, sorting is usually not performed, while recycling is only scarce. The landfills are not safe enough.

In Serbia, about 0.63 kg of waste are generated per person daily, i.e. 230 kg annually (1). Public utility companies are in charge of collection and transport of the waste, where 58% of the population are covered by organized waste collection. Most commonly, the transportation is carried out directly to the landfills, without previous organized sorting of the waste by the source. Rural areas are not covered by organized collection of waste, so that the people in rural settlements burn own waste or dispose of it on wild dumpsites.

Contrary to Serbia where almost all solid waste ends up unused at the landfills, in the EU countries great step forward has been made since 17% of the waste are incinerated, 33% are recycled and 49% are disposed of in landfills (2).

In 2006 in Serbia, 1.73 million tons of communal solid waste were produced, out of which 1.04 million tons were collected and disposed of in landfills. In the structure of the disposed waste, a large amount accounts for waste of unknown origin, while the part with known contents is dominated by organic waste, food, glass, plastic and paper. According to the 2005 data analyzed for 163 landfills, at 117 landfill layers of dirt or soil or other inert material were used to bury the waste. Most municipalities have mechanization and vehicles for garbage collection: from special trucks to ordinary trucks and tractors with trailers. Also, 7.3% of the landfills are less than 100m away from the settlements; 15.2% are less than 50m from the bank of a river, stream, lake or accumulation; 6.7% of landfills are situated less than 500m from the water supply area, and 12.2% are less than 1000m away. In all, 34 landfills have electricity supply, 25 had water supply, and 10 sewerage system. Internal roads were regulated in 48 landfills; 33 have fire-fighting equipment, and only 12 a system for gas collection (1).

The main features of urban and rural landfills are monitored within Program of Population Protection from Communicable Diseases, by the common effort of district institutes for public health (3,4). The 2007 data obtained from that source only confirmed the information supplied by the Environment Protection Agency, i.e. urban landfills were mostly unsanitary and only in somewhat over a half burial is conducted (Table 13).

In rural areas, only 305 out of 3992 studied settlements had registered landfill (7.6%). In settlements without landfills, disposal was not organized, where waste from rural households was usually dumped beyond the village limits (85.7%), in the back yard (66%) and nearby waterway (50.4%) (Table 14).

The 2003 National Waste Management Strategy and several accompanying laws and by-laws that are in the Parliamentary proce-

Table 13. Urban waste landfills in Serbia, 2007

YEAR	NUMBER OF CITIES	FINAL SOLID WASTE DISPOSAL LANDFILL							
		LANDFILL							
		YES	NO	SANITARY LANDFILL		SOIL COVERING/BURYING		SPECIAL VEHICLES	
				YES	NO	YES	NO	YES	NO
2007	160	132	29	19	113	85	47	127	7

Source: Institute of Public Health of Serbia, Report on realization of the Program for population protection from communicable diseases for the year 2007

dure for imminent enactment will provide necessary prerequisites for cost-effective and sustainable waste management of the level of the Republic of Serbia (2).

Table 14. Rural waste landfills in Serbia, 2007

YEAR	NUMBER OF SETTLEMENTS	FINAL SOLID WASTE DISPOSAL				
		LANDFILL		WASTE DISCARD		
		YES	NO	OUT OF VILLAGE LIMITS	WATER WAY	BACKYARD
2007	3 992	305	3 687	3 161	1 858	2 436

Source: Institute of Public Health of Serbia, Report on realization of the Program for population protection from communicable diseases for the year 2007

References:

1. Cadastre of waste landfills. Environmental Protection Agency, Ministry of Environment and Spatial Planning of the Republic of Serbia. Available at: http://www.sepa.sr.gov.yu

2. Waste and waste management. Environmental Protection Agency, Ministry of Environment and Spatial Planning of the Republic of Serbia. Available at: http://www.sepa.sr.gov.yu

3. Institute of Public Health of Serbia. Ecomaps 2005, 2006, 2007. Available at: http://www.batut.org.rs

4. Institute of Public Health of Serbia. Report on realization of the Program for population protection from communicable diseases for the year 2007, Belgrade: Institute of Public Health of Serbia: 2008.

Eating habits of the population of Serbia are characterized with irregular meals during the day, low intake of fruits and vegetables with concomitant high intake of high energy foods. As a consequence of poor eating habits Serbia has a rising trend of overweight and obese children; over 50% of adults are overweight, with concomitant substantial deficit of micronutrients.

Substantial demographic and economic changes in the previous decade with modernization, urbanization and globalization of the world food market have significantly affected access of food to the population of Serbia and, at the same time, their eating habits and nutritional status.

Regular diet as one of the main factors for maintenance and promotion of human health implies regular intake of meals during the day, diversity in selection of foodstuffs and their appropriate representation, as well as mode of preparation in everyday diet. Supply of sufficient amount of food and balanced ratios of health safe food are the main prerequisites for proper nutrition. Culture and customs, influence of family and social environment, as well as accessibility of food are of great importance not only for selection of types of foodstuffs, but for organization of meals during the day and mode of their preparation. Eating habits affect several aspects of health, including subjective evaluation of health, other life habits (such as physical activity), functional state and use of health care, while improper diet is an important risk factor for the occurrence of numerous various health disorders.

In the period 1997-2007 diet of the population of Serbia was not satisfactory and was a risk factor for the occurrence of chronic non-communicable diseases, primarily health disorders resulting from excessive or insufficient nutrition (deficits of micro or macronutrients) (1,2,3). Modern

way of life characterized with long working hours, great distances between home and work, irregular intake of meals and at least one meal a day out of home, are only some of the reasons for increased incidence of health problems rooted in improper diet. Coverage of population of Serbia by the so-called "collective meals", which actually implies organized meals in pre-school institutions, elementary schools, boarding schools, homes for children and the elderly, and in companies was significantly reduced in the previous decade.

Availability of food groups

Data on availability of some food groups are regularly collected by the Statistical Office of the Republic of Serbia in surveys conducted on consumption of foodstuffs in households, while additional data on dietary habits are provided by population studies. Since 2003 collection of data on the average consumption of some food groups per capita has been conducted pursuant the methodology harmonized with Eurostat standards, so that availability of main food groups has been analyzed for the period 2003-2007. Figure 27 illustrates the average daily intake per capita for 13 food groups in Serbia for the stated years.

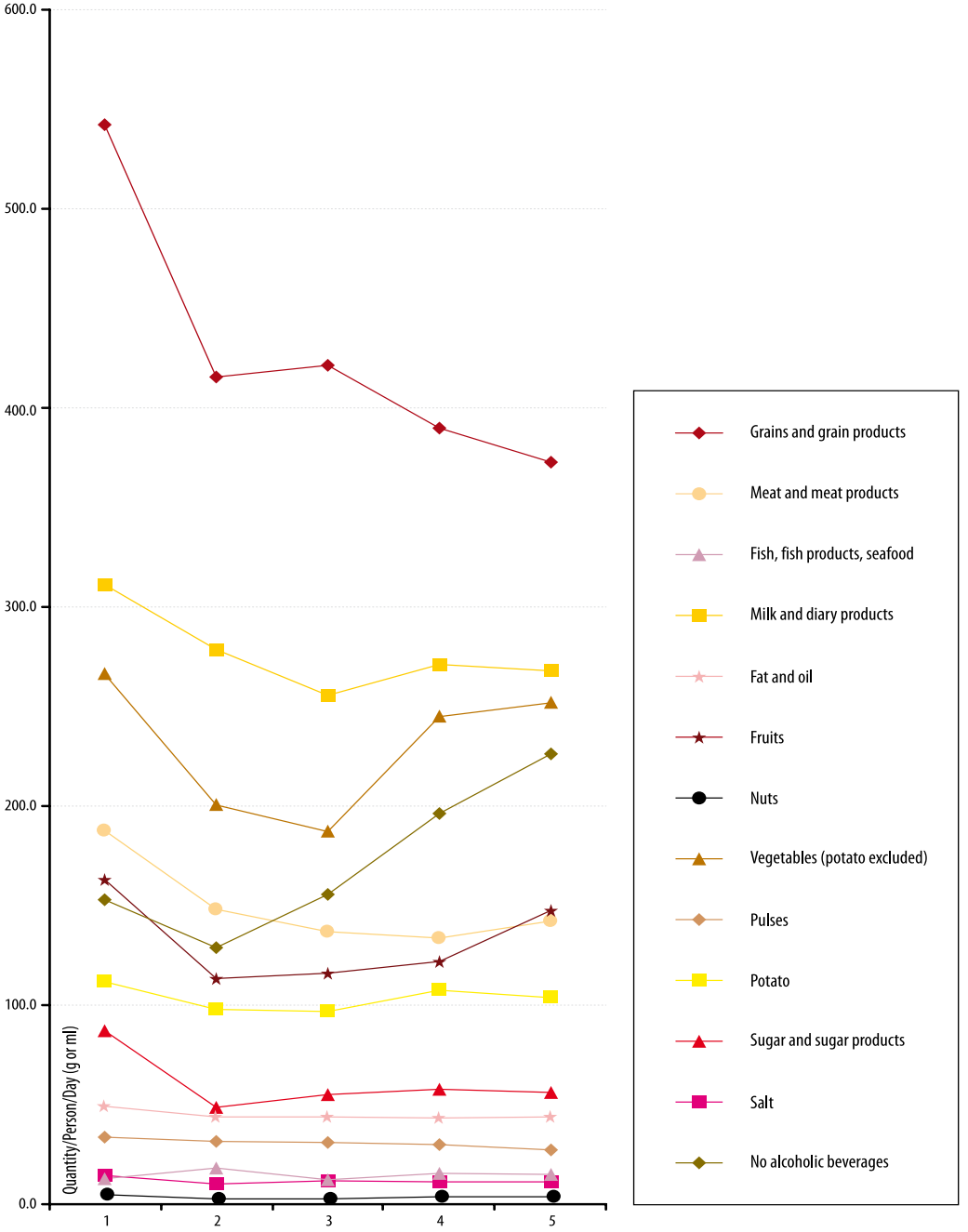
Consumption of all food groups, except for the fish and seafood, shows a falling trend over the studied period. The average intake of pulses (leguminous plants), oils and fats has not changes significantly. Higher average consumption of non-alcoholic beverages and fruits in urban areas was noted in the studied period, with concomitant increased consumption of sugar, cereals and grain products and salt in rural areas of Serbia (Figure 28).

Dietary habits of the Serbian population

Data on dietary habits of the population of Serbia were obtained within the 2000 and 2006 health surveys of the population of Serbia. According to the results of these studies, regularity of meals in Serbia was reduced in comparison with 2000. Over ¾ of adults had proper breakfast (77.6%), which is an increase in comparison with 2000 (71.9%). As to selection of certain foods in diet (Table 15) (1), in 2006 over a half of adult population of Serbia (57.2%) used mostly white bread and 14.8% used whole grain, rye and similar kinds of bread. Use of animal fat for food preparing was reduced in 2006 to 33.8% in comparison with 2000 (40.5%). In 2006, fresh fruits and vegetables were part of daily diet of 54.8%, i.e. 44.0% adults, which is significantly more than in 2000 (42.5% of all population, i.e. 34.4% adults).

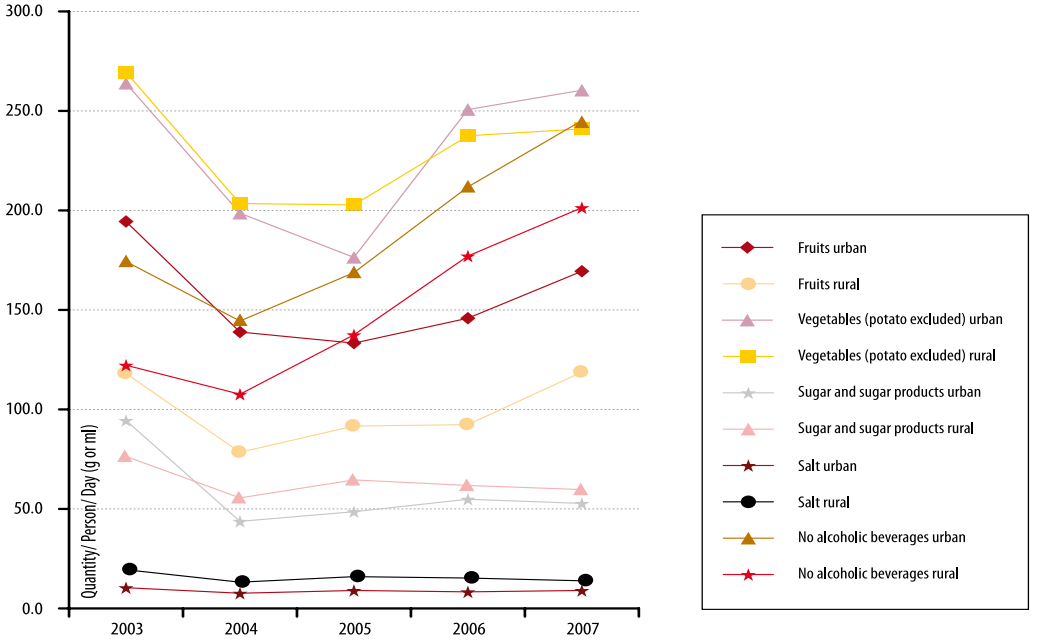
In the population of children and adolescents aged 7-19 years not all meals comply with the nutritive recommendations. In 2006 in Serbia 87.3% of children took their breakfast every day, and 74.4% had all three meals per day, which is a decrease in comparison with 2000 (Table 16) (2). In 2006, significantly fewer children and adolescents took at least one glass of milk or dairy products in comparison with the 2000 data (57.5 versus 62.0%). Also, the number of children that take at least one glass of milk or dairy

Figure 27. Daily average food consumption per person, Serbia, 2003–2007



Source: Household survey on food consumption, Statistical Office of Republic of Serbia, 2003–2007

Figure 28. Daily average consumption of selected food groups in urban and rural areas, Serbia, 2003–2007



Source: Household survey on food consumption, Statistical Office of Republic of Serbia, 2003–2007

products significantly falls with age. Over a half of children and adolescents (51.6%) eat fresh fruits every day. In 2006 about a half of the young people (48.9%) used fresh vegetables every day, which is an improvement in comparison with 2000 (46.3%). Percentage of young people that have health in mind when choosing what to eat was significantly increased in 2006 in comparison with 2000 (36.7% versus 22.0%).

Nutritional status of Serbian population

Nutritional status of the Serbian population is not systematically monitored for the whole population, while regular measure-

Table 15. Dietary habits in adult population, Serbia, 2000 and 2006

Dietary habits in adult population	Percentage of adult population	
	2000	2006
Three main meals	71.9	56.6
Mostly prevalent use of white bread	43.4	57.2
Use of animal fat	40.5	33.8
Use of fish less than once a week	62.7	48.7
Daily use of fresh vegetables	42.5	54.8
Daily use of fresh fruits	34.4	44.0

Source: National Health Survey Serbia, 2000 and 2006

ments of body weight and height are conducted for pre-school and school children, and partially university students (check-ups once a year before school, in odd grades of elementary and secondary schools, and odd years of university studies). Nutritional status of different groups of population is estimated on the basis of special studies.

the prevalence of underweight children under 5 years of age reached almost 2%; stunting was recorded in 6% of children, 3% of children had low body weight for their height, and almost 15% of children were obese (Table 17) (6).

According to the 2006 health survey of the Serbian population two thirds of children and

Table 16. Dietary habits in children and adolescents, Serbia, 2000 and 2006

Dietary habits in children and adolescents	Percentage of children and adolescents	
	2000	2006
Three main meals	85.6	74.4
Mostly prevalent use of white bread	58.6	74.6
Use of animal fat	41.1	31.6
Use of fish less than once a week	61.5	52.8
Daily use of fresh vegetables	46.3	48.9
Daily use of fresh fruits	46.2	51.6

Source: National Health Survey Serbia, 2000 and 2006

Nutritional status is an important indicator of health. In the period 1997 to 2007 percentage of children with low birth weight ranged from 4.9% (1997) and 5.9% (2003) to 5.6% (2007) when it was somewhat below the value recorded in 2003 (5,6,7,8). On the basis of 1996 and 2000 studies the prevalence of underweight and obesity do not change significantly, and for ten years now there is a trend of increasing prevalence of stunting (1). According to the UNICEF 2005 Multiple Indicator Cluster Survey (MICS3) adolescents were in the normal nutritional status (67.7%). Almost one fifth of the young (18%) were overweight or obese, which is an increase in comparison with 2000. Also, fall of the number of underweight children (6.2%) in comparison with 2000 (8.4%) (Table 18) was noted. The increase in the number of overweight and obese children resulted from poor dietary habits and insufficient exercise, presenting an important public health problem (18).

The data presented in the mentioned 2006 survey relating to nutritional status of

Table 17. Indicators of health status of children under five years of age, Serbia, 1996, 2000 and 2005

Indicators of health status of children under five years of age	Prevalence (%)		
	1996	2000	2005
Underweight children	0.6	1.9	1.6
Children with low body weight for height	2.2	3.7	3.3
Stunted children (too short for their age)	3.0	4.7	5.9

Source: UNICEF, Multiple Indicator Cluster Survey, 1996–2005

adult population show that every other adult in Serbia is overweight (54.5%) , i.e. 36.2% of adults are overweight (BMI>25kg/m2) and 18.3% are obese (BMI≥30 kg/m2) (Table 19). In spite of the fact that the data on the nutritional status do not differ substantially from the 2000 data, high prevalence of overweight and obese persons illustrates an important risk factor for the occurrence, course and outcome of many chronic non-communicable diseases.

Proper nutrition is important for prevention of iron deficiency anemia, which is the most common form of anemia in children under 5 and women aged 15-49 years. Results of the 2000 survey suggest that the prevalence of hemoglobin levels under 110g/L in children under 5 years of age was 29.4% (31.9% in urban and 26.9% in rural areas). Prevalence of sideropenic anemia in women aged 15-49 was 26.7% (no significant difference between rural and urban areas). The highest prevalence of sideropenic anemia in women with childbearing potential was registered in the area of Belgrade, reaching 31% (5).

Table 18. Nutritional status of children and adolescents 7–19 years of age, Serbia, 2000 and 2006

Nutritional status of children and adolescents 7–19 years of age (BMI)	Prevalence (%)	
	2000	2006
Underweight (< 18.5 kg/m^2)	8.4	6.2
Normal weight (18.5-24.9 kg/m^2)	69.9	67.7
Overweight (25.0-29.9 kg/m^2)	8.2	11.6
Obesity (> 30.0 kg/m^2)	4.4	6.4

Source: National Health Survey Serbia, 2000 and 2006
*BMI=Body Mass Index

Table 19. Nutritional status of adult population, Serbia, 2000 and 2006

Nutritional status of adult population (BMI*)	Prevalence (%)	
	2000	2006
Underweight (< 18.5 kg/m^2)	7.4	2.3
Normal weight (18.-24.9 kg/m^2)	38.6	38.3
Overweight (25.0-29.9 kg/m^2)	36.6	36.2
Obesity (> 30.0 kg/m^2)	17.3	18.3

Source: National Health Survey Serbia, 2000 and 2006
*BMI=Body Mass Index

References:

1. Institute of Public Health of Serbia. Health status, health needs and health care utilization of population of Republic of Serbia. Glasnik 2002; 76 (1-2): 39-48, 76-80.
2. Institute of Public Health of Serbia. Health status, health needs and health care utilization of population of Republic of Serbia. Glasnik 2002; 76 (3-4): 183-188.
3. Ministry of Health of Republic of Serbia. National health survey Serbia, 2006. Key findings. Ministry of Health of Republic of Serbia; Belgrade, 2007; 18-19, 22-24
4. Ministry of Health of Republic of Serbia. National health survey Serbia, 2006. Key findings. Ministry of Health of Republic of Serbia; Belgrade, 2007; 40; 43-4
5. UNICEF. Monitoring the situation of children and women. Multiple Indicator Cluster Survey. Belgrade: UNICEF Belgrade, 2000.
6. UNICEF. Monitoring the situation of children and women. Multiple Indicator Cluster Survey. Belgrade: UNICEF Belgrade, 2005.
7. UNICEF. Monitoring the situation of children and women. Multiple Indicator Cluster Survey. Belgrade: UNICEF Belgrade, 2007.
8. Statistical Office of Republic of Serbia. Birth register. Unpublished data for year 2007.

In adult population, 24% of women and 33% of men are daily smokers. Numerous promotional, educational and legislative activities have resulted in reduction of smoking, but more among men than women. Number of people exposed to passive smoking in their own homes as well as at work has also been reduced.

Nowadays, there are 1.3 billion smokers worldwide. Out of these 650 million will die as a consequence of tobacco use. It is even more alarming that hundreds of thousands of people will die of tobacco smoke inhaling although they have never been smokers (1,2).

For several years now activities on tobacco control have been implemented in Serbia: Committee for Smoking Prevention was set up, WHO Framework Convention on Tobacco Control was signed and ratified (3), Tobacco Control Office was established, Tobacco Control Strategy for the Republic of Serbia was adopted together with the 2007-2011 Action Plan (4), preventive and promotional anti-smoking activities (Reports on implemented activities) have been intensified, numerous studies (Serbian Population Health Survey, Global Survey of Tobacco Use in Young People, Global Survey of Tobacco Use in Health Workers, European School Project of Alcohol and Other Drugs), as well as studies on smoking ban indoors at the University of Belgrade; new laws have been enacted or old amended to promote tobacco control; cigarette contraband and illegal market have been substantially reduced (5).

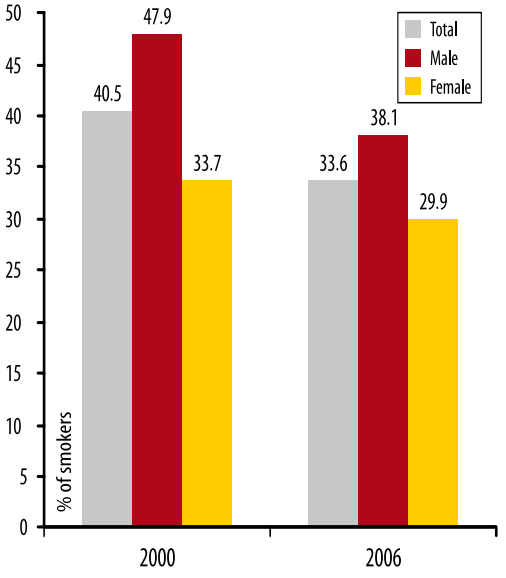
Smoking is the major single cause of most diseases (the heart and blood vessels, respiratory diseases, cancer and many other problems) that may be prevented among the Serbian population. People who quit smoking significantly reduce their risk of coronary diseases and lung cancer.

Finland is an obvious example where fifty years ago about 76% of adult men

smoked. Well designed programs helped reduce the number of smokers by two thirds, to about 26%. With drastic reduction of the number of smokers, mortality associated with myocardial infarction fell by 73%, the incidence of all types of cancer fell by 17%, of the primary bronchial cancer by 63%, life expectancy was significantly prolonged and multiple reduction in expenditures for sick leaves, drugs and hospitalizations ensued (6).

In Serbia, among adults, smoking in 2006 was reduced by 6.9% in comparison with 2000, amounting to 33.6%. Smoking was reduced by 9.8% and 3.8% in men and women, respectively (7) (Figure 29).

Figure 29. Smoking prevalence among adults, by gender, Serbia, 2000 and 2006



Source: Ministry of Health, National Health Survey Serbia, 2000 and 2006

Most smokers belong to the 35-44 yr age group (46.9%), people that are not classified as well off (36.7%), in urban settlements (36.7%) who have secondary school education (39.9%).

In 2006 in Serbia over three fifths of adult population (61.7%) were exposed to tobacco smoke at home and 44.9% at work, which is an improvement over 2000 (Table 20).

Table 20. Exposure to tobacco smoke of adult population at working place and home, Serbia, 2000 and 2006

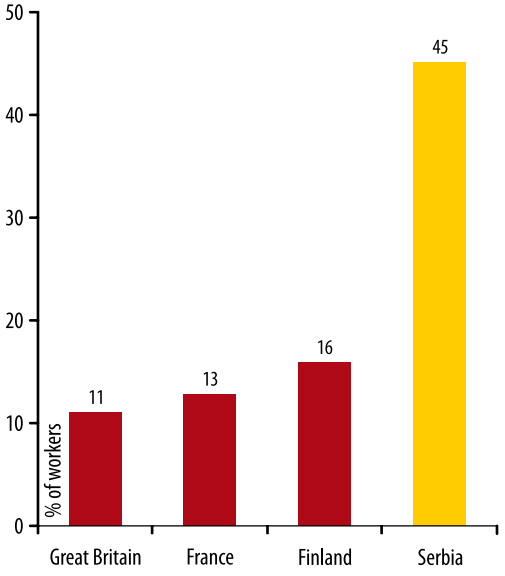
Exposure to tobacco smoke	Prevalence (%)	
	2000	2006
Working place	55.4	44.9
Home	65.7	61.7

Source: Ministry of Health, National Health Survey Serbia, 2000 and 2006

Exposure to tobacco smoke at home was higher for women (62.1%), while men were more exposed at work (49%). The greatest percentage of exposure to tobacco smoke at home (64.6%) and at work (50.5%) was noted in people classified as well off and those with secondary school education (66.8% and 51.8%, respectively). Age-wise, exposure to tobacco smoke at home was highest among the 20-34 and 35-44 yrs age groups.

The population of Serbia was exposed to tobacco smoke at work three to four times more that their counterparts in Finland, France or Great Britain (Figure 30).

Figure 30. Percentage of workers exposed to tobacco smoke at working place in Serbia and selected EU countries



Source: Kauppinen et al, Occup Environ Med, 2000; Alipour et al. J Occup Health 2006; Jamrozik, BMJ 2005; Kauppinen and Virtanen, Scand J Work Environ Health 2002; National Health Survey Serbia, 2000 and 200.

All EU member states have some regulations aimed at restriction of exposure to tobacco smoke in the environment and its health related adverse effects. The nature and scope of these regulations vary among the countries a great deal. Complete ban of smoking and at work and indoors, including bars and restaurants, was enacted in Ireland, Scotland, England and Wales. Anti-smoking legislation with certain exceptions was enacted in Sweden, France, Finland and Lithuania, where employers may allocate special smoking rooms with a separate ventilation system. The third group includes Belgium, Cyprus, Estonia, Holland, Slovenia and Spain where smoking is prohibited in public places indoors, with the exception of hospitality industry, where only partial restrictions apply (8).

In the last seven years, marked improvement has been made in the developing countries particularly the activities planned for 2008 and 2009, enactment of new legislations and implementation thereof (9).

In Serbia there are a number of regulations on tobacco control. These are laws and by-laws primarily covering the area of tobacco control or containing provisions relevant for the issue. The Law on Smoking Ban Indoors is imprecise and outdated and should be replaced by a new one. New piece of legislation and its adoption are planned in 2009 (10).

Over a half of school children in Serbia aged 13 to15 (54.7%) have already smoked cigarettes, and one in six (16.3%) currently smokes. Approximately one third (31.3%) have lit their first cigarette before they turned 10, suggesting a high potential for use of tobacco later in life and potentially high prevalence of tobacco-induced diseases. Young people are greatly exposed to secondary tobacco smoke and the percentage is extremely high (97.4%), the highest in the region of Europe. Somewhat over a half of secondary school students (56.7%) learned about noxious effects of smoking and only two fifths (40.9%) discussed the reasons why their peers smoke (11).

In the preceding years the prevalence of smoking among adolescents has been reduced. On the average, boys and girls in Serbia smoke in more or less similar numbers, like their counterparts, boys and girls in Europe (12).

Over 90% of medical students support smoking ban in all public places and believe that health professionals are role models for

their patients. Most of medical student (over 90%) would like to learn more on modes and techniques to cease smoking in their curricula to be able to help their patients quit the habit (13).

Most of students of the University of Belgrade (79.9%) support the Law on Smoking Ban Indoors (14).

Over a half of the Serbian population (57.5%) were aware of deleterious consequences of smoking and exposure to tobacco smoke, i.e. there is over 20% increase from 34.5% in 2000 (7).

Out of all adult smokers only 1% stated to have used counseling service to help them quit smoking, while 3% of smokers said that they had not used the counseling service since they did not know there were any. Out of the total number of smokers 37.1% stated they wanted to quit smoking: more women (39.9%) than men (34.4%), age group 35-44 yrs who are most acutely aware of consequences of smoking/tobacco smoke to health.

The "Quit and Win", an international campaign implemented in 2008 in Serbia for the sixth time illustrates a positive method of helping a large number of smokers to give up the habit: 5953 participants applied out of which 3042 smokers and 2910 non-smokers who provided support. The international contest attracted more women (54%) than men (46%). In the "Quit and Win" campaign 43% of smokers kicked the habit for the first time, while 44% quit smoking one to three times (15).

Continuous efforts are made in Serbia to reduce the prevalence of smoking and effects of smoking on all people exposed to tobacco smoke by permanent enforcement of smoking ban at work, in health and educational institutions, by development of counseling services to quit smoking, health warnings on cigarette packs, prohibition of advertising of tobacco and tobacco products, as well as sponsorships of tobacco industry, prohibition of sale of cigarettes to underage persons, health promotion and health education.

It is important to intensify the efforts to stop young people from even taking the habit, and support those that try to quit. Health professionals have to play a more active role in tobacco control.

Support to cessation of smoking should be stronger and reflected in measures that should primarily be oriented to people who find it most difficult to quit. Additional information is needed on the impact of tobacco control measures on starting and quitting smoking in different population groups.

References:

1. World Health Organization, International Union Against Cancer. The Tobacco Country Profiles (2nd edition), 2003.
2. Mackay J, Ericsen M, Shatey O. The Tobacco Atlas, American Cancer Society, 2006.
3. WHO FCTC: WHO Framework Convention on Tobacco Control (FCTC) (Online). Available at: http://www.fctc.org/docs/treaty/fca-fctc-ratificationoverview-en.pdf
4. Ministry of Health of Republic of Serbia. Strategy for tobacco control in Republic of Serbia and Action plan 2007-2011. Belgrade; 2007.
5. Dzeletovic, A. Intersectorial seminar for capacity building of tobacco control, Report, Ministry of Health of Republic of Serbia, Institute of Public Health of Serbia, WHO Regional Office for Europe – Country Office Serbia, Vrsac; 2007.
6. Borovic P. Arterial hypertension, selected topics 2 (in Serbian). In: Tobacco and Hypertension. University of Belgrade, Medical faculty, Belgrade, 2006; 159-173.
7. Ministry of Health of Republic of Serbia. National health survey Serbia, 2006. Key findings. Belgrade; 2007. Available at: http://www.batut.org.rs
8. Green paper, Towards a Europe free from tobaccosmoke: policy options at EU level COM (2007) 27 final; 2007.
9. Global smoke free partnership, Global Voices: Working For Smoke free Air, 2008 Status Report; 2008.
10. Dzeletovic A. Public health response to tobacco epidemic, Medica. 2008; 2 (I) (in press).
11. Dzeletovic A, Dimitrijevic-Tanaskovic L. Global tobacco youth survey, Republic of Serbia 2003, National commission for smoking prevention of Ministry of Health of Republic of Serbia, Belgrade; 2005.
12. Manzoni MJ, Bjegovic V, Jankovic-Ciric S, Prepeliczay S. Survey on alcohol and other drugs abuse among young people in Serbia 2005 (in Serbian), Ministry of Health of Republic of Serbia, Belgrade;2005.
13. Global Health Professional Survey (GHPS), Fact Sheet, CDC, 2006.
14. Health Support Students Association of Belgrade. Results of indoors smoking prohibition survey (in Serbian). University of Belgrade. Belgrade; 2008.
15. Dzeletovic A. Quit and win 2008–International contests for smoking cessation (in Serbian). EKOList.2008; 7 (II), s 12-13.

Over a half of the population of Serbia do not drink alcohol, while somewhat over one fifth have never drunk alcoholic beverages in their life. High prevalence of alcohol consumption is registered among school age boys. Percentage of population familiar with adverse effects of psychoactive substances is on the rise.

WHO estimates that nowadays about 2 billion people worldwide drink alcoholic beverages, while disorders resulting from consumption of alcohol may be diagnosed in 76.3 million people. People that drink higher quantities of alcohol are exposed to higher risk for many diseases, as well as traffic accident related trauma, family violence, suicide and crime (1). In the European Union alcohol is responsible for early death and disability in 12% of men and 2% of women (2).

Consumption of alcoholic beverages per capita has been reduced from 2003 to 2007. Between 2003 and 2004 significant reduction of alcohol consumption was registered, and after 2004 till 2007 a rising trend was noted (Table 21).

Within the project on availability of foodstuffs in European countries (DAFNE – Data Availability Food Network) (3) in 2004, in addition to Serbia, other countries had their data on the average consumption of alcoholic beverages per capita posted on the database

Table 21. Daily average alcohol consumption per person, Serbia, 2003–2007

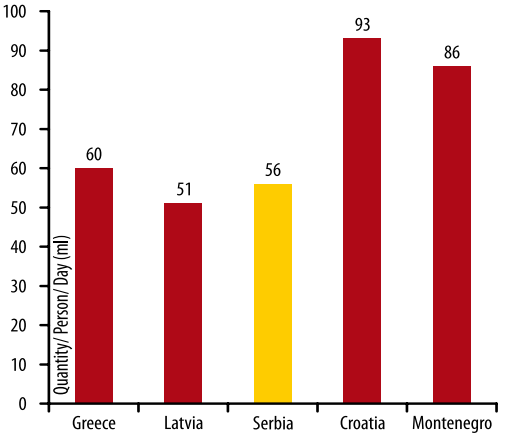
	2003	2004	2005	2006	2007
Alcoholic beverages (ml)	79.2	56.3	58.9	68.1	71.4

Source: Household survey on food consumption, Statistical Office of Republic of Serbia, 2003–2007

Since 2003 collection of data on the average consumption of alcoholic beverages per capita in Serbia is conducted pursuant to methodology harmonized with the Eurostat standards.

website of this project. That year, alcohol consumption in Serbia was significantly lower than in neighboring Croatia and Montenegro (Figure 31).

Figure 31. Daily average alcohol consumption per person in Serbia and selected European countries, 2004



Source: Dafne Data food networking, http: //www.nu.uao.gr/Dafnesoftweb/

In 2006 in Serbia 3.4% of the population used alcohol every day. Most commonly they drank hard liquor, which was followed by beer and wine. Significantly lower number of women drank alcohol every day than men (0.4% versus 7.2%). According to the socio-economic status, it was noted that the percentage is much higher among the poorest group (5.3%) and those with only elementary or lower education (5.1%).

In 2006 in Serbia 6.6% of the population were classified as being at medium risk group for development of chronic illnesses i.e. health problems resulting from the use of alcohol. Under 3% of women that used over 20 g ethanol and 8.7% of men that used over 40 g ethanol daily belonged to the aforementioned population group (4).

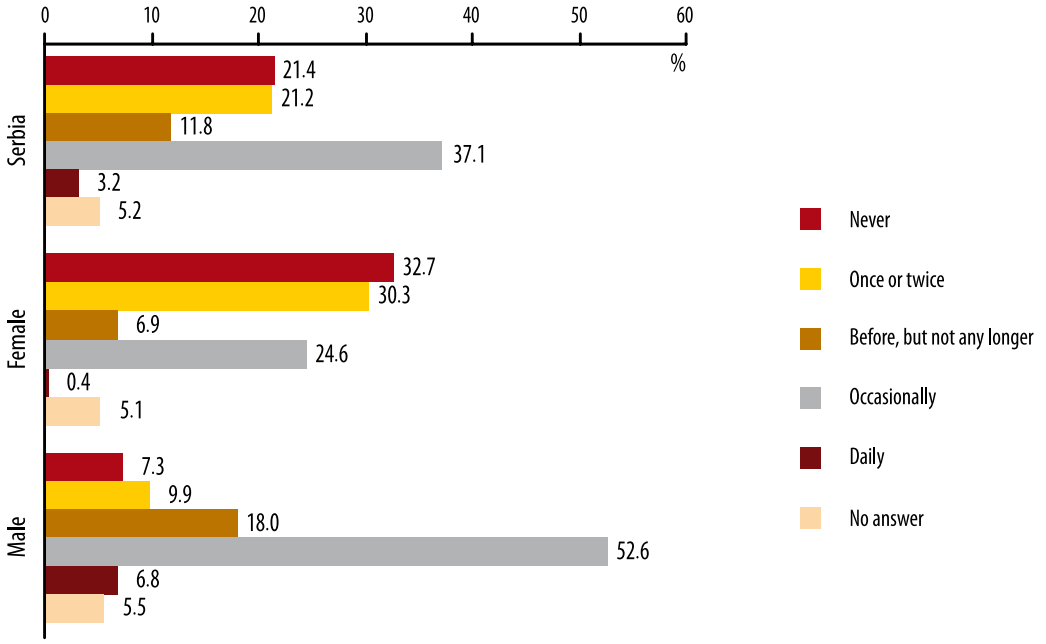
In Serbia 3.9% of adult population used 50 or more grams of ethanol daily, which is one of the indicators for "serious drinking". This high risk group for the occurrence of chronic diseases and conditions caused by alcohol consumption includes significantly more men than women (5.7% versus 0.4%). The percentage was significantly higher in the population with elementary and lower education (6.3%) than in those with higher or university education (1.8%).

Over 70% of women in Serbia stated that they did not drink alcoholic beverages (or had never tried, or tried once or twice in the lifetime, or used to drink in the past and stopped), which is almost twice than men (37.2%). One in three women (32.7%) have never drunk alcoholic beverages, while only 7.3% of men could state the same (Figure 32).

According to the results of the study conducted in the population of adolescents aged 16, most of students (93%) in Serbia tried alcohol at least once in life, where higher frequency and earlier onset together with higher amounts of alcohol were characteristic of boys. On the average 70% of boys tried alcohol for the first time when they were under 13 years of age. Two thirds of students drank any kind of alcohol (beer, wine or hard liquor). A half of them drank beer, almost a third drank wine and somewhat less drank hard liquor (5).

Among students in Serbia, the general rate of alcohol consumption was 67.5%, exceeding the average of 62% reported by the European School Project of Alcohol and Other Drugs - ESPAD (2003). The prevalence of high frequency of alcohol consumption among boys in Serbia was 25% exceeding by far the 2003 ESPAD average of 13%, while the girls were on the 2003 ESPAD average level (8%), which is higher than in Romania, Croatia, Slovenia and Hungary.

Figure 32. Alcohol consumption in adult population, by gender, Serbia, 2006



Source: Ministry of Health, National Health Survey Serbia, 2000 and 2006

Use of psychoactive substances

The use of psychoactive substances (PAS) illustrates unhealthy behavior and a special socio-psychological feature of individuals, resulting in addiction. Addictive diseases are at the same time behavioral disorders and a part of social pathology with extremely severe health consequences.

Medical substances such as sedatives, antidepressants, stimulants, anabolic steroids or analgesics are not illicit by definition; instead they are legal as long as they are used as prescribed by authorized physician. PAS imply illicit drugs, cannabis (marihuana or hashish), amphetamines, LSD or other hallucinogenic drugs, crack, cocaine, ecstasy and heroin.

In 2006 over one third (35.6%) of adult population of Serbia were familiar with effects of psychoactive substances and knew that cannabis, ecstasy, cocaine, LSD, heroin and crack were harmful, which is 7% more people than in 2000. Poor people and those with lower education were significantly less informed on the effects of psychoactive substances, while almost every other citizen of Serbia (47.4%) aged 18 to 34 was familiar with effects of psychoactive substances.

In Serbia 17.1% of adult population tried tablets (Bensedin, Trodon, Amphetamin or other); 3.6% of adult population of Serbia tried marihuana, more men than women (4.5% versus 2.8%). The first try of psychoactive substances among adults in Serbia took place between the ages of 18 and 22, and that most commonly happened at a friend's or own home.

Use of prescription drugs without prescription was present in 15% of Serbian stu-

dents which is an alarming information, in the light of potential health risks and tendency to develop addiction. Cannabis in the form of marihuana or hashish is the most widespread illicit substance tried by 12.9% of students. Most adolescents tried it for the first time at the age of 14. Experience with other illicit drugs was registered in 4% of students. As to the abstaining from illicit PAS for lifetime, the results show that about 75% are not at risk of experimenting with illicit drugs (5).

References:

1. Global Status Report on Alcohol. WHO, Geneva; 2004.

2. WHO: Alcohol (Online).
Available at:
http://ec.europa.eu/health-eu/my_lifestyle/alcohol/index_en.htm.

3. DAFNE IV - European Food Availability Databank based on Household Budget Surveys. European Commission, DG Health and Consumer Protection, Public Health; 2002.
Available at:
http://ec.europa.eu/health/ph_projects/2002/monitoring/monitoring_2002_04_en.htm

4. Ministry of Health of Republic of Serbia. National health survey Serbia, 2006. Key findings. Ministry of Health of Republic of Serbia, Belgrade; 2007.

5. Manzoni MJ, Bjegovic V, Jankovic-Ciric S, Prepeliczay S. Survey on alcohol and other drugs abuse among young people in Serbia 2005 (in Serbian), Ministry of Health of Republic of Serbia, Belgrade; 2005.

II Population Morbidity and Mortality

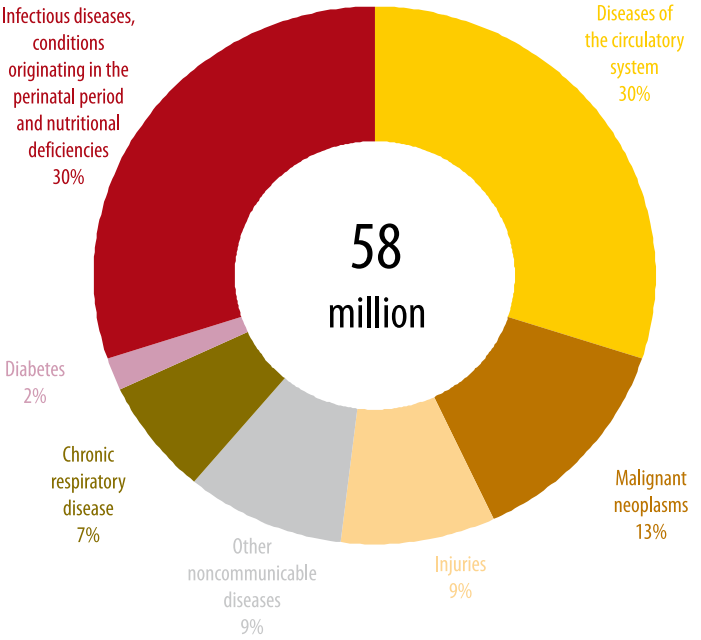
Non-communicable Diseases – Leading Public Health Problem

Chronic Non-communicable Diseases

Prolonged life expectancy, control of most of communicable diseases, behavioral changes and life style changes have resulted in increased morbidity, disability and early death from chronic non-communicable diseases in Serbia.

According to the WHO data chronic non-communicable diseases are leading causes of death worldwide. Out of 58 million human deaths per year, all causes combined, 41 million, i.e. 70% die of consequences of these diseases. According to the same source (1,2,3 in the period ahead further rise of mortality attributable to these diseases is expected, and the most of deaths will take place in underdeveloped and developing countries (Figure 33).

Figure 33. Leading causes of mortality in the world, 2006



Source: www.who.int/chp/chronic_disease_report/en/

The last WHO report on non-communicable diseases (2) suggests that global integrated action for prevention of these diseases would preserve by 2015 at least 36 million lives worldwide that would otherwise be lost, where 9 out of 10 preserved lives will be in the developing or medium developed countries.

On the other hand, only 3% of all health expenditures in OECD member states are allocated to prevention programs and public health programs (3,4). Absenteeism and mortality from chronic non-communicable diseases in working population affect respective national economies significantly.

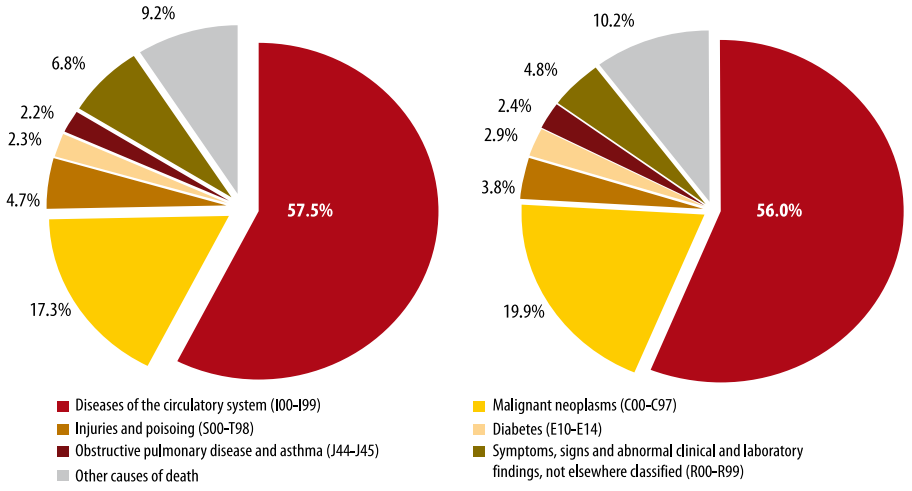
Leading causes of death in our country are almost the same as elsewhere in Europe. Approximately 100,000 people in Serbia die from all causes of death combined. In 2007, chronic non-communicable diseases accounted for 85% of all causes of death in Serbia, as well as in countries of the European Region (2,5).

In 2007, diseases of the heart and blood vessels and malignant tumors accounted for over three quarters of all causes of death in Serbia. In the mortality structure, cardiovascular diseases accounted for over a half of the fatal outcomes (56.0%) and almost one in five persons (19.9%) died as a victim of malignancy. Out of the total number of deaths, 3.8% died of injuries and intoxications, 2.9% of diabetic complications, and 2.4% of chronic obstructive pulmonary disease or asthma. In the course of the last decade, the highest rise of deaths in Serbia was noted for malignancies and diabetes (Figure 34).

In spite of the fact that the proportion of symptoms and insufficiently specified conditions in Serbia has been reduced from 6.8% in 1997 to 4.8% in 2007, caution is warranted in analysis of the data and conclusions drawing.

According to the results of the "Burden of Diseases and Injuries in Serbia" study,

Figure 34. Leading causes of mortality in Serbia, 1997 and 2007



Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia

ischemic heart disease, cerebrovascular diseases, lung cancer, unipolar depression and diabetes accounted for almost two thirds of total burden calculated for 18 health disorders in Serbia in 2000 (6). For men, the leading causes of this burden were ischemic heart disease, stroke, lung cancer, traffic trauma and unipolar depression, while for women the corresponding burdens were stroke, unipolar depression, ischemic heart disease, breast cancer and diabetes (Table 22).

The leading risk factors for development of chronic non-communicable diseases are smoking, hypertension, hypercholesterolemia, alcohol, obesity, improper diet and physical inactivity. The stated risk factors are common to many chronic non-communicable diseases the occurrence of which, in the light of their multifactorial etiology, is linked to the presence of two or more of the aforementioned risk factors.

The 2006 health survey of the population of Serbia showed that 33.6% of the population are smokers, 46.7% have hypertension, 40.3% drink alcohol every day or occasionally, 18.3% are obese and 74.3% suffer from lack of exercise.

Table 22. The Burden of Disease and Injury (DALY*/1000) by gender, Serbia, 2000

Disease and Injury	Male DALY/1000	Rank	Female	Rank DALY/1000
Ischaemic heart diseases	18.1	1	7.9	3
Cerebrovascular diseases (Stroke)	12.4	2	10.3	1
Lung and bronchus cancers	8.8	3	2.2	7
Transport accidents	6.7	4	1.8	12
Chronic obstructive pulmonary disease	5.7	5	5.8	8
Unipolar depressive disorders	5.3	7	8.8	2
Breast cancer	-	-	4.3	4
Diabetes	3.2	8	3.0	5

The Burden of Disease and Injury in Serbia. Belgrade: Ministry of Health of the Republic of Serbia; 2003
* DALY – disability adjusted life years, by World standard population

Chronic non-communicable diseases (CNDs) have multifactorial etiology and result from complex interaction of individuals and environment in which they live. Individual features (such as sex, ethnicity, genetic predisposition, etc.) together with socio-economic determinants and external conditions (such as income, education, living conditions and occupational conditions) determine the differences in exposure and sensitivity of individuals to CNDs.

In comparison with the previous 2000 survey, the incidence of smoking in the population of Serbia is reduced by 6.9%, alcohol intake by 7.2% and physical inactivity by 12%. Over the same period, the prevalence of hypertension rose by 2% and obesity by 1% (Table 23).

Table 23. Prevalence (%) of risk factors, Serbia, 2000 and 2006

Risk factors	Prevalence (%)	
	2000	2006
Smoking	40.5	33.6
Hypertension	44.5	46.5
Alcohol drinking	47.5	40.3
Obesity	17.3	18.3
Physical activity tree times per week	13.7	25.7

Source: National Health Survey, Serbia 2000 and 2006

The data for disability adjusted life years (DALY/1000 population) for some of the risk factors by the sexes in Serbia in 2000 are presented in Table 24.

According to the results of the 2000 study "Burden of Diseases and Injuries in Serbia" the greatest burden of risk factors (6) in men were attributable to smoking, which was followed by hypertension, lack of exercise and obesity. Our women were burdened with hypertension, lack of exercise, smoking and obesity – in that order (Table 24).

The total burden of the aforementioned risk factors was higher in men than women.

Table 24. Disability Adjusted Life Years (DALY*/1000) for certain risk factors by gender, Serbia, 2000

Risk factors	DALY/1000	
	Male	Female
Smoking	35.2	12.5
Hypertension	21.7	17.5
Hypercholesterolemia	3.1	1.7
Alcohol consumption	5.7	1.5
Obesity	14.9	12.2
Physical inactivity	19.5	16.3

The Burden of Disease and Injury in Serbia. Belgrade: Ministry of Health of the Republic of Serbia; 2003
* DALY – disability adjusted life years

References:

1. World Health Organization. Preventing chronic diseases: a vital investment: WHO global report. Geneva: WHO; 2005.
2. WHO: Chronic diseases and health promotion (Online).
Available at:
http://www.who.int/chp/chronic_disease_report/en/
3. Centers for Disease Control and Prevention. Chronic Disease. Notes & Reports Vol. 18 No. 2 June 2007.
4. World Health Organization. Gaining Health. The European Strategy for the Prevention and Control of Noncommunicable Diseases. Copenhagen: WHO; 2006.
5. The Institute of Public Health of Serbia. Health statistical yearbook of Republic of Serbia, 2006, Belgrade, 2007.
6. Atanaskovic-Markovic Z, Bjegovic V, Jankovic S, Kocev N, Laaser U, Marinkovic J, et al. The Burden of Disease and Injury in Serbia. Belgrade: Ministry of Health of the Republic of Serbia; 2003.
7. The Ministry of Health of Republic of Serbia. National Health Survey, Serbia, 2006. Key findings. Ministry of Health, Republic of Serbia; Belgrade, 2007.
8. The Institute of Public Health of Serbia. Health survey, healthcare needs and healthcare utilization in Republic of Serbia. Results of survey, I part – Household and family characteristics in Serbia. Health survey, healthcare needs and healthcare utilization among adult population in republic of Serbia. Journal of the Institute of Public Health of Serbia 2002; 76(1-2):91-129.

Non-communicable Diseases – Leading Public Health Problem

Cardiovascular Diseases

Serbia witnesses a falling trend of cardiovascular mortality, but its proportion in all causes of death still remains on top. Burden of cardiovascular diseases has a increasing trend in countries in transition, to which our country belongs, with predicted continuation of the adverse trend unless pertinent preventive measures are undertaken.

Cardiovascular diseases (CVD), (ICD-10: I00-I99) have been the leading cause of morbidity, disability, absenteeism and premature death (before 65yr) for decades in developed and developing countries (1,2).

Approximately one third of the total world mortality is attributed to CVD out of which 80% is in developing and underdeveloped countries (2,3). It is assumed that almost 75% of CVD result from the impact of the so called conventional risk factors relating to life style that are known to accelerate the atherosclerosis process (smoking, high cholesterol level, irregular diet, obesity, lack of exercise).

Also, increasing number of studies suggest the link between low socio-economic status and occurrence of cardiovascular diseases (2).

In our country, CVD have been a leading cause of death ever since the eighties. In 1981 the proportion of cardiovascular diseases in all causes of death amounted to 55.4%; in 2007 it was 56.0%.

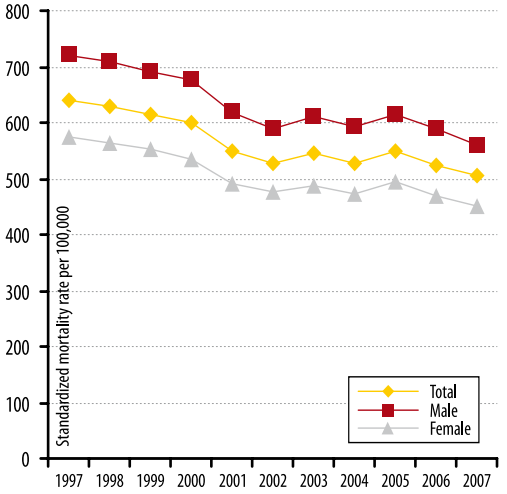
In spite of the identified falling trend of mortality attributed to cardiovascular diseases in our country (Figure 35 demographic trends characterized primarily by the increase of proportion of the elderly, will most probably result in increased absolute number of people suffering from various form of these diseases in the future.

Ischemic heart disease

In 2007 thirty-five people in Serbia died every day from ischemic heart disease (IHD)

(ICD-10: I20-I25). Due to poor coding of the underlying cause of death, it is assumed that the number of IHD deaths is even higher. Therefore, the proportion of IHD in deaths caused by all cardiovascular diseases is unrealistically low, amounting to only 23%, contrary to its global prevalence in the world (43%). Accordingly, IHD mortality rates are lower, as well (4).

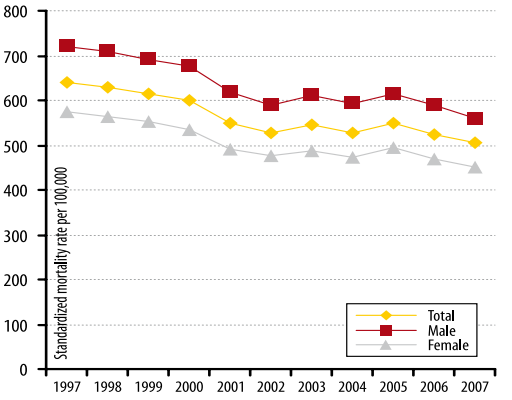
Figure 35. Standardized mortality rate* for cardiovascular diseases, Serbia, 1997–2007



Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia
*European standard population

In the period 1997-2007 a mild falling trend of premature IHD mortality rates (before the age of 65) was also noted. The values of the rates decrease by 13.6% on the average, 11.9% in men and 17.77% in women (Figure 36).

Figure 36. Standardized mortality rate* for ischemic heart disease in population aged 0–64, Serbia, 1997–2007

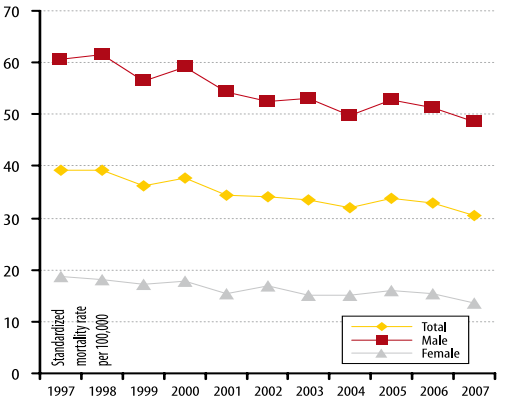


Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia
*European standard population

In 2007 IHD mortality rates were three times higher for men than women (60.4/100,000 vs. 18.1/100,000).

Over eleven observed years a decrease of AMI mortality rates (AMI, ICD-10: I21-I22) was also noted, somewhat more prominently in men (Figure 37).

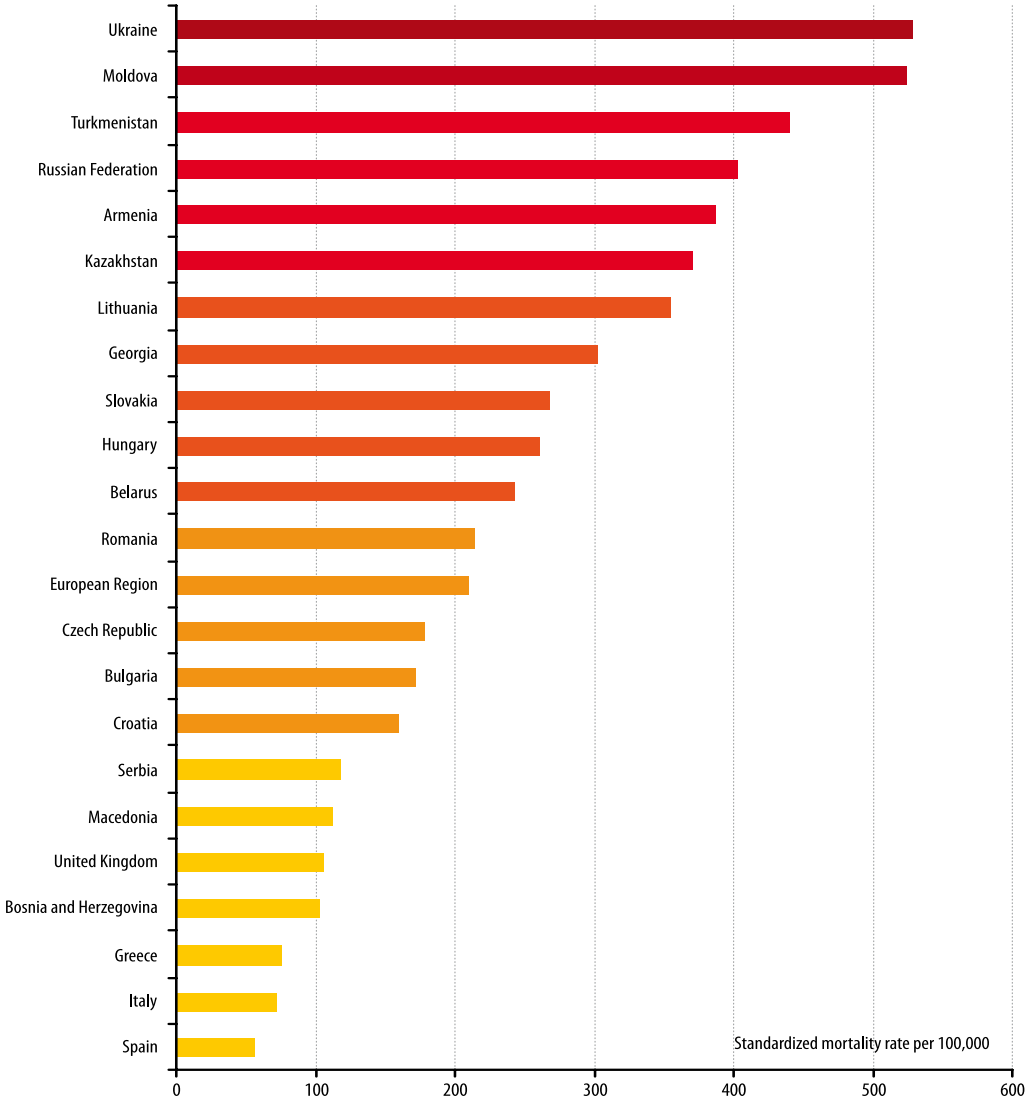
Figure 37. Standardized mortality rate* for acute myocardial infarction in population aged 0–64, Serbia, 1997–2007



Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia
*European standard population

The trend may be explained in several possible ways. Shifting of the age of patients with AMI towards younger populations is associated with better prognosis. Previous decade was marked with significant improvement in diagnostics and treatment of AMI primarily relating to the use of thrombolytic treatment, emergency surgical revascularization and

Figure 38. Standardized mortality rate* for ischemic heart disease in Serbia and selected countries of European Region, 2007



Source: data base "Health for all", WHO, http://data.euro.who.int/hfadb/
* European standard population

percutaneous coronary intervention.

With the rate of 117.6/100,000 in 2007 Serbia was among the European countries with a lower mortality risk of ischemic heart disease (IHD) (Figure 38). The average standardized rate for the whole region of Europe was 210.3/100,000. Ever since the seventies, developed countries in Europe and North America register a decreasing IHD mortality trend (2).

However, in spite of the decreasing mortality trend, burden of ischemic heart disease measured by DALY, including morbidity and mortality aspects of the disease, is very prominent in our country. The situation complies with WHO data highlighting that over 60% of total burden of IHD is associated with developing countries (2). According to the 2000 survey, the total burden of diseases in Serbia was mostly caused by IHD. The IHD burden was higher in men than women, and rose with age for both sexes (5).

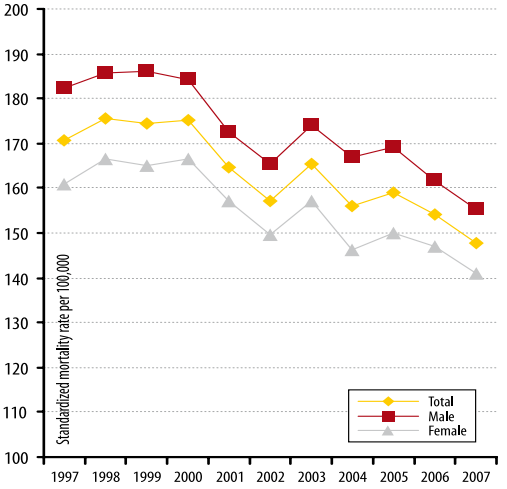
Significant results in reduction of IHD morbidity and mortality in developed countries worldwide have been achieved by the use of primary prevention measures. Benefits of the applied measures are present in all age groups including quitting smoking, reduction of cholesterol level and blood pressure, proper diet and increased level of exercise.

Cerebrovascular diseases

In 2007, cerebrovascular diseases (stroke – ICD 10: I60-I69) participated in the total mortality structure with almost 17%. This means that one in six persons in our country fell victim of stroke. The proportion of stroke in the mortality of all cardiovascular diseases was 29%, being somewhat below the global 33% level in the world. (4).

Over the studied period, a decreasing mortality trend from cerebrovascular diseases was noted in both sexes. The rates fell by 13.4% in the studied period, 14.8% in men and 12.3% in women (Figure 39). In our country the mortality rates from cerebrovascular disease differ only slightly between men and women.

Figure 39. Standardized mortality rate* for cerebrovascular diseases, Serbia, 1997–2007



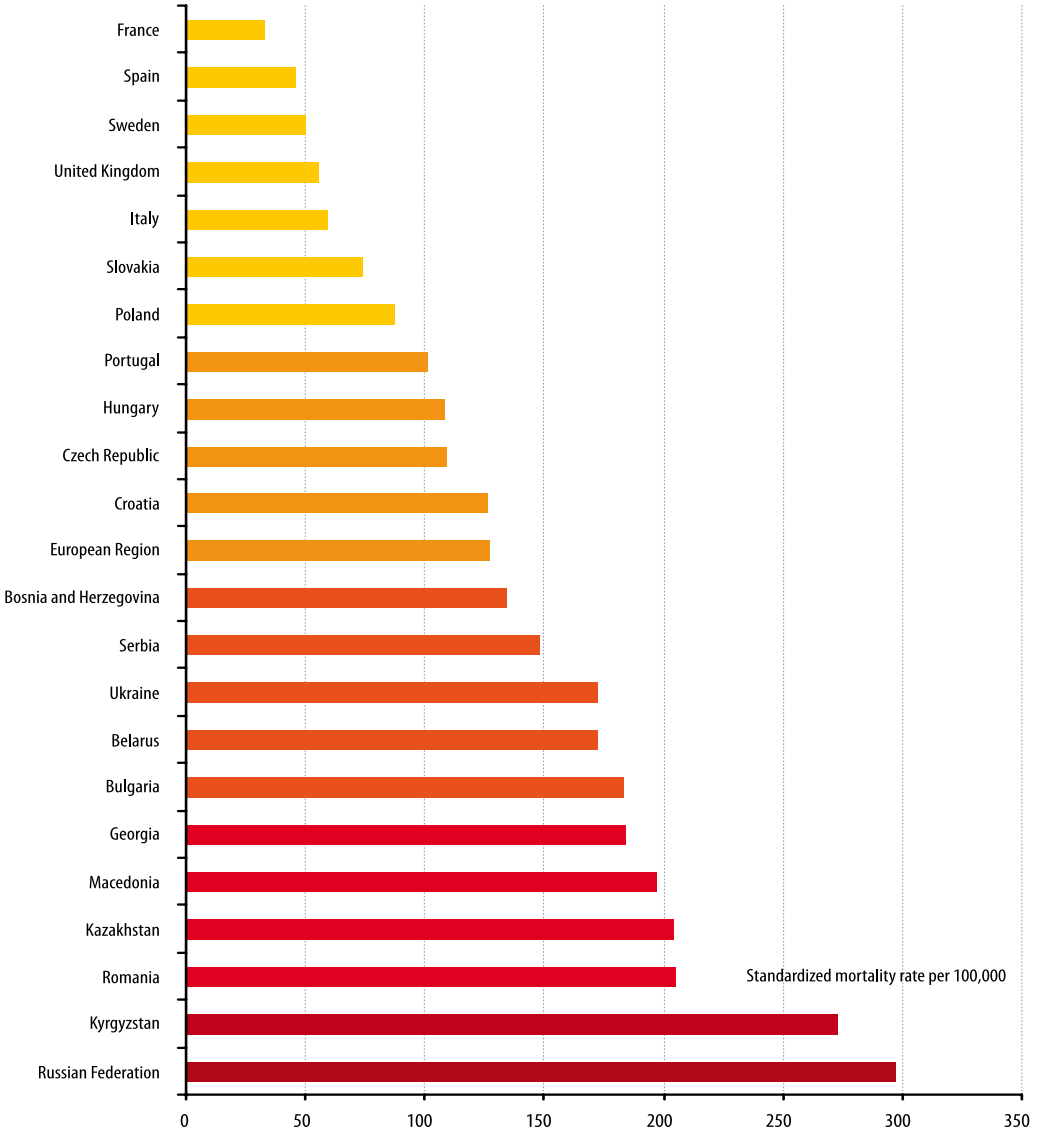
Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia
*European standard population

Serbia is among the countries with medium mortality risk from cerebrovascular diseases in comparison with other countries in the region of Europe. In 2007 in our country (Figure 40) somewhat higher rate (147.8/100,000) was recorded than the average in the region of Europe (127.1/100,000).

It has been estimated that approximately 15 million people worldwide are affected by

stroke. Fatal outcome ensues in about one third, while the remaining two thirds suffer permanent sequelae which is why stroke patients are often dependant on care of others (2). Thirty percent of these people require assistance for routine activities of daily living, 20% require assistance out of home, and 16% are placed in institutions (6). Quality of life

Figure 40. Standardized mortality rate* for cerebrovascular diseases in Serbia and selected countries of European Region, 2007



Source: data base "Health for all", WHO, Available at: http://data.euro.who.int/hfadb/
*European standard population

of these persons is significantly affected and burden of these diseases is at the top of the list of total burden. It is estimated that the burden of stroke will increase from 38 million DALYs, which were registered in 1990, to 61 million in 2020 and that over 80 % of the burden will originate from developing countries (2).

In the total burden of diseases in Serbia, burden caused by cerebrovascular diseases holds the second place. In women, the burden caused by stroke is at the top, while in men it follows immediately behind the IHD burden. The DALY rates in men and women alike rise with age, peaking at 75 years of age and above (5).

Regulation of elevated blood pressure is one of the most important measures for reduction of morbidity and mortality related to stroke. Treatment of hypertension may reduce the risk of stroke by over 40% (2).

Hypertension

Hypertension is a common disease (ICD-10: I10-I15) and one of the most preventable causes of premature death worldwide. Elevated blood pressure, i.e. hypertension implies the value of systolic blood pressure over 140 mmHg and/or diastolic pressure over 90 mmHg.

The risk of cardiovascular diseases is doubled with each increase of diastolic blood pressure by 10 mmHg or any elevation of the systolic pressure by 20mmHg. Hypertension is responsible for the occurrence of over 50% of cardiovascular diseases.

In most countries worldwide over 30% of adult population suffer from hypertension (2).

In the 2000 population health survey in Serbia the prevalence of hypertension and potential hypertension in adults was 44.5%, as compared to 46.7% noted in 2006 (7,8).

In 2000 in Serbia, out of the total burden of IHD, about 21.2% are related to hypertension (5).

The rate of people taking antihypertensive medication in the period between the two surveys increased from 46.5% in 2000 to 51.3% in 2006 (7,8). Also, in the period between two surveys the number of people regularly taking antihypertensive medication increased by almost 18%.

References:

1. Mickovski-Katalina N, Savkovic S, Miljus D, Zivkovic S, Vukicevic A, Rakocevic I, Plavsic S. Characteristics and importance of cardiovascular diseases in our counrty an in the world. Journal of the Institute of Public Health of Serbia 2005;3-4:31-34.
2. WHO. The Atlas of Heart Disease and Stroke. Geneva: WHO, 2004.
3. The Institute of Public Health of Serbia. National Health Survey, Serbia 1989-1996. Analytic study. Belgrade;1998.
4. WHO. World Health Report 2004: Changing history, Geneva: WHO; 2004.
5. Atanaskovic-Markovic Z, Bjegovic V, Jankovic S, Kocev N, Laaser U, Marinkovic J, et al. The Burden of Disease and Injury in Serbia. Belgrade: Ministry of Health of the Republic of Serbia; 2003.
6. Biller J, Love BB. Vascular diseases of nervous system. In: Neurology in clinical practice. Bradley WG, Daroff RB, Fenichel GM, Marseden CD. eds. Butterworth Heinemann, Boston, Oxford, 1999, 1125-1128.
7. The Institute of Public Health of Serbia. Health survey, healthcare needs and healthcare utilization in Republic of Serbia. Results of survey, I part – Household and family characteristics in Serbia. Journal of the Institute of Public Health of Serbia 2002;76(1-2):91-129.
8. The Ministry of Health of Republic of Serbia. National Health Survey, Serbia, 2006. Key findings. Ministry of Health, Republic of Serbia; Belgrade, 2007.

Non-communicable Diseases – Leading Public Health Problem

Malignant Diseases

In Serbia the rise of incidence and mortality of all malignancies combined and all leading sites of malignancies except for the gastric cancer have been noted.

Substantially prolonged life expectancy, population aging and increasingly better diagnostics of malignancies in recent decades have resulted in increased risk of malignant diseases, as well as associated incidence and mortality globally and in our country.

Out of all malignancies analyzed in the Burden of Diseases and Injuries in Serbia, lung cancer is at the top, followed by colorectal cancer and breast cancer, stomach cancer and cervical cancer (1).

Reliable data on the incidence of cancer in our country are available only for 1999-2005, were obtained from the Cancer Registry of Central Serbia (2).

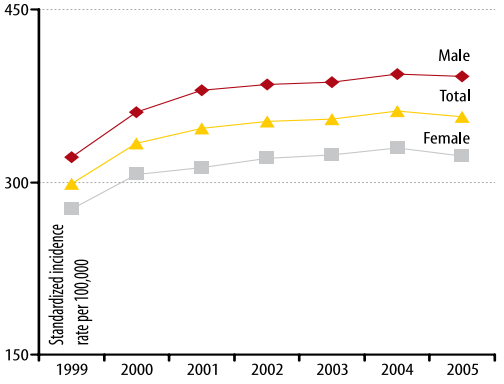
Figures 41-43 illustrate standardized incidence rates for all most common malignancies in men and women in Central Serbia. Comparison of the incidence of all cancer sites in Central Serbia from 1999 and 2005 (Figure 41) show 21.8% rise in men (from 321.3/100,000 to 391.5/100,000) and 16.8% in women (from 276.3/100,000 to 322.7/100,000).

The average standardized incidence rates in the studied period of 321.3/100,000 and 276.3/100,000 for men and women, respectively, placed Serbia in the group of European countries with medium cancer risk (3).

In the studied period, men were most frequently affected with cancer of the lungs, colorectum, prostate, urinary bladder, stomach and pancreas (Figure 42). From 1999 to 2005 a rising trend of incidence was noted in men for all leading sites of malignancies, except for the stomach cancer.

In comparison with 1999, the standardized incidence rates increase in 2005 by 60.3% (prostate cancer), 36.6% (urinary bladder cancer), 28.6% (colorectal cancer) and 15.5% (lung cancer).

Figure 41. Standardized incidence rates* for cancer by gender, Central Serbia, 1999–2005

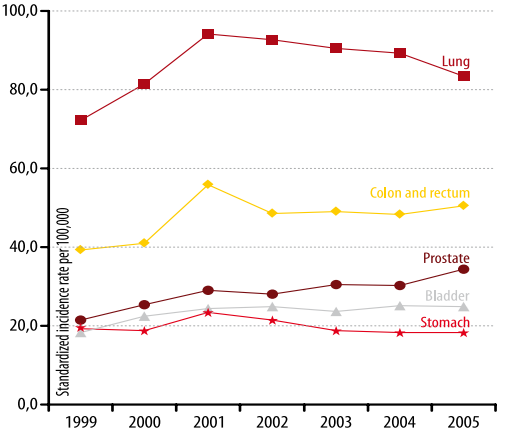


Source: Cancer registry of Central Serbia, Institute of Public Health of Serbia
*Standard European populatione

In women, malignant processes were usually localized on the breast, colorectum, cervix, lungs, uterus and stomach (Figure 34). From 1999 to 2005, in spite of certain variations, the increase in incidence rates was noted in women for all leading malignancies, except for the cervical cancer (Figure 43) where decrease was noted by 3.5% (from 31.3/100,000 to 30.2/100,000). The incidence rates increase for colorectal malignancies by 24.6%, lung cancer by 23.7%, uterus cancer by 17.1% and breast cancer by 6.8%.

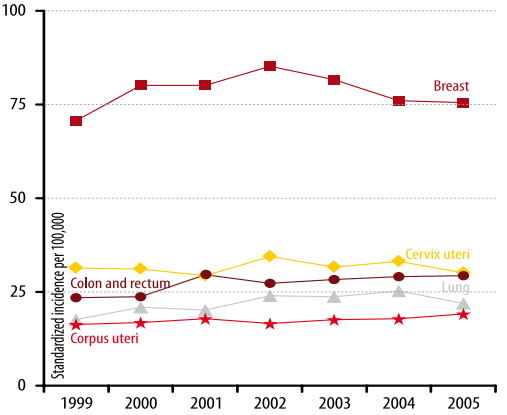
In spite of the stated decrease in the cervical cancer incidence, the rates of new cases of this malignancy among our women are still among the highest in Europe (3).

Figure 42. Standardized incidence rates* for cancer by leading primary sites, males, Central Serbia 1999–2005



Source: Cancer registry of Central Serbia, Institute of Public Health of Serbia
*Standard European population

Figure 43. Standardized incidence rates* for cancer by leading primary sites, females, Central Serbia 1999–2005



Source: Cancer registry of Central Serbia
Institute of Public Health of Serbia
*Standard European population

In comparison with 1997, the greatest rise in mortality structure in 2007 was noted for malignant tumors (2.6%).

The number of deaths and standardized cancer mortality rates by gender in Serbia in

1997 and 2007 are presented in Table 25. The number of deaths from malignancies increase in the last decade by 20.3%, and the standardized rate increase from 185.3 per 100,000 population in 1997 to 203.6 per 100,000 population in 2007.

ity rates increase for prostate malignancies by 32.4%, colorectal cancer by 16.0%, lung cancer by 15.0% and pancreas by 12.4%.

In the same period, in women, increase of mortality for all leading malignancies (Figure 46) was noted as well, except

Table 25. Number of cancer deaths and mortality rates for cancer per 100,000 population, by gender, Serbia, 1997 and 2007

Malignant neoplasms	1997			2007		
	Male	Female	Total	Male	Female	Total
Number of deaths	9674	7299	16,973	11,736	8681	20,417
Standardized mortality rates*	235. 0	146.8	185.3	262.5	157.1	203.6

Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia
*European standard population

Figures 44-46 illustrate standardized mortality rates (all malignancies combined) and rates for most common malignancies in men and women of Serbia.

In the period 1997-2007 the rise of mortality rates for all malignancies (Figure 44) in men by 11.7% (from 235.0/100,000 to 262.5/100,000) and in women by 7.0% (from 146.8/100,000 to 157.1/100,000) was noted.

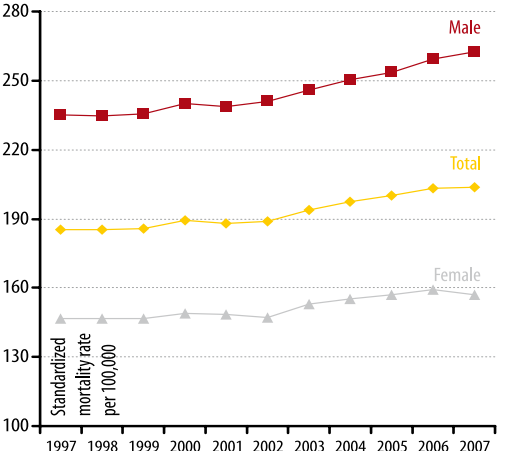
With the average standardized mortality rates of 192.8 per 100,000 population for all malignant tumors, in the last decade Serbia was among European countries with medium cancer mortality risk (4,5).

The most common causes of mortality in both men and women were the very same malignancies that were most common causes of incidence.

In the period 1997-2007 the rise of mortality rates for all malignancies in men (Figure 45) except for the stomach cancer was noted. The standardized mortality rates for stomach cancer fell by 20.1% (from 19.1/100,000 to 15.9/100,000). Over the same period, mortal-

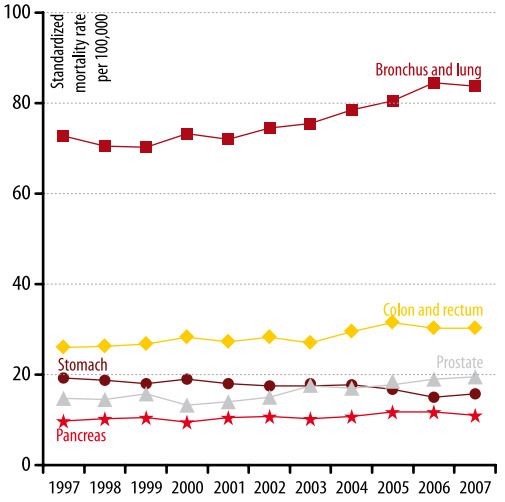
for stomach cancer that shows 16.7% decrease of associated mortality rate (from 8.4/100,000 to 7.2/100,000). Over the studied period mortality rates increase for lung cancer (by 43.8%), cervical cancer (by 9.4%), breast cancer (by 4.1%) and colorectal cancer (by 1.8%).

Figure 44. Standardized mortality rates* for cancer by gender, Serbia, 1997–2007



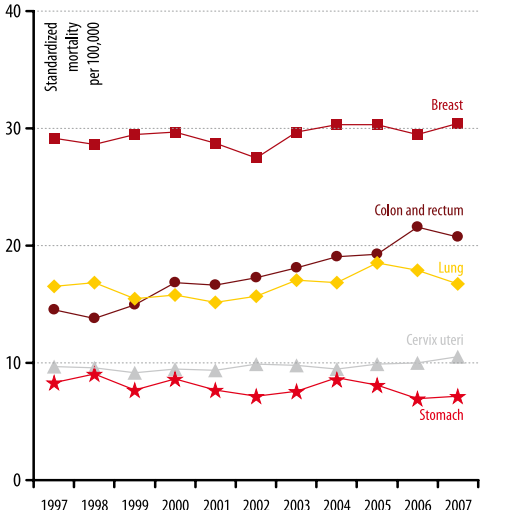
Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia
*European standard population

Figure 45. Standardized mortality rates* for cancer by leading primary sites, males, Serbia, 1997–2007



Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia
*European standard populatione

Figure 46. Standardized mortality rates* for cancer by leading primary sites, females, Serbia, 1997–2007



Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia
*European standard population

Numerous reasons may have led to changes in cancer incidence and mortality rates.

The period for which we have reliable data on new cases of cancer in Central Serbia is too short to allow any conclusions on the incidence trends. Nevertheless, remain the fact that the incidence changes follow the mortality trends over the period of ten years. The recorded increase of incidence of all malignancies combined and all leading sites of malignancies, except for the stomach cancer, may probably be attributed to better coverage and higher quality of reporting of new cases of cancer (6,7).

The increase of mortality may also be partially explained by improved diagnostics and reduced share of symptoms and insufficiently specified conditions stated as causes of death, particularly at the beginning of the studied period in Serbia.

Lack of organized programs for primary and secondary prevention, failure to recognize risk behavior and insufficient use of benchmarks in implementation of prevention programs and early detection of malignancies from developed European countries are most probably the main reasons for increased cancer incidence and mortality in Serbia over the studied period (7,8). In 1985 the EU member states launched a joint program entitled "Europe Against Cancer" in order to reduce cancer mortality in the stated region by 15% till 2000 (9,10). Owing to campaigns implemented in these countries, primarily anti-smoking, screening (for cervical cancer, breast cancer and colorectal cancer) and health promotion activities, cancer mortality rates were reduced by 9% (10% in men and 8% in women).

In Serbia, the decrease in incidence and mortality associated with stomach cancer in both sexes coincides with the same decrease in most of European countries. The reason for the falling trend in incidence and mortality associated with this type of cancer are most probably related to widespread use of antibiotics against Helicobacter pylori, preservation of food by freezing instead by salt and smoking (9,10).

Also, the study of demographic impact on cancer mortality rates in Serbia in the last two decades showed no major differences that could explain the increased mortality rates recorded in the period 1997-2007 (11).

References:

1. Atanaskovic-Markovic Z, Bjegovic V, Jankovic S, Kocev N, Laaser U, Marinkovic J, et al. The Burden of Disease and Injury in Serbia. Ministry of Health of the Republic of Serbia, Belgrade; 2003.
2. Cancer incidence and mortality in Central Serbia – 1999–2005, Cancer registry of Central Serbia Institute of Public Health of Serbia, Belgrade; 2007.
3. Parkin. D.M.. Whelan. S.L.. Ferlay. J.. and Storm. H. Cancer Incidence in Five Continents. Vol. I to VIII. IARC CancerBase No. 7. Lyon; 2005.
4. Ferlay J. Autier P. Boniol M. Heanue M. Colombet M. Boyle P. Estimates of the cancer incidence and mortality in Europe in 2006. Ann Oncol 2007;18:581–592.
5. WHO Statistical Information System (WHOSIS). Mortality Database.
Available at:
http://www3.who.int/whosis/menu.cfm
6. Boyle P. d'Onofrio A. Maisonneuve P. et al. Measuring progress against cancer in Europe: has the 15% decline targeted for 2000 come about? Annals Oncol 2003;14:1312–1325.
7. Blumenthal PD, McIntosh N. Cervical cancer prevention guidelines for low-resource settings. Baltimore7 JHPIEGO; 2005.
8. Sankaranarayanan R, Wesley RS. Visual inspection of the uterine cervix with acetic acid (VIA) and Lugol's iodine (VILI) teaching manual. Lyon, France7 IARC Press; 2000.
9. Hill C. Benhamou E. Doyon F. Trends in cancer mortality. Lancet 1990;336:1262–1263.
10. Levi F. Lucchini F. Negri E. Boyle P. La Vecchia C. Cancer mortality in Europe. 1995–1999. and an overview of trends since 1960. Int J Cancer 2004;110:155–169.
11. Institute of Public Health of Serbia, Attributable Causes of Cancer in Serbia, 2005, Belgrade, 2008.

Non-communicable Diseases – Leading Public Health Problem

Diabetes

Diabetes is the fourth leading cause of death in our country. In Serbia, the diabetes mortality trend is on the rise. The standardized diabetes mortality rates were almost two times higher than in the EU countries. The highest prevalence rise is expected in developing countries, including ours.

Diabetes (diabetes mellitus, ICD-10: E10-E14, O-24) comprises a heterogenic group of metabolic diseases characterized with hyperglycemia as a result of defective insulin secretion, insulin activity or both (1).

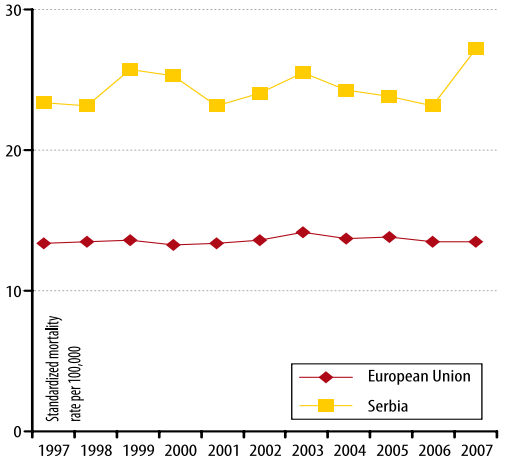
Modern etiological classification of clinically manifested diabetes (2) recognizes four main categories of the disease: type I diabetes (previously called insulin-dependent form of diabetes mellitus, ICD-10: E10), type 2 diabetes (previously called insulin-nondependent form of diabetes mellitus, ICD-10: E11), other specific types of diabetes (ICD-10: E12-E14) and gestational diabetes (diabetes in pregnancy, ICD-10:O24).

Diabetes is among five leading causes of death in most countries in the world (3). In the 1997 mortality structure in Serbia, diabetes ranked fifth, and in 2007 it ranked fourth among the causes of death, after cardiovascular diseases, malignancies and poisoning.

Over the studied period Serbia registered a rise in standardized diabetes mortality rates. In comparison with the EU countries over the same period (Figure 47) the standardized diabetes mortality rates in Serbia were twice as high (4).

From 1997 to 2004 higher diabetes mortality rates were recorded in women compared to men in Serbia. However, in the period 2005 to 2007, diabetes mortality rates were higher in men (Figure 48).

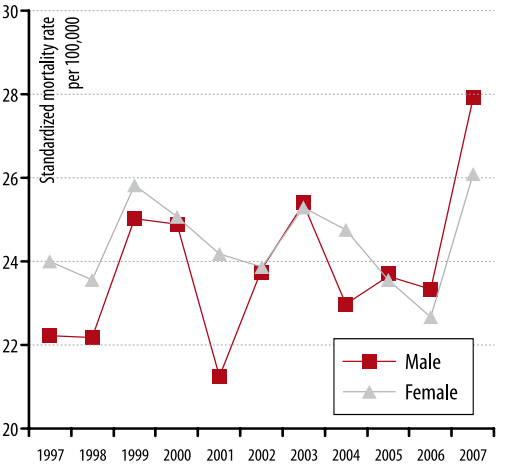
Figure 47. Standardized mortality rates* for diabetes, European Union and Serbia, 1997–2007



Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia and database «Health for all», WHO, http://data.euro.who.int/hfadb/

* European standard population

Figure 48. Standardized mortality rates* for diabetes, by gender, Serbia, 1997–2007

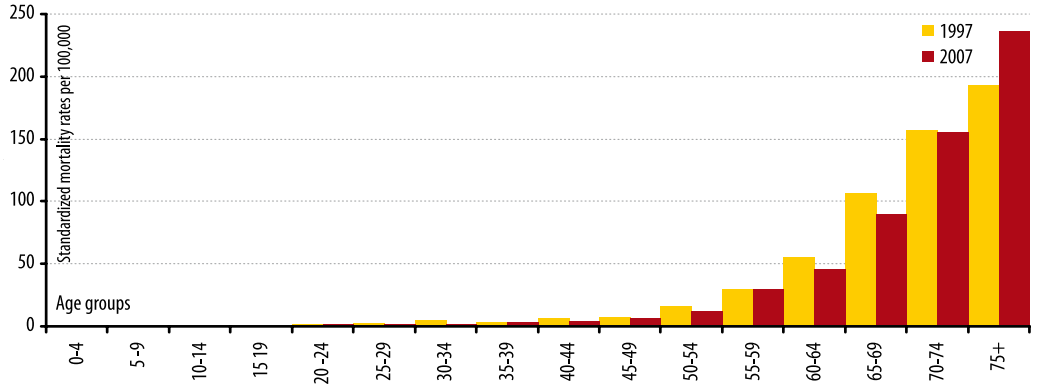


Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia

Higher diabetes mortality rates in 1997 than in 2007 were noted in the 20-69 age group. Over the same period, higher diabetes mortality for the 75+ age group was noted in 2007 than in 1997 (Figure 49).

The International Diabetes Federation (IDF) and World Health Organization (WHO) estimate that about 240 million people live with diabetes worldwide (3) where almost a half of them are over 65 years of age (5). The number of diabetes patients has been on the rise for years now, and it is now estimated that in two decades the number of diabetes patients will reach approximately

Figure 49. Age-specific mortality rates for diabetes in Serbia, 1997–2007



Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia

380 million. The steepest rise of prevalence is expected in developing countries, including ours (3).

The number of patients with type 2 diabetes is approximately nine times higher than the number of type 1 diabetes (3).

In 2006 in Serbia 5.0% of men and 5.6% of women suffered from diabetes (6).

Type 1 diabetes is one of the most common chronic diseases in childhood (7). According to the Serbian Diabetes Registry, in 2006 in Serbia 152 boys and girls under 14 years of age had this type of diabetes diagnosed. The standardized incidence rate was 12.5 per 100,000 population, classifying Serbia among medium risk countries for type 1 diabetes (3).

The incidence rises with age so that it is the lowest in the 0-4 yr age group (8.4/100,000), and highest in puberty, ages 10-14 (18.9/100,000). After the age of 14, the incidence falls gradually, reflecting the values registered in early childhood. The risk of morbidity was approximately the same for both sexes (Table 26).

The IDF data illustrate wide variability in the world distribution of this type of diabetes (3). The lowest standardized incidence rates for 0-14 yr age group are recorded in Asia and Latin America (0.1-2.5/100,000), and highest in Nordic countries, United Kingdom, Canada, Australia and New Zealand (18.0-41.4/100,000).

On the contrary to type 1 diabetes which is easy to recognize and we may assume that all affected people are diagnosed, the asymptomatic phase of type 2 diabetes may last for years.

According to estimates of local experts and results of international studies, almost 50% of patients with type 2 diabetes account for unrecognized forms of the diseases (8,9,10). In 2006 in Serbia 17,891 new cases of type 2 diabetes were diagnosed. Age-specific incidence rates of type 2 diabetes rise exponentially with age and are almost 100 times higher late in life than in early childhood (Figure 50). However, although this type of diabetes is characteristic of middle and late period of life, IDF suggests increasing incidence in younger people, as well (11,12).

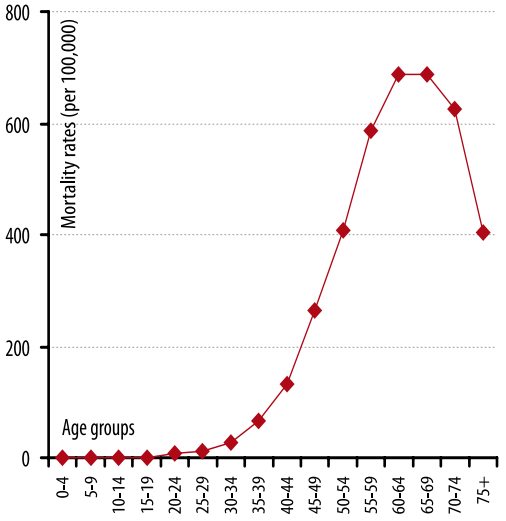
Table 26. Incidence rates for type 1 diabetes in population aged 0–14, by gender, Serbia, 2007

Gender	Incidence rates/100,000			Standardized incidence rates*/100,000
	Age groups			
	0-4	5-9	10-14	0-14
Male	9.7	9.1	18.4	12.6	12.3
Female	7.0	14.1	19.4	13.7	13.2
Total	8.4	11.5	18.9	13.1	12.7

* Europe standard population

Similar age and sex distributions were registered in other countries worldwide, as well.

Figure 50. Age-specific mortality rates* for type 2 diabetes, Serbia, 2007



Source: Serbian Diabetes Registry

According to the "Burden of Diseases and Injuries in Serbia" study, in the year 2000 in our country diabetes was the fifth leading cause of burden of disease, in line with results for more developed countries (12,13).

References:

1. Bennett P, Knowler W. Definition, Diagnosis, and Classification of Diabetes Mellitus and Glucose Homeostasis. In: Kahn R, Weir G, King G, Jacobson A, Moses A, Smith R, eds. Joslin's Diabetes Mellitus selected Chapters. 14th ed. Boston: Lippincott Williams and Wilkins, 2005.p.105-113.
2. Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Diabetes Care 2002, 25:5-20.
3. Sicree R, Shaw JE, Zimmet PZ. The Global Burden of Diabetes. In: Gan D, ed. Diabetes Atlas 3rd ed. Brussels: International Diabetes Federation, 2006.p.10-153.
4. European health for all database (HFA-DB), WHO Regional Office for Europe, Copenhagen, Denmark.
   Available at:
   http://www.euro.who.int/hfadb
5. Harris MI, Goldstein DE, Flegal KM et al. Prevalence of diabetes, impaired fasting glucose,and impaired glucose tolerance in U.S. adults: the Third National Health and Nutritional Survey,1988-1994. Diabetes Care 1998, 21:518-524.
6. Ministry of Health Republic of Serbia. National Health Survey, year 2006. Key findings. Ministry of Health Republic of Serbia; Belgrade, 2007.
7. LaPorte RE, Cruickshanks KJ: Incidence and risk factors for insulin-dependent diabetes. In: Harris MI, Hamman RF, eds. Diabetes in America. National Diabetes Data Group, NIH publ, 1985.p.85-1468.
8. Yliharsila H, Lindstrom J, Eriksson JG et al. Prevalence of Diabetes and impaired glucose regulation in 45- to 64-year-old individuals in three areas of Finland. Diabet Med 2005; 22:88-91.
9. Ford ES. Risks for all-cause mortality, cardiovascular disease, and diabetes associated with the metabolic syndrome: a summary of the evidence. Diabetes Care 2005; 28:1769–1778.
10. McEwan P, Williams JE, Griffiths A et al. Evaluating the performance of the Framingham risk equations in a population with diabetes. Diabet Med 2004; 21:318–323.

11. Alberti G, Zimmet P, Shaw J, Bloomgarden Z, Kaufman F, Silinik M; Consensus Worshop Group. Type 2 diabetes in the young: the evolving epidemic: the international diabetes federation consensus workshop. Diabetes Care. 2004 Jul;27(7):1798-811.

12. Atanaskovic-Markovic Z, Bjegovic V, Jankovic S i dr. The Burden of Disease and Injury in Serbia. Belgrade: Ministry of Health of the Republic of Serbia, 2003.

13. Venkat Narayan K.M., Zhang P, Kanaya A.M., Williams D.E., Engelgau M., Imperatore G, Ramachandran A. Diabetes: The Pandemic and Potential Solutions. In: Venkat Narayan K.M, Zhang P, Kanaya A.M, eds. Disease Control Priorities in Developing Countries. Boston: Lippincott Williams and Wilkins, 2005.p.591-603.

Mental Health Disorders

Years of exposure to continuous stress in our country resulted in the increase of mental health problems incidence among our population. Unipolar depression was one of the leading causes of burden of diseases in Serbia.

Ambiguous concept of mental health, including lack of definition of normal in the area of mental health is related to a series of problems in defining, measuring and studying mental and behavioral disorders.

The World Health Organization (WHO) defines mental health as a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community (1).

Mental health and behavioral disorders imply clinically confirmed health disorders characterized by abnormalities in cognition, mood and behavior accompanied with suffering and/or impaired personality functioning. One incident of unusual behavior or short episode of bad mood by no means implies any presence of behavioral disorder or mental illness. In order to diagnose a condition as a disorder it is necessary that it is persistent and repetitive, accompanied with suffering or dysfunction in any or more areas of life. Therefore, it is important to differentiate between bad mood (depressiveness) and clinically diagnosed depression (1).

Mental symptoms

Symptoms in the area of mental health are transient, usual and normal response to various stressors. Individual differences in response to stress result from a complex relations between stress and mental health (2).

In the 2000 and 2006 population health surveys the incidences of health problems (symptoms) of mental health were established.

In 2000 insomnia was among the most common health problems affecting 31% of women and 9% of men. In 2006 mild fall of women suffering from insomnia was noted (27%) and two-fold increase in the male population (17%) in comparison with the 2000 data.

In 2006 the fall of frequency of persons with emotional problems was noted in comparison with 2000. These problems were still more common among women than men, and in poorer population. Also, in the period between two surveys the fall of frequency of persons under stress was noted (59% and 44% in 2000 and 2006, respectively).

The percentage of Serbian population using sedatives in the week preceding the survey was 13% in 2000 and 14% in 2006.

In the study of mental health of children and adolescents aged 7 to 19, it was found that the frequency of unpleasant states and feelings increases with age, including the state of stress and emotional problems that were most prominent in the 15-19 age group. In 2006 somewhat lower number of young people with these unpleasant feelings and emotional problems were registered (22% in 2006 versus 25% in 2000) (3,4,5).

Mental health and behavioral disorders

It has been estimated that over 25% of population worldwide (1) suffer from a mental health or behavioral disorder (ICD-10: F00-F99) in the course of life. The highest annual prevalence rates in general population (260-300/100,000) are obtained with all forms of mental disorders taken into account, including the undiagnosed ones (6). Unfortunately, the occurrence of two or more mental health disorders in one person is common, which additionally increases the burden of these diseases.

The factors associated with prevalence, incidence and course of mental health and behavioral disorders include poverty, sex, age, wars and disasters, serious somatic diseases as well as social and familiar environment (1).

Years of crisis in our country with numerous acute and chronic stressors have adversely affected mental health of the population, as it has already been accentuated. Intensive acute and chronic stress, as well as years of accumulated trauma have undoubtedly caused significant psychological consequences, particularly in vulnerable individuals. Absolute number of persons with depressive, stress-related and psychosomatic disorders is on the rise; rising trend of addictions to alcohol and psychoactive substances has also been recorded (7).

Depression

Depression, particularly the unipolar type (ICD-10: F32) is a frequent mental health disorder affecting the quality of life significantly.

The WHO 2000 data suggest that the burden of unipolar depression ranks fourth (1) among 20 selected health disorders. However,

WHO predicts that by 2020 unipolar depression will become the second leading cause of burden of diseases, next to ischemic heart diseases, and the leading one in developing countries (1,8,9). In 2000 in Serbia unipolar depression was among the leading health disorders, ranking fourth behind ischemic heart diseases, cerebrovascular diseases and lung cancer from the pool of 18 selected health disorders. In Serbia it was more frequent among women, ranking third, than men where it was only on the sixth place (10,11).

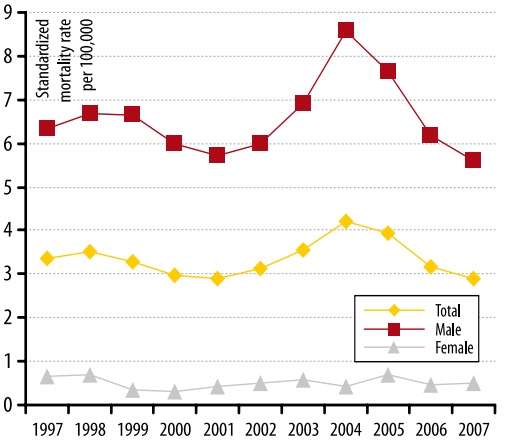
Mental health and behavioral disorders caused by the use of psychoactive substances

It has been known that daily use of alcohol increases the prevalence of persons affected by alcoholism and other mental health disorders. In our country 3.4% adults drink alcohol every day. Intake of alcohol is started relatively early, because of cultural features, local customs and broad accessibility of alcoholic beverages. As many as 25% of young people aged 12 – 19 years were drunk at least once (3).

In 2006 3.9% of adult population of Serbia drank 50 or more grams of ethanol every day, which is a WHO indicator of heavy drinking. This category of alcohol users is at highest risk of various chronic complications and other diseases. Like in other countries, heavy drinkers are most common among men, among the poorest (1,2) and in the 55-64 age group.

From 1997 to 2004 mortality associated with alcohol consumption had a icreasing trend, but thereafter a decreasing trend was in place (Figure 51).

Figure 51. Standardized mortality rate* for alcohol abuse and mental health disorders, Serbia, 1997–2007



Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia

*European standard population

In the studied period mortality rate was 14 times higher for men than women, and the initial deaths are registered in the 20-24 yr age group. In 2007, the highest age-specific mortality rates were recorded in the 65-69 age group.

There are no precise data about the number of drug addicts in our country. Due to certain specificities, these data are collected only in specific, targeted surveys and registers of addicts. Experts from the Institute for Addictive Diseases assess that the number of addicts to various psychoactive substances in Serbia ranges between 60,000 and 80,000 and that over 60% of these are young people. Also, experts from the abovementioned health institution state that since 1997 the number of treated addicts increased by 900 new cases. They point out that the number of young people asking for help to overcome addiction has increased by 100% (7).

Refeneces:

1. WHO. The World Health Report 2001. Mental Health: New Understanding, New Hope. Geneva: WHO, 2001.
2. Zotovic M. PTSP and depressive mood disorders after NATO bombing: individual factors and difference in stress reaction. Psychology 2005;38(1).
3. The Ministry of Health of Republic of Serbia. National Health Survey, Serbia, 2006. Key findings. Ministry of Health, Republic of Serbia; Belgrade, 2007.
4. The Institute of Public Health of Serbia. Health survey, healthcare needs and healthcare utilization in Republic of Serbia. Results of survey, I part – Household and family characteristics in Serbia. Health survey, healthcare needs and healthcare utilization among adult population in republic of Serbia. Journal of the Institute of Public Health of Serbia 2002; 76 (1-2):91-129.
5. The Institute of Public Health of Serbia. Health survey, healthcare needs and healthcare utilization in Republic of Serbia. Results of survey, II part – Health survey, healthcare needs and healthcare utilization among children and youth in Republic of Serbia. Journal of the Institute of Public Health of Serbia 2002;76(3-4):201.
6. Tyrer P, Tyrer F. Public Mental Health. In: Detels R, McEwen J, Beaglehole R, Tanaka H (eds): Oxford Textbook of Public Health, 4th ed., Vol.3. New York: Oxford University Press 2002;pp.1309-28.
7. Lecic-Tosevski D, Curcic V, Grbesa G, at al. Mental healthcare in Serbia – challenges and solutions. Psychiatry Tod 2005;37(1):9-15.
8. Jankovic S. Frequency and extension of depression in the world and in Serbia. Acta Clinica 2005;5(3):34-41.
9. Jankovic S. Depression. In: Atanasković-Marković Z, Bjegović V, Janković S, Kocev N, Laaser U, Marinković J, et al. The Burden of Disease and Injury in Serbia. Belgrade: Ministry of Health of the Republic of Serbia; 2003: 109-113.
10. Horwath E, Cohen RS, Weissman MM. Epidemiology of Depressive and Anxiety Disorders. In: Tsuang MT, Tohen M (eds). Textbook in psychiatric epidemiology. 2en edition. New York: Wiley-Liss, 2002:389-426.
11. Üstün TB, Ayuso-Mateos JL, Chatterji S, Mathers C, Murray CJL. Global burden of depressive disorders in the year 2000. Brit J Psychiat 2004; 184: 386–92.
12. WHO. Global Status Report on Alcohol. Geneva: WHO, 2004.

Non-communicable Diseases – Leading Public Health Problem

Chronic Non-communicable Respiratory Diseases

Over 500,000 people in Serbia suffer from chronic non-communicable respiratory diseases.

Chronic non-communicable respiratory diseases (CNRD, ICD-10: J42-J45) include chronic obstructive pulmonary disease (COPD) (ICD-10: J44) and asthma (ICD-10: J45). COPD is characterized with limited air flow through airways. This limitation is usually progressive and associated with inflammatory response of the lungs to particles and gases.

Globally, approximately 400 million people live with the diagnosis of CNRD, out of which 320 with asthma and 80 million with COPD (1).

According to the 2006 Health Survey of Serbian population (2) it was estimated that over half a million people in our country live with a chronic non-communicable respiratory disease. According to the same source, it was estimated that approximately 320,000 people suffer from COPD and 200,000 from asthma.

The CNRD mortality rate in Serbia fell by 8.4%, i.e. from 23.2/100,000 in 1997 to 21.5/100,000 in 2007. The fall of CNRD mortality rate over the stated period was three times more prominent in women (14.9%) than in men (5.4%). The CNRD mortality rates were higher in men than in women (Table 27).

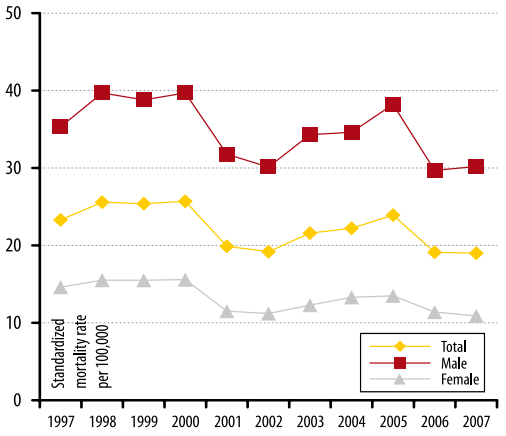
The registered fall of mortality rate in the last versus the first year of the observed period was associated with increased CNRD mortality values in the period 1997-2000 and 2002-2005, where the fall was registered in 2000-2002 and after 2005 (Figure 52).

Table 27. Number of deaths and standardized mortality rates* for chronic obstructive pulmonary disease and asthma, per 100,000 population, by gender, Serbia, 1997 and 2007

Chronic non-communicable respiratory disease (CNRD)		Year					
		1997			2007		
		Male	Female	Total	Male	Female	Total
COPD	Number of deaths	1048	539	1587	1232	646	1878
	Standardized mortality rate*	26.5	10.1	17.0	30.2	10.9	19.0
Asthma	Number of deaths	341	231	572	172	92	264
	Standardized mortality rate*	8.8	4.5	6.3	3.3	1.8	2.5
CNRD	Number of deaths	1389	770	2159	1404	738	2142
	Standardized mortality rate*	35.3	14.6	23.3	33.5	12.7	21.5

Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia
* European standard population

Figure 52. Standardized mortality rates* for chronic respiratory disease by gender, Serbia, 1997–2007



Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia
* European standard population

In comparison with 1997, the CNRD mortality rates were lower in 2007 in all age groups (Figure 53).

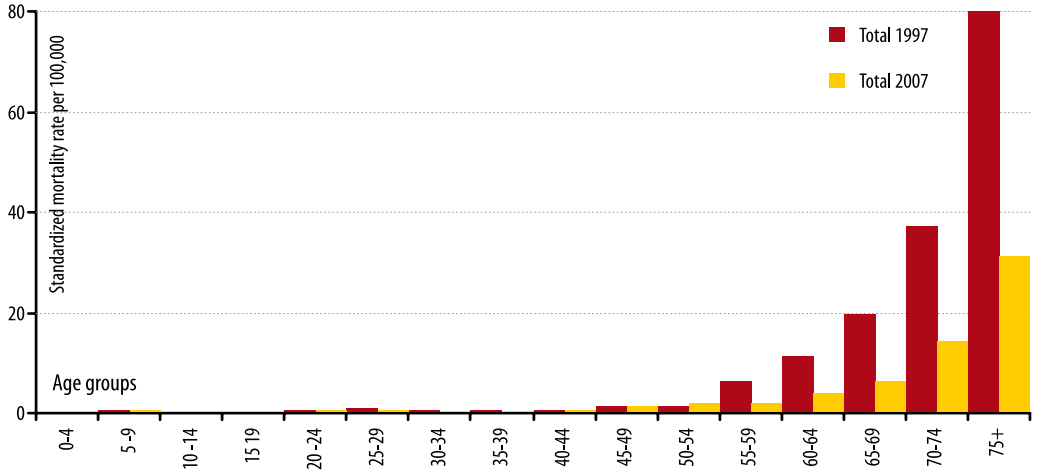
With the standardized mortality rate of 19.0/10900,000 population in 2007, Serbia ranks among European countries with medium high CNRD mortality rate (3). The highest CNRD mortality rates are recorded in Kyrgyzstan (99.0/100,000), Kazakhstan (56.5/100,000) and Moldova (51.9/100,000), while Greece (0.2/100,000), Bulgaria (2.6/100,000) and France (8.3/100,000) boast the lowest.

Chronic obstructive pulmonary disease

Chronic obstructive pulmonary disease is most commonly manifested as chronic bronchitis (ICD-10: J42) and pulmonary emphysema (ICD-10: J43). Active smoking is the most important risk factor for COPD (4). Other risk factors include genetic predisposition, allergy, viral and fungal infections and environmental factors (5).

COPD prevalence greatly depends on the smoking status. It has been found out that COPD prevalence varies among world regions

Figure 53. Age-specific mortality rates for chronic respiratory disease, Serbia, 1997 and 2007



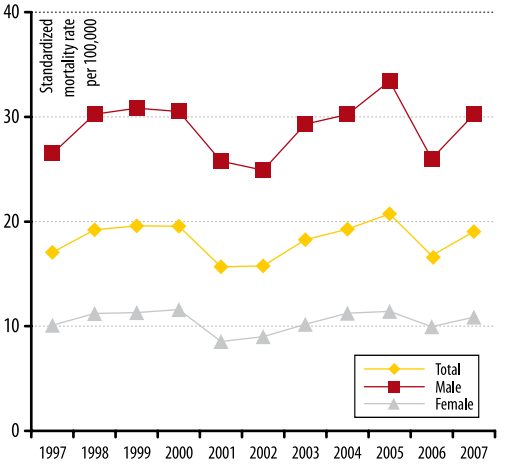
Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia

and that it correlates with the prevalence of smoking. According to 2006 health survey of adult population of Serbia COPD was present in 3.6% of men and 4./9% of women. The disease is more common in older age groups and among men, which is explained by their higher exposure to risk factors, primarily smoking. Recently, COPD is increasingly more common in women, probably as a consequence of still very high prevalence of tobacco smoking among the fairer sex.

COPD mortality rates in the last ten years (Table 27) rose by 11.8%, from 17.0/100,000 (1997) to 19.0/100.000 (2007).

The mortality rates rise with age. In USA very low mortality rates are recorded in the population under 45 years of age, while in the 65+ age group COPD ranks fourth among the leading causes of death (6). Over the studied period, with identified oscillations of COPD mortality rates, the rise was noted in the late nineties and 2005 (Figure 54).

Figure 54. Standardized mortality* rates for chronic obstructive pulmonary disease by gender, Serbia, 1997–2007



Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia
* European standard population

Asthma

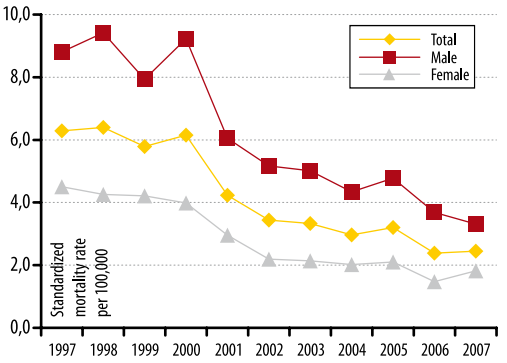
Asthma is defined as a chronic inflammatory disease of the airways manifested in

recurrent episodes of dyspnea and wheezing resulting from mainly reversible obstruction of the airways (7). The disease is characterized with exacerbations, most commonly provoked by numerous allergens, irritants and viral infections.

The asthma incidence worldwide ranges from 0.7 to 38.7 per 1,000 population, depending on the age, and it peaks in childhood – this is the most common chronic disease in childhood. It affects more boys than girls, but around puberty it becomes more common in girls. According to results of 2006 Health Survey of adults in Serbia 2.7% of the Serbian population suffered from asthma.

In the period 1997-2007 the asthma mortality rate fell almost 2.5 times, from 6.3/100,000 in 1997 to 2.5/100,000 in 2007 (Figure 55). The fall was particularly marked after 2000 and most probably resulted from timely and better diagnostics, and more effective treatment of the disease. Gender-wise, it has been noted that the asthma mortality rates in our country were almost two times higher in men than women (Figure 55).

Figure 55. Standardized mortality rates* for asthma by gender, Serbia, 1997–2007



Source: unpublished data of the Statistical Office of Serbia, analyzed in the Institute of Public Health of Serbia

* European standard population

References:

1. World Health Organization, Management of Noncommunicable Diseases Department, WHO strategy for prevention and control of chronic respiratory diseases. WHO; 2002.

2. Ministry of Health Republic of Serbia. National Health Survey, year 2006. Key findings. Ministry of Health Republic of Serbia, Belgrade; 2007.

3. Database „Health for all", WHO, http://data.euro.who.int/hfadb/

4. Sherrill DL, Lebowitz MD, Burrows b. Epidemiology of chronic obstructive pulmonary disease. Clin Chest Med 1990.

5. Standford AJ, Weir TD, Pare PD. Genetic risk factors for chronic pulmonary disease. Eur Respir J 1991.

6. Anto MJ, Vermeire P, Sunyer J. Chronic obstructive pulmonary disease In: Annesi-Maesano I, Gulsvik A, Viegi G eds: Respiratory epidemiology in Europe. European Respiratory monograph. Sheffield: European Respiratory Society Journals Ltd; 2000.

7. 6NIH. Global Strategy for Asthma Management and Prevention. NHLBI/WHO Workshop Report NIH Pub No-953659, 1995, Revised 2002.

Non-communicable Diseases – Leading Public Health Problem

Injuries

Injuries are the leading cause of death in the population under 29 and the third leading cause of early death and disability in Serbia.

Injuries are health disorders resulting from acute exposure to some of various forms of energy: mechanical, thermal, electrical, chemical or radiation that in its intensity exceeds the limit of physical tolerance. Injuries may be accidental (in traffic, exposure to heat, chemical agents, falls, etc.) or intentional resulting from self violence or against others (1,2).

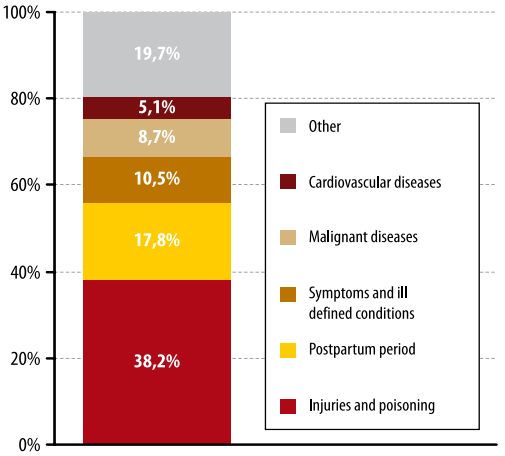
Low socio-economic status, cultural norms favoring violence, low standard of living, family violence and alcohol and drug abuse are some of factors that may predispose to injuries (3,4,5).

Each year over 5 million people worldwide lose their lives as a consequence of injuries (9% of all causes of death). In the 15-29 age group 8 out of 15 leading causes of death are consequences of traffic accidents, suicides, murders, drownings, burns, war injuries, poisoning and falls (7,8,9,10).

Injuries (ICD-10: S00-T98) are a common cause of death in the population of Serbia. These health disorders are the third leading cause of death in our country (3.8%). In the period 1997-2007 the structure of mortality of all injuries combined changed slightly. In 2007 accidental injuries accounted for 50.5% of all fatal outcomes and intentional ones for 49.5%. In the mortality structure caused by accidental injuries, almost a half were caused by traffic injuries.

In 2007, injuries and poisonings were the leading causes of death in age group up to 29 years (38.2% of fatal outcomes) in Serbia (Figure 56). In the same age group mortality caused by these health disorders was twice as high in men than in women (45.3% versus 21.6%) in Serbia.

Figure 56. Leading causes of death in population aged 0–29 Serbia, 2007

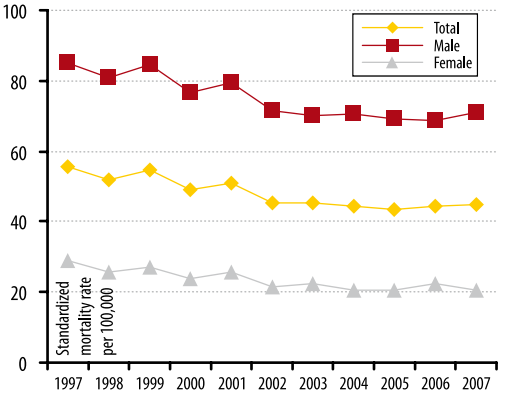


Source: unpublished data of the Statistical Office of Serbia analyzed in the Institute of Public Health of Serbia

Out of all injuries and poisonings, injuries to the head and neck were the most common causes of death (31.7%) in Serbia in 2007 (Table 28). In the same year, consequences of frostbites accounted for the least number of deaths in this group (0.4%).

In the period 1997-2007 in Serbia falling trend of injury-associated mortality was noted for both sexes (Figure 57). Injuries in the group of young people account for more victims than all other causes combined. Men fall victims of injuries and poisonings, twice as much as women.

Figure 57. Standardized mortality rates* for injury by gender, Serbia, 1997–2007



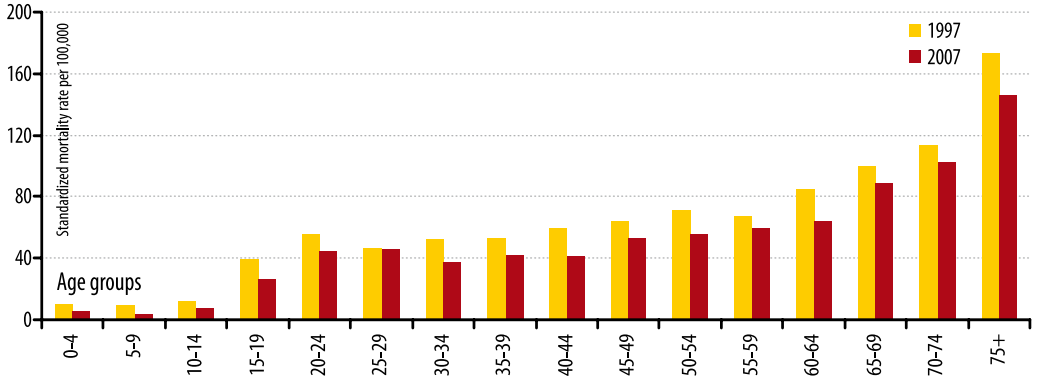
Source: unpublished data of the Statistical Office of The Republic of Serbia analyzed in the Institute of Public Health of Serbia
*Standard European population

Table 28. Leading causes of injury and poisoning mortality, Serbia, 2007

Injury and poisoning (ICD10: S00-T98)	Number of deaths	%
Injuries to the head and neck	1228	31.7
Certain other consequences of external causes	1128	29.2
Injuries involving multiple body regions	392	10.1
Poisoning	368	9.5
Injuries to the thorax, to the shoulder and upper arm	285	7.4
Injuries to the abdomen lower back, lumbar spine, pelvis and leg	185	4.8
Injuries to unspecified part of body region	126	3.3
Burns	97	2.5
Effects of foreign body entering through natural orifice	43	1.1
Frostbite	17	0.4
All	3869	100.0

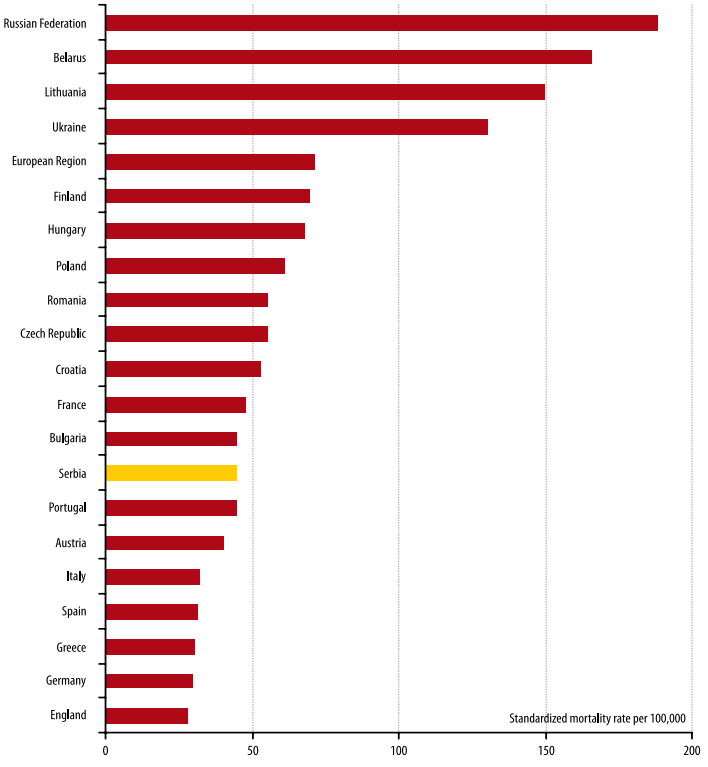
Source: unpublished data of Statistical Office of the Serbia analyzed in the Institute of Public Health of Serbia

Figure 58. Age-specific mortality rates for injury and poisoning, Serbia, 1997 and 2007



Source: unpublished data of the Statistical Office of Serbia analyzed in the Institute of Public Health of Serbia

Figure 59. Standardized mortality rates*for injury and poisoning, Serbia and selected European countries, 2007



Source: WHO database „Health for all", http://data.euro.who.int/hfadb/
*Standard European population

Comparing to 1997, mortality rates of injures and poisoning were lower in 2007 in all age groups (Figure 58).

The highest standardized injury and poisoning mortality rates were reported in Russia and other former Soviet Republics, and the lowest in England, Germany and Greece. In 2007 the standardized injury and poisoning mortality rate in Serbia (71.3/100,000) was lower than the average injury mortality rate in the region of Europe (Figure 59).

References:

1. Etienne G. Krug, Linda L. Dahlberg, James A. Mercy, Anthony B. Zwi and Rafael Lozano. World report on violence and health. World Health Organization Geneva, 2002.
2. Prothrow-Stith D, Spivak H, SegeRD. Interpersonal violence prevention: a recent public health mandate. In: Detels R et al., eds: Oxford Textbook of Public Health, 4th ed., Vol. 3. New York: Oxford University Press 2002.
3. Krug EG et al, eds. World report on violence and health. Geneva: World Health Organization; 2002.
4. Reza A, Mercy JA, Krug E. Epidemiology of violent deaths in the world. Injury Prevention 2001.
5. The economic dimensions of interpersonal violence. World Health Organization, Geneva; 2004.
6. Felitti VJ et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. American Journal of Preventive Medicine, 1998, 14:245–258.
7. Anda RF et al. The enduring effects of abuse and related adverse experiences in childhood: a convergence of evidence from neurobiology and epidemiology. European Archives of Psychiatry and Clinical Neuroscience, 2006, 256:174–186.
8. Anda RF et al. Adverse childhood experiences and prescribed psychotropic medications in adulthood: a prospective study. American Journal of Preventive Medicine, 2007, 32:389–394.
9. Tang B et al. The influence of child abuse on the pattern of expenditures in women's adult health service utilization in Ontario, Canada. Social Science and Medicine, 2006, 63:1711–1719.
10. Violence: a public health priority. Geneva, World Health Organization, 1996 (document WHO/EHA/SPI.POA.2).World report on violence and health. Geneva, World Health Organization, 2002.

Non-communicable Diseases – Leading Public Health Problem

Road Traffic Injuries

The number of accidents in road traffic in Serbia increased since 2002, while the accidents with fatal outcomes had a mild falling trend.

In spite of fact that these health disorders reach pandemic impact and affect all sectors of society, they still get insufficient attention. In addition to direct health care costs and premature death by injuries, continuously increasing number of vehicles and national policy of road traffic have substantial influence on social and economic conditions, as well as environment, including the climate change factors (1,2). In some country air pollution is a more substantial cause of premature death, contributing to respiratory diseases and circulatory diseases, even more than the accidents themselves (3,4).

According to WHO estimates, every year 26 million people are injured in road traffic, and for about 1,300,000 people these injuries are fatal (5). Although the number of motor vehicles per capita is significantly higher in economically developed countries, fatal outcomes are far more frequent in undeveloped and medium developed countries of the word.

Analysis of the structure of individual causes of death suggests that nowadays injuries in road traffic rank 9, 15 and 17 globally, in Europe and Serbia, respectively.

Mortality as a consequence of injuries in road traffic mainly affects the younger population. About 50% of people that are killed in road accidents are between 15 and 44 years of age, where the risk for men is three times higher than for women (6,7).

In developing countries, pedestrians, bicycle riders, children and passengers in public transport are the most common victims of traffic accidents; in economically more developed parts of the world drivers and pedestrians are the most common victims (8,9).

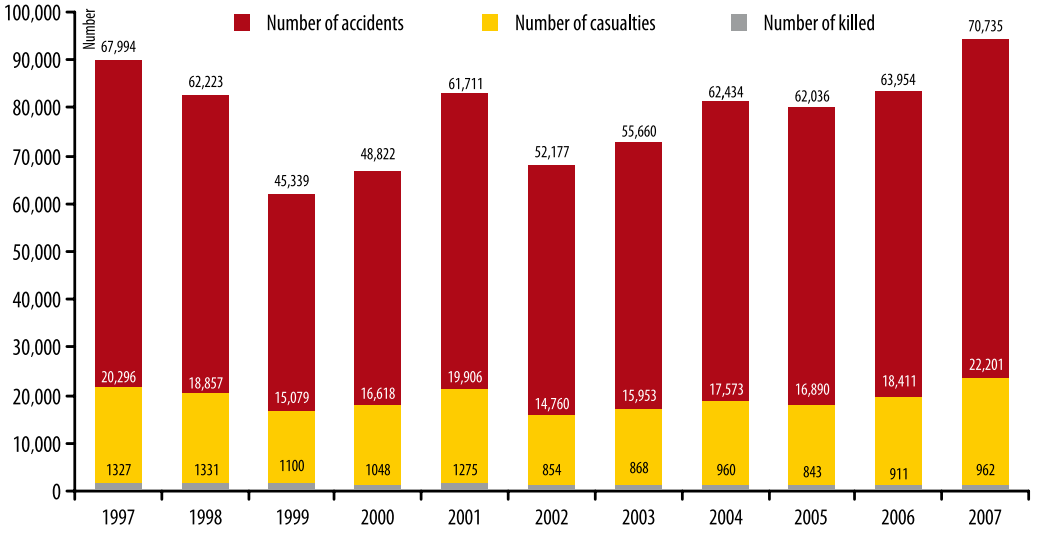
Conversely, in highly developed countries, such as Finland, where campaign for safety on the road has been in place for 30 years now, the number of deaths in road traffic has been reduced by 50%, although the number of vehicles has been trebled over the same period (10,11,12).

Based on the data of the Ministry of Interior of the Republic of Serbia, in the period 1997-2007 variations in the number of traffic accidents were noted (Figure 60). The lowest number of traffic accidents was recorded in 1999 (45,339) and the highest in 2007 (70,735). Over the same period, the lowest number of injured people was recorded in 1999 (15,079) and the highest in 2007 (22,201). However, the number of deaths in traffic accidents was the lowest in 2002 (854) and highest in 1997 (1327).

In spite of high oscillations, it appears that over the observed period of ten years, the number of traffic accidents increases, the number of injuries in these accidents is on the same level, while the mortality mildly decreases. (Figure 60).

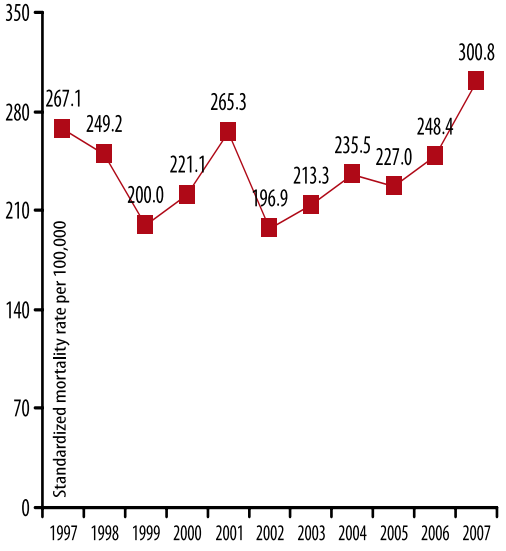
Over the observed period of ten years the traffic injury incidence rates were the highest in 1997 (267.1/100,000), 2001 (265.3/100,000), and 2007 (300.8/100,000) (Figure 61). The same years were related to the highest mortality in road traffic (17.5/100,000) in 1997, (17.5/100,000) in 2001 and (13.0/100,000) in 2007.

Figure 60. Number of traffic accidents, injured and dead persons in transportation, Serbia, 1997–2007



Source: unpublished data of the Ministry of Internal Affairs of Serbia analyzed in the Institute of Public Health of Serbia

Figure 61. Incidence rates for injuries in traffic accidents, Serbia, 1997–2007



Source: unpublished data of the Ministry of Internal Affairs of Serbia analyzed in the Institute of Public Health of Serbia

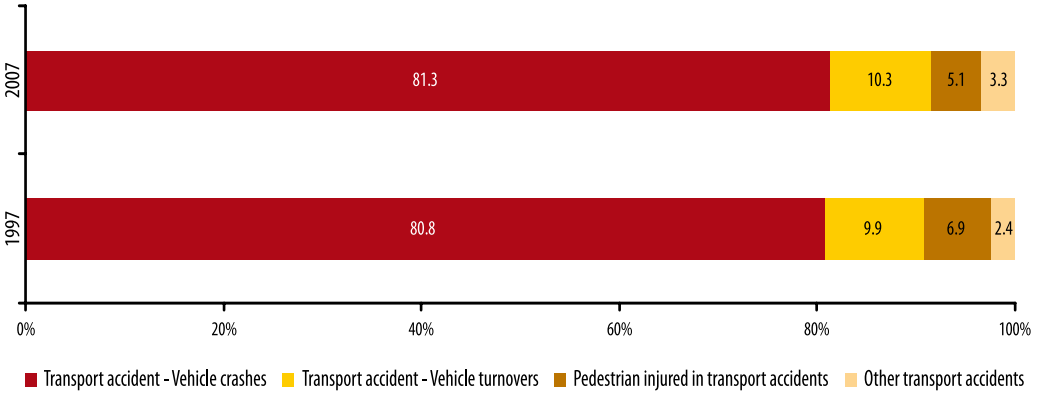
The structure of traffic accidents in Serbia did not change substantially from 1997 to 2007 (Figure 62). In 2007 most common causes of traffic accidents in Serbia were crashes of motor vehicles (81.3%); they were followed by skidding off the road or vehicle turning over (10.3%), pedestrian accidents (5.1%) and other (3%).

Among participants in road traffic, drivers were at the highest risk of injury and fatal outcome. Passengers were injured more frequently, while pedestrians most frequently had fatal outcomes.

In 2007 over a half of victims of traffic accidents (55.5%) in Serbia belonged to the 15-54yr age group.

Adoption and implementation of the new Law on Traffic Safety that would strictly sanctioned driving under the influence of alcohol and drugs, unadjusted or excessive speed, not using car safety belts or helmets on motorbikes, poor planning, road design and maintenance, failure to implement safety standards in road traffic, could reduce the number of accidents in road traffic and pertinent number of injured and killed people.

Figure 62. Types of traffic accidents, Serbia, 1997 and 2007



Source: unpublished data of the Ministry of Internal Affairs of Serbia analyzed in the Institute of Public Health of Serbia

References:

1. Bolen J et al. Overview of efforts to prevent motor vehicle-related injury. In: Bolen J, Sleet DA, Johnson V, eds. Prevention of motor vehicle related injuries: a compendium of articles from the Morbidity and Mortality Weekly Report, 1985–1996. Atlanta, GA, Centers for Disease Control and Prevention, 1997.
2. Dora C, Phillips M, eds. Transport, environment and health. Copenhagen, World Health Organization Regional Office for Europe, 2000; (European Series No. 89)
Available at:
http://www.who.dk/document/e72015.pdf
3. Evans L. The new traffic safety vision for the United States. American Journal of Public Health, 2003, 93:1384–1386.
4. Koornstra M et al. Sunflower: a comparative study of the development of road safety in Sweden,the United Kingdom and the Netherlands. Leidschendam, Institute for Road Safety Research, 2002.
5. Rumar K. Transport safety visions, targets and strategies: beyond 2000. Brussels, European Transport Safety Council, 1999 (1st European Transport Safety Lecture)
Dostupno na:
http://www.etsc.be/eve.htm
6. Litman T. If health matters: integrating public health objectives in transportation planning. Victoria, BC, Victoria Transport Policy Institute, 2003.
Dostupno na:
http://www.vtpi.org/health.pdf
7. TransMilenio. A high capacity/low cost bus rapid transit system developed for Bogotá, Colombia. Bogotá, TransMilenio SA, 2001.
8. Hummel T. Land use planning in safer transportation network planning. Leidschendam, Institute for Road Safety Research, 2001 (SWOV Report D-2001-12).
9. Ross A et al., eds. Towards safer roads in developing countries. A guide for planners and engineers. Crowthorne, Transport Research Laboratory, 1991.
10. Aeron-Thomas A et al. A review of road safety management and practice. Final report. Crowthorne, Transport Research Laboratory and Babtie Ross Silcock, 2002 (TRL Report PR/INT216/2002).
11. Allsop R. Road safety audit and safety impact assessment. Brussels, European Transport Safety Council, 1997.
12. Margie Peden, Richard Scurfield, David Sleet, Dinesh Mohan, Adnan A. Hyder, Eva Jarawan and Colin Mathers. World report on road traffic injury prevention. World Health Organization, Geneva; 2004.

Non-communicable Diseases – Leading Public Health Problem

Suicides

Since 2000 Serbia has witnessed a decreasing trend in the number of suicides. The burden of suicide is higher in men. On the average, the suicide rates in Serbia were three times higher in men than in women.

Suicide (ICD-10: X60-X84) implies intentional and conscious deprivation of own life. Unconscious self-injury with fatal outcome is not a suicide, but an accident (1).

Suicide is an increasing public health problem globally. Approximately one million people commit suicide each year, meaning one death per 40 seconds. The number of attempted suicides is twenty times higher than the number of actual suicides (1).

In our country in 2007 suicide as a cause of death was registered in 1354 cases, meaning four persons a day.

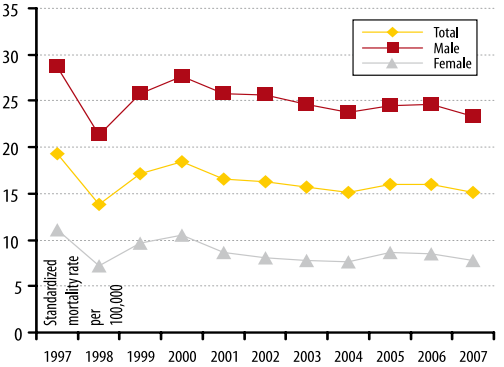
A 25% increase of suicide rate was noted in the period 1998-2000 in both sexes alike, most probably resulting from years of crisis, war and low socio-economic state affecting the country as a whole. Over that period, increase of suicide rates in women reached 31%, where it was somewhat lower in men (23%).

After 2000, the suicide rate had a decreasing trend. In 2000-2007 the suicide rate on the national level decreased by 18% (16% in men and 26% in women) (Figure 63).

Like in other countries worldwide, suicide rates are higher for men. According to WHO data the average non-standardized suicide rate was 14.5/100,000, where male to female suicide rates ratio was 3.5 vs. 1 (2). In 2007, the non-standardized suicide rate in Serbia was 18.3/100,000, and the male to female suicide rates ratio was 3 vs. 1. The 2000 study "Burden of Disease

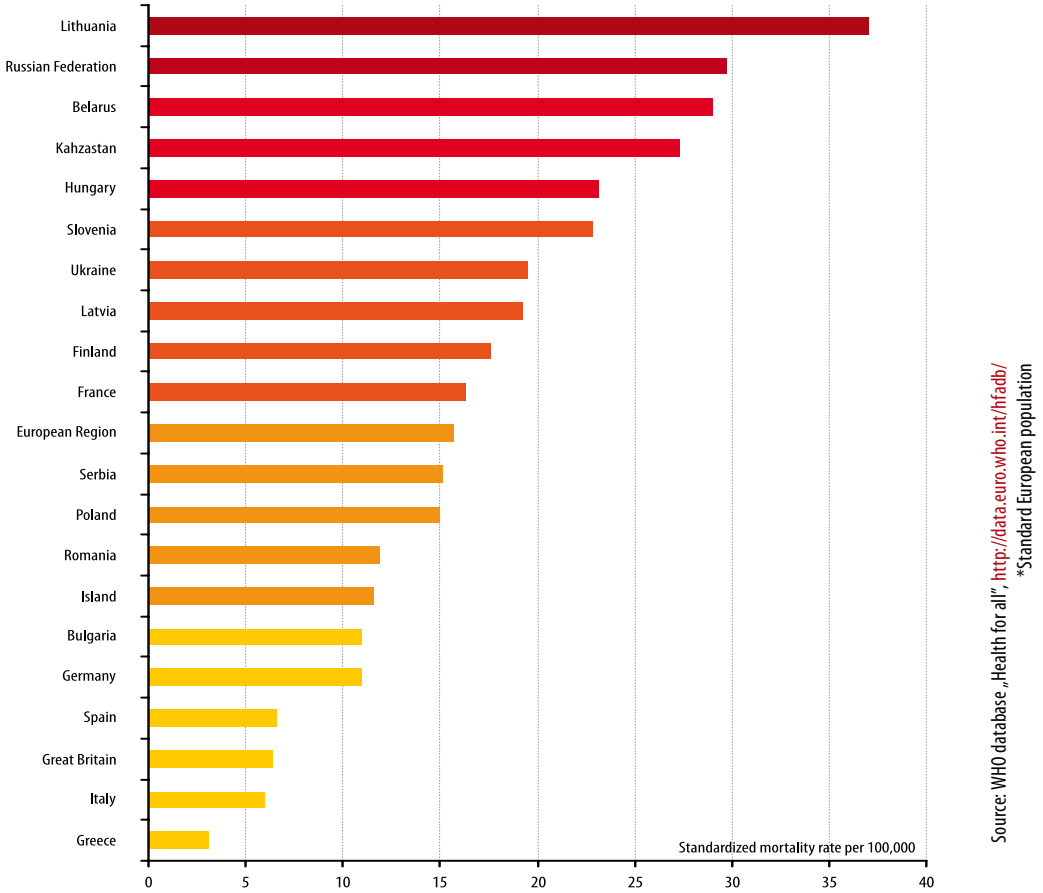
and Injuries in Serbia" substantiated that suicide rates were higher for men. Suicide was ranked fifth among 18 studied health disorders in men, and ranked eleventh in women (3).

Figure 63. Standardized mortality rates* for suicide, Serbia, 1997–2007



Source: WHO database „Health for all", http://data.euro.who.int/hfadb/
*Standard European populatione

Figure 64. Standardized mortality rates* for suicide in Serbia and selected countries in European Region, 2007



Source: WHO database „Health for all", http://data.euro.who.int/hfadb/
*Standard European population

The average European standardized suicide rate for all countries in the region of Europe was 15.1/100,000. In comparison with the countries in the region of Europe Serbia with its 15.3/100,000 rates is among the countries with medium risk of suicide (Figure 64).

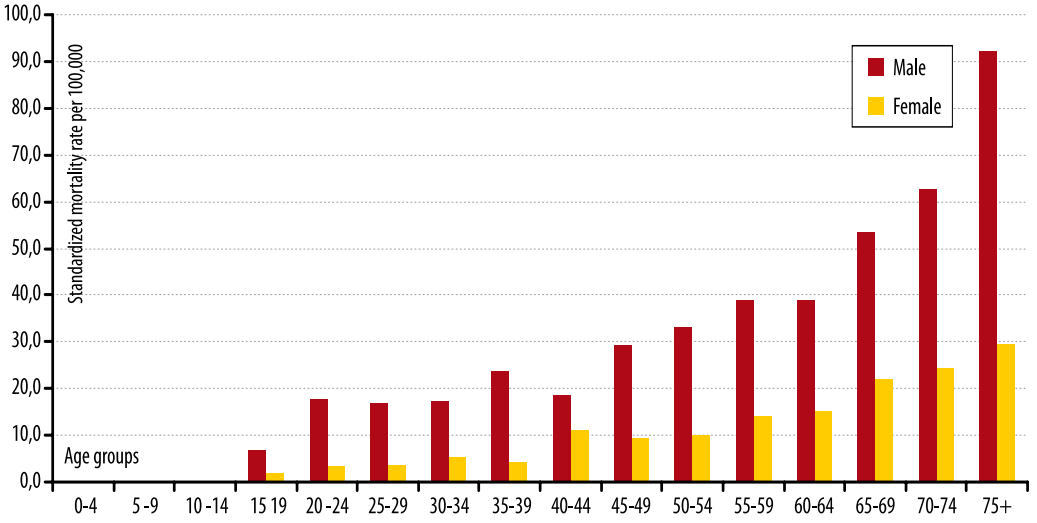
The highest age-specific suicide rates in Serbia were recorded in population aged 75 years and above for both sexes (Figure 65), similarly to other countries (4).

Increased suicide rate among the oldest age group is related to frequent occurrence of serious somatic diseases (e.g. malignant diseases), low social network and support, loss of active role in the community and unrecognized and untreated depression (2,4).

Alarmingly, on the global level suicide is among three leading causes of death of young people aged 15-24, i.e. 15 to 34. In the 15-34 yr age group suicide rates have trebled in the period from the fifties to the nineties of the twentieth century (2). It is assumed that the increased suicide rate among young people aged 15-34 years resulted from increased prevalence of mental diseases (depression, schizophrenia), abuse of alcohol and psychoactive substances, as well as broad access to fire arms (4).

In Serbia, suicide is also a common cause of death among young people aged 15-24 years. However, contrary to trends worldwide, in Serbia in the period 1997-2007 fall of the proportion of suicide in all causes of death in this age group was recorded. In 1997 the proportion of suicide in all causes of death in this age group was 17%, falling to 13% in 2007. Over the studied period, the suicide rates among young people aged 15-24 years fell by 43%.

Figure 65. Age-specific mortality rates for suicide, Serbia, 2007



Source: unpublished data of the Statistical Office of Serbia analyzed in the Institute of Public Health of Serbia

References:

1. WHO. The World Health Report 2001. Mental Health: New Understanding, New Hope. Geneva: WHO, 2001
2. WHO. The World Report on Violence and Health. Self-directed violence. Geneva; WHO, 2002; 185-212.
3. Atanackovic-Markovic Z, Bjegovic V, Jankovic S, Kocev N, Laaser U, Marinkovic J, et al. The Burden of Disease and Injury in Serbia. Belgrade: Ministry of Health of the Republic of Serbia; 2003.
4. Kozaric-Kovacic D. Epidemiological indicators of suicides in the Republic of Croatia – certain epidemiological indicators of suicide. The first conference on suicide in Croatia, November 2000; Abstract book, Zagreb; 2000.

Communicable Diseases

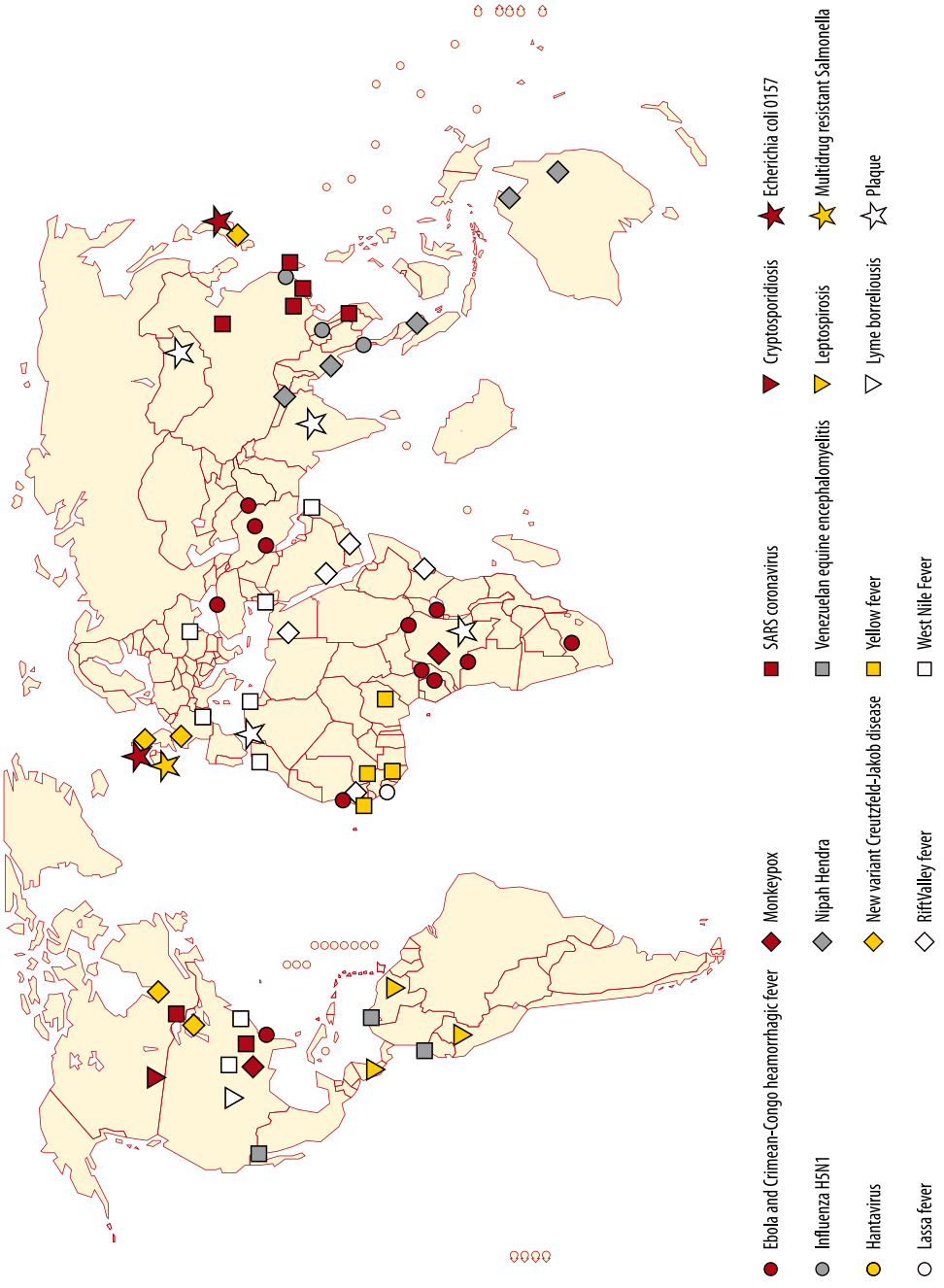
Communicable diseases still present a substantial public health problem because of their epidemiological features, and in particular because of rate of spreading under the conditions of marked mobility and mutual relationships among the populations.

Communicable diseases trends

Communicable diseases caused by specific infectious agents or their toxic products have continuously been an important cause of morbidity and mortality in many European countries (1). Since the seventies of the previous century one or more new communicable diseases have been discovered on the average each year. The onset of 21st century was marked by bioterrorism, severe acute respiratory syndrome caused by new corona virus – SARS-CoV, increasing problem of multiple resistance to antibiotics, occurrence of avian influenza A virus (H5N1), threatening flu pandemic caused by new influenza virus. According to the WHO data, communicable diseases that most commonly result in death of children and adolescents include pneumonia, tuberculosis, diarrheal syndrome, malaria, measles and HIV/AIDS. They account for 90% out of 13 million fatal outcomes of communicable diseases each year.

Reporting of communicable diseases in Serbia in the period from 1997 to 2007 was regulated by pertinent laws and by-laws (3). The legal instruments stipulate diseases that are subject to mandatory reporting, as well as the mode of such reporting, which has affected some variations in the values of incidence rates; they may be related to improving, i.e. deteriorating situation in the area of epidemiology of communicable diseases. Over the studied period in Serbia the incidence rate of communicable diseases ranged from up to four times higher than the lowest registered in 1999 (1064.4/100,000) which was directly related to difficulties in the operation of health care services resulting from the NATO bombing raids on Serbia. The highest incidence of

Map 1. Selected emerging and re-emerging infectious diseases: 1996-2004



Source: WHO, August 2007, http://www.who.int/whr/2007/whr07_en.pdf

communicable diseases was reported in 2007: 4364.2/100,000 resulting from more reported cases of respiratory communicable diseases that are reported on a common form since 2006, with predominance of diseases caused by beta hemolytic streptococcus and pneumonia (Table 28). Respiratory communicable diseases were the most common causes of morbidity in the group of communicable diseases over the studied period with the proportion ranging from 45.3 to 88.8%, while the proportion of influenza in total incidence of communicable diseases was the highest (45.3%).

Table 28. Cases of communicable diseases and the incidence rate (per 100,000 population), Serbia, 1997-2007

Year	Number of cases	Incidence rate /100,000
1997	105,071	1382.8
1998	110,899	1465.4
1999	78,903	1046.4
2000	96,890	1289.1
2001	93,896	1251.4
2002	100,430	1339.1
2003	109,342	1461.7
2004	115,094	1542.2
2005	89,604	1204.2
2006	193,169	2606.3
2007	323,452	4364.2

Source: Institute of Public Health of Serbia, Annual report on communicable diseases in Republic of Serbia

According to the 2005 WHO global data, 8.8 million cases of tuberculoses were registered that year. Out of 1.6 million cases with fatal outcome, over 90% lived in developing countries (4). According to the data for 25 EU member states close to 60,000 cases were reported in 2005 with increasing proportion of HIV positive persons and the problem of resistance to tuberculostatic drugs (4). In 1997-2007 in Serbia the incidence rate of lung tuberculosis ranged from 20.2 to 38.7/100,000. The decreasing incidence of lung tuberculosis in the period 1997-2007 resulted from implementation of the global WHO program for TB control and introduction of Direct Observation Treatment Strategy (DOTS) in 2002. Therefore, after a larger number of reported cases in 2004, due to improved surveillance continuous decrease of lung TB incidence was observed (28.3/100,000 in 2005 and 25.2/100,000 in 2007).

In Serbia, the mortality rate associated with communicable diseases in the period 1997-2007 ranged from 1.3 to 3.1/100,000. Due to increased number of registered cases of death caused by tuberculosis and sepsis, resulting from updated reports of fatal outcomes of communicable diseases and changes in the reporting system, the highest mortality rates were recorded in the period 2005 to 2007 (Table 29).

Table 29. Cases of deaths related to communicable diseases and the mortality rate (per 100,000 population), Serbia, 1997-2007

Year	Number of deaths	Mortality rate /100,000
1997	138	1.8
1998	163	1.8
1999	145	1.9
2000	110	1.5
2001	101	1.3
2002	149	2.0
2003	134	1.8
2004	198	2.7
2005	233	3.1
2006	203	2.7
2007	231	3.1

Source: Institute of Public Health of Serbia, Annual report on communicable diseases in Republic of Serbia

The proportion of respiratory communicable diseases in the total mortality ranged from 26.2 to 62.7%, with significant proportion of sexually transmitted diseases ranging from 8.7 to 45.9%. Over the studied period the leading causes of death from communicable diseases in Serbia were HIV/AIDS, tuberculosis, sepsis and bacterial meningitis. Since 2003 communicable diseases are not among the ten leading causes of death of the population of Serbia.

Analysis of the specific mortality rates in the age group 0-4yrs in Serbia, revealed the highest value of 4.5/100,000 in 2004, when sepsis was the most common cause of death in 44.5% of the cases.

Outbreaks

Outbreak of a communicable diseases implies an increase of the number of affected persons above the usual one in a certain population, over a certain period of time.

In the period 1997-2007 in Serbia 3565 outbreaks with 62,536 affected persons were registered (4.41% of all persons affected by communicable diseases) and 39 deaths (2.2% of all deaths from communicable diseases). The number of outbreaks in the period of ten years ranged from 272 in 2001 to 358 in 1997.

Due to transmission route of infective agents, most common were alimentary outbreaks with 65.2% share; they were followed by contact outbreaks (23%), airborne/droplet spreading (8.1%), unidentified spreading (1.7%) and waterborne spreading (1.5%).

Within alimentary outbreaks salmoneloses were most common (57.4%), where the source of infection most commonly was at home or in workers' canteens.

Over the studied ten years three more important outbreaks took place: influenza outbreak in 2000, outbreaks of measles and hepatitis A in 2007.

In 2007 there were 197 outbreaks that required WHO intervention out of which 43% in Sub-Saharian Africa. Most common were outbreaks of cholera, acute diarrheal syndrome, acute respiratory diseases, epidemic meningitis and viral hemorrhagic fevers (5).

Hospital infections

Hospital infections (HI) are the infections occurring in patients or staff during in-patient treatment in a hospital or other health institution.

The scope of the problem is impossible to understand globally. The incidence of these infections in the European countries ranges from 3.5 to 15%; in USA it ranges from 3.4 to 5% (6).

In the period 1997-2007 in Serbia two national studies were conducted investigating the prevalence of hospital infections. The first covered 27 hospitals, where the prevalence of 7.5% was established (7), while the second comprised 56 hospitals and the resulting prevalence was 3.5% (8). By the localization the most common were infections of the urinary system, and the most common causes of HI were Staphylococcus aureus, E. coli and Pseudomonas. These data are more or less similar to the corresponding global data, except for the ranking sequence of these pathogens.

According to the EU data for their member states, each year about 3 million people ac-

quire a hospital infection, and approximately 500,000 out of these eventually die from it (4).

Since 2001 HI surveillance has been intensified in Serbia, where the incidence rates have helped identify high risk departments such as intensive care units and neonatology wards where the highest values are recorded: 56.9 and 45.2 (per 1000 in-patient days), respectively.

In the period 1997-2007 in Serbia 137 HI outbreaks were registered (3.8% of all outbreaks with 2308 patients (3.7% of all persons affected by outbreaks. The incidence of HI outbreaks ranged from 3 (2005) to 28 (2007). Spreading-wise, vehikleborne epidemics were most common (55.4%), which were followed by airborne/droplet spreading (19.7%), foodborne (13.9%), unidentified spreading (9.4%) and those caused by inoculation (1.4%).

The HI prevalence in Serbia does not differ much from the 9.9% average reported by WHO after a study comprising 55 hospitals in 14 countries (6). The program (9) defined prevention measures, control and surveillance of hospital infections in Serbia, which make a 20-30% reduction feasible.

HIV infection/AIDS

Since 1981 when it was first recognized as a new diseases AIDS caused death of over 30 million people, making the HIV epidemic the most destructive one in written history of the humankind. According to the estimates made by WHO and UNAIDS at the end of 2007 there were 33.2 million people living with HIV worldwide, out of whom 68% in the Sub-Saharan region, including 2.5 million children under 15 years of age. It is estimated that in 2007 there were 2.5 million new cases of HIV infection and 2.1 million people died from AIDS (10).

In the regions of West and Central Europe the number of people living with (HIV) is continuously increasing, which is a result of prolonged life expectancy due to access to combined antiretroviral treatment and increase of newly diagnosed HIV cases from the year 2002.

The region of Central Europe is still characterized with lower prevalence of HIV in comparison with the rest of Europe. Although in Baltic countries HIV infection is stabilized Estonia is still a country with the highest estimated prevalence of HIV (1.3%) in Europe (10).

In Serbia from 1985 when the initial cases were diagnosed 1398 AIDS cases were registered till the end of 2007 out of which 923 (66%) died. In the studied period 1997-2007 a decreasing trend of AIDS morbidity and mortality was present, with the lowest incidence (0.6/100,000) and mortality (0.2/100,000) recorded in 2007, which most probably resulted from the use of highly active antiretroviral therapy (HAART) that is accessible free of charge to all patients in our country since 1997 (11) (Table 30). In the region of Central Europe higher incidence of AIDS from the one registered in Serbia (1999-2006), was present in Romania only (12).

Among AIDS cases and deaths there are three times more men, while the highest number of both AIDS cases and AIDS related deaths of either sex was registered in the age group 30-39 yr (11).

In respect to the mode of transmission, i.e. reported way of acquiring HIV infection, most of the persons who developed AIDS acquired it by i.v. drug use, but since 1999 decreasing trend was noted in this-the most at risk population group for HIV, and the predominant mode of transmission became unprotected sex with infected persons of the same or opposite sex (1) (Figure 66).

Table 30. AIDS incidence and mortality rate (per 100,000 population), Serbia, 1997-2007

Year	Number of cases	Incidence rate /100,000	Number of deaths	Mortality rate /100,000
1997	81	1.1	64	0.8
1998	105	1.4	62	0.8
1999	61	0.8	52	0.7
2000	78	1.0	42	0.6
2001	79	1.1	56	0.8
2002	78	1.0	26	0.4
2003	61	0.8	27	0.4
2004	58	0.8	27	0.4
2005	54	0.7	25	0.3
2006	52	0.7	24	0.3
2007	42	0.6	15	0.2

Source: Institute of Public Health of Serbia, Annual report on communicable diseases in Republic of Serbia

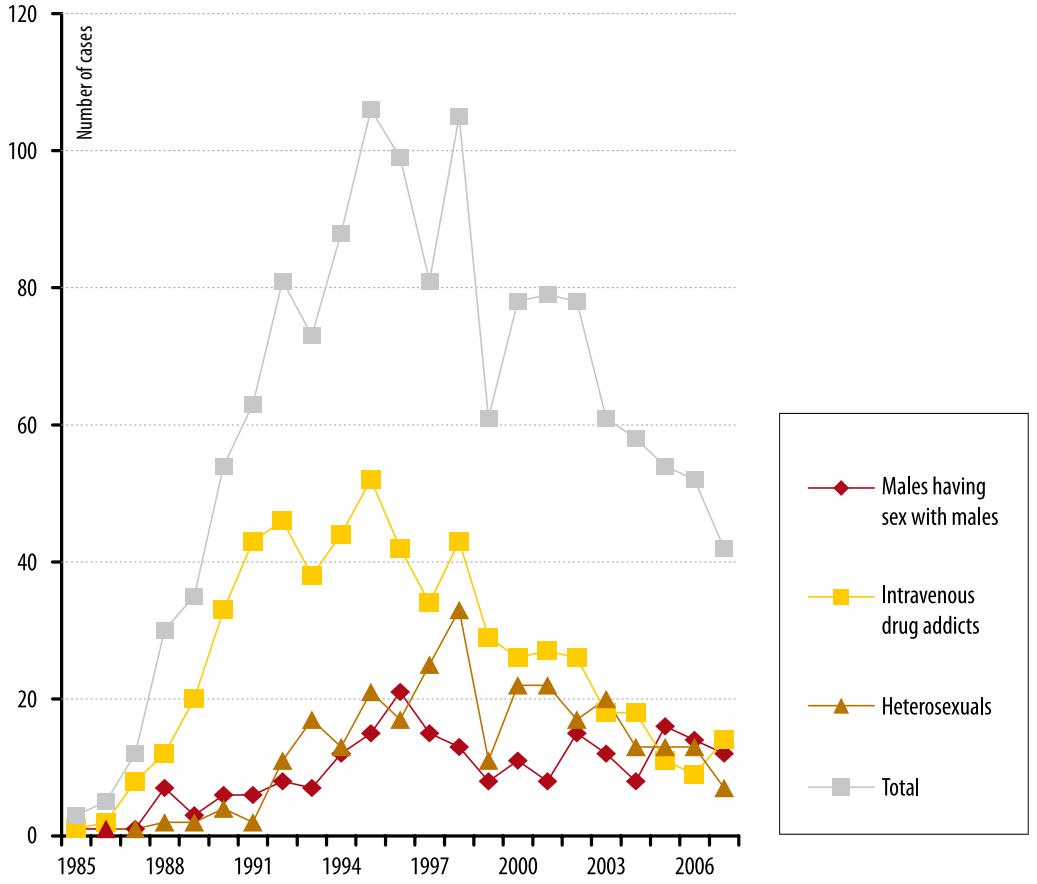
The National Strategy for Fighting Against HIV/AIDS (13) adopted by the Government of the Republic of Serbia in February 2005 provided a basic framework for national action on prevention and control of HIV epidemic in Serbia in the period 2005-2010. The main goal of the Strategy is prevention of HIV infection and sexually transmitted infections, as well as providing treatment and support to persons living with HIV/AIDS. Within implementation of the Second Generation of HIV Epidemiological Surveillance (14), which is an integral part of the System and plans for monitoring and evaluation of the national response to HIV epidemic, plans for repeated, standardized seroprevalence and/or behavioral studies in defined population groups that are the most at risk for HIV are made.

Immunization

Vaccination as a specific measure for prevention and control of communicable diseases is the most effective means to combat these diseases (15).

After eradication of small pox on the global level, in 1988 the process of eradication of polio was initiated and is till in progress. Achieving and maintaining a high coverage by immunization with introduction of additional strategies may help eliminate many communicable dis-

Figure 66. AIDS cases by dominant transmission categories, Serbia, 1985-2007



Source: Institute of Public Health of Serbia, Annual report on communicable diseases in Republic of Serbia

eases such as diphtheria, neonatal tetanus, measles rubella, etc.

Poliomyelitis. The number of countries worldwide in which poliomyelitis is endemic has been reduced from 125 at the beginning of the eradication process to 4, which were registered in 2007 (16).

In the WHO Region of Europe, the disease was eradicated in 2002, when the region was officially declared polio-free, after both Americas and West Pacific Region. The confirmed case of poliomyelitis due to indigenous wild poliovirus was detected in Europe in Turkey, and the last imported case in 2001 in Bulgaria. Maintenance of the polio-free status in all countries in the region will be conducted until eradication has been successfully completed globally.

However, in spite of significant results, the polio eradication program faces serious challenges so that the deadline to achieve it is being continuously postponed (17).

In the period 1997-2007 there were no cases of polio in Serbia. The last case of the disease was registered in 1996 in an epidemic on the territory of Kosovo and Metohija. By implementation of the strategy to achieve and maintain high coverage of newborns by OPV, and activities of additional immunization with implementation and achievement of high quality surveillance of suspected cases, through surveillance of acute flaccid paralysis, Serbia was proclaimed a polio-free country in 2002, as a country within the WHO European Region. After that, the country has been bound by its National Plan of Action to maintain the status in accordance with the strategies proposed by WHO until global eradication is proclaimed.

Coverage by OPV vaccine in the period 1999-2007 was maintained on the level of 97-98% level, which is above the coverage with the same vaccine in the WHO Region of Europe over the same period (92-95%) (Table 31). Relatively low coverage was noted in 1998 (89% in comparison with the region where it was 92%), which is related to deterioration of political situation in the area at the time (18).

Diphtheria. In the early nineties in some European countries (former USSR) outbreaks of diphtheria were recorded resulting directly from reduced coverage by DTP vaccine (19) with relatively high values of the incidence of the disease in the region at the onset of the studied period.

Over the studied period, 1997-2007, there were no reported cases of diphtheria in Serbia, and the last case was registered in 1980. This is a result of maintenance of high coverage by vaccine against diphtheria, tetanus and pertussis (DTP) in both initial vaccination and re-vaccination that keeps up with the DTP coverage over the studied period (Figure 67).

Pertussis. The incidence rate of pertussis in Serbia over the studied decade shows

Table 31. Reported immunization coverage for DTP3, OPV3 and MMR in Serbia and WHO European Region, 1997-2007

Year	DTP3 (%)		OPV3 (%)		MMR (%)	
	Serbia	European region WHO	Serbia	European region WHO	Serbia*	European region WHO
1997	94	91	94	92	92	87
1998	89	90	89	93	89	88
1999	97	92	97	94	92	90
2000	97	93	97	94	87	91
2001	97	93	97	94	95	91
2002	97	93	97	93	93	91
2003	97	91	98	92	95	90
2004	98	94	98	95	97	91
2005	97	95	97	95	95	93
2006	97	95	97	95	96	94
2007	98	-	98	-	97	-

*Measles, Mumps, Rubella Vaccine (MMR)

Source: Institute of Public Health of Serbia, Annual report on immunization in the Republic of Serbia
WHO vaccine preventable diseases monitoring system, 1997-2006 global summary

values that are several times lower at the end (0.04/100,000) than they were at the beginning (0.53/100,000) of the period. Increasing incidence that is registered in older age noted in the countries in the region may be explained by weakening of the vaccine-induced immunity over time, so that the patients do occur even in countries with high coverage (20).

Tetanus. The last cases of neonatal tetanus in Serbia were recorded in 1999. Its elimination is one of the WHO objectives. Reaching it is of key importance for maintenance of adequate vaccination status of women in reproductive age.

Tetanus incidence in adult population of Serbia in the period 1997-2007 contributed to the total incidence in the region by about 6%. It mainly results from injuries of non-vaccinated persons or incompletely vaccinated elderly adults. Out of the total number of deaths in the studied period (9) 92.2% were above 60 years of age.

Morbilli. Measles is one of the most common causes of death among children worldwide. It is estimated that about 5000 children die from this disease in the European Region. However, reaching and maintaining high vaccination coverage in all regions, introduction and reaching high quality surveillance make the elimination of measles possible, which was achieved in the USA in 1994 (21). In recent years, imported cases and measles outbreaks are a growing problem in risk populations and regions, postponing the elimination in the region.

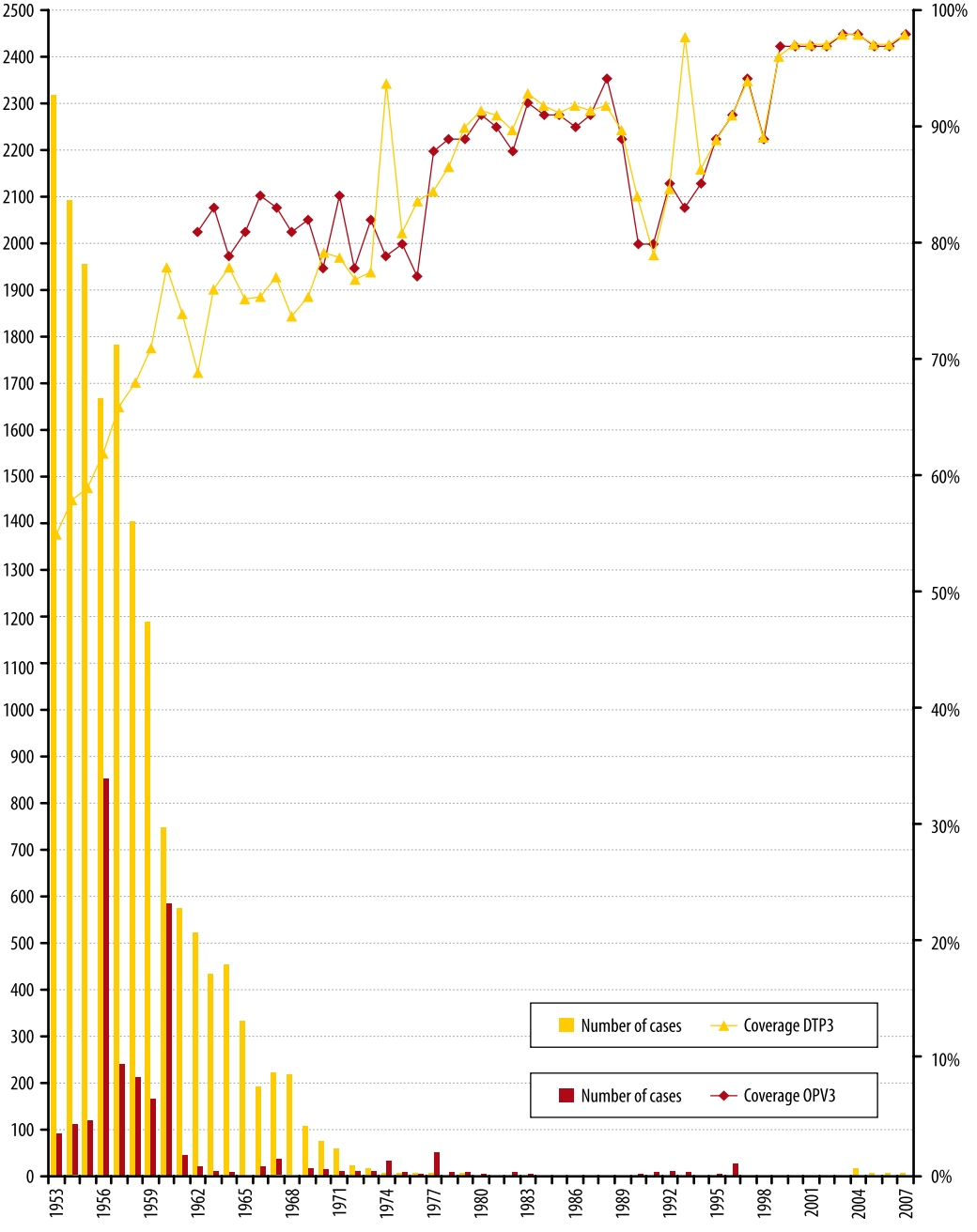
Measles vaccine was introduced in 1971 in the Program of Mandatory Immunizations in Serbia; measles and mumps vaccine (MM) in 1981, and measles, mumps and rubella vaccine (MMR) in 1993. In the period 1997-2007 MMR coverage ranged from 87-97%, which is above the regional average. This coverage was accompanied with fall of incidence of measles from 7.7 to 0.02/100,000 recorded in 2006 when an epidemic broke out in 2007 (201 cases) resulting from spread of the virus among non-vaccinated persons, mainly Roma population (22).

In late 2006, the National Plan for Elimination of Measles and Reduction of the Incidence of Congenital Rubella Syndrome was adopted. Surveillance of measles in the studied period was not active, i.e. was based only on reporting of the cases based on the clinical picture of the disease.

Continuously high coverage of OPV/DTP/MMR immunization on the national level was not accompanied with the high coverage in all municipalities and among all population groups (marginalized populations), which may jeopardize maintenance of the country status as polio-free and diphtheria-free country, and reaching the measles elimination.

Immunization against hepatitis B was introduced into the Program of Mandatory Immunizations in 2002, and the implementation started in 2005. Immunization against a diseases caused by Haemophilus influenzae type b was introduced by the Law on Protection of the Population from Communicable Diseases from 2004, and has been implemented since 2006.

Figure 67. Poliomyelitis and diphtheria incidence (number of reported cases) and immunization coverage (%) for OPV3 and DTP3, Serbia, 1962-2007



Source: Institute of Public Health of Serbia, Annual report on immunization in the Republic of Serbia

References:

1. WHO. Europe-Communicable Disease Surveillance and Response 2007.
Available on:
http://www.who.int

2. WHO. Report on Infectious Diseases 1999.
Available on:
http://www.who.int

3. Law on Population Protection from Communicable Diseases, Official Gazette of the Republic of Serbia, No. 125/04; Bylaw on Notification of Infectious Diseases and Other Cases Specified in the Law. Official Gazette of the Republic of Serbia, No. 114/05.

4. ECDC. Microbes without borders: Key facts on Infectious Diseases in Europe
Available on:
http://www.ecdc.europa.eu

5. WHO. Annual Health Report 2007.
Available on:
http://www.who.int

6. Seguljev Z. Hospital Infections. In: Radovanovic Z. Editor. Epidemiology, Nis: School of medicine, 2005, 277-289.

7. Denic Lj, Drndarevic D, Milic N at all. Prevalence Study of Hospital Infections in Serbia, Journal of the Institute of Public Health of Serbia, 2000, volume 1-4, 37-80. (in Serbian with English summary)

8. Denic Lj, Milic N, Knezevic T at all. The Second National Prevalence Study of Hospital Infections, Journal of the Institute of Public Health of Serbia, 2007, volume 3-4, 5-80. (in Serbian with English summary)

9. Health Care Population Program from Communicable Diseases from 2002 – 2010 (in Serbian). Official Gazette of Republic Serbia, No. 29/02.

10. UNAIDS/WHO.AIDS epidemic update, December 2007.
Available on:
http://www.unaids.org

11. Institute of Public Health of Serbia. Annual Report on Communicable Diseases in Republic Serbia in the year 2007 (in Serbian), Belgrade, Institute of Public Health of Serbia; 2008.

12. Euro HIV. HIV/AIDS Surveillance in Europe, End year Report 2006, No 75, december 2007.
Available on:
http:// www.eurohiv.org

13. Ministry of Health of Republic of Serbia, National Strategy for Fight Against HIV/AIDS, 2005 (in Serbian with English summary)

14. WHO/UNAIDS, Guidelines for Second Generation HIV Surveillance, 2000.

15. Radovanovic Z, Vlajinac H. Editor. Epidemiology (in Serbian), Belgrade: School of Medicine, 2001.

16. WHO. Euro polio page Monthly Acute Flaccid Paralysis Surveillance Bulletin. Euro Polio Page March 2007 (week 9).
Available at:
http://data.euro.who.int/DownloadArea/VPI/afp/E200703_PolioPage.pdf

17. WHO. World Health Assembly Resolution 59.1. Geneva: WHO, May 2006.

18. Institute of Public Health of Serbia: Annual report on immunization in the Republic of Serbia for the year 1998, Belgrade: Institute of Public Health of Serbia, 1999.

19. Institute of Public Health of Serbia: Health status of population in the Republic of Serbia 1989-1996. Analytical study, Belgrade: Institute of Public Health of Serbia, 1998.

20. Radovanovic I. Immunization. In: Radovanovic Z. ed. Epidemiology, Nis: School of Medicine, 2005, 251-267.

21. WHO. Surveillance guidelines for measles and congenital rubella infection in the European Region, Copenhagen: WHO, 2003.

22. Institute of Public Health in Serbia: Annual report on immunization in the Republic of Serbia for the year 2007 (in Serbian), Belgrade: Institute of Public Health of Serbia, 2008.

III Health Status and Use of Primary Health Services by the Age Groups

Health status of children

Positive changes in health status of children are reflected in reduced mortality rates for infants and children under 5 years of age. It is necessary to invest additional efforts to improve the health status of the poorest and marginalized groups of children.

Health status of infants and pre-school children is of extremely high importance for any society in general. The nervous, reproductive and respiratory systems at that age are not fully developed yet and are, thus, more sensitive to health risks. Health care of these population groups is particularly focused, not only because of special sensitivity to action of various factors that may jeopardize their health, but because of the fact that poor health and unhealthy lifestyles in childhood may result in poor health for the lifetime, which is in turn reflected in health, financial and social consequences for the society.

The aim of the Republic of Serbia is to provide healthy and safe beginning of life and provide conditions for optimum development for all children. These aims are defined in the National Plan of Action for Children of the Government of the Republic of Serbia specifying the country policies for children for the period up to 2015 (1).

In Serbia 99% of newborn children are registered in the vital records registry, which is a necessary prerequisite to have children exercise their right to name and nationality, as well as protection from deprivation of identity and, accordingly, the right to mandatory health care.

In Serbia, children aged 1-6 may attend nursery schools and kindergartens that are under the scope of health, education and welfare sectors. In the academic 2006/2007 the compulsory preparatory pre-school program introduced at the time covered 98% of the children. Coverage of children aged 3-7 by the preparatory program is among the lowest in Europe (3). In 1997-2007 in Serbia the total coverage of children aged 1-7

by the pre-school education did not exceed 45% (4). Particularly low was the coverage of children with special needs, from rural areas and marginalized populations. Only 7% of children from the poorest population attended the pre-school programs (5). Roma children attended the pre-school education eight times less than other children in the same age group (2).

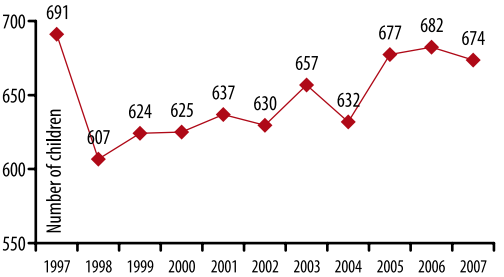
The proportion of children aged 0-6 in the total population in the period 1997-2007 ranged from 7.4% to 7.1% in 1997 and 2007, respectively; Infants (children aged 0-365 days) accounted for approximately 1% of the total population in 2007.

Provision and utilization of primary health care of children

On the primary level, health care for children aged 0-6 years is provided by the health care services at the primary health care centers.

At the pre-school sections in 2007 health care was provided by 777 medical doctors, out of which 85.1% specialists. Percentage of specialists in the total number of medical doctors was on the rise in the period 1997-2007, while the ratio of health professionals with secondary and college degrees versus medical doctors in the same period was unchanged remaining at 1.85. The workload per physician in the studied period was the lowest in 1999 amounting to 4202 visits of patients. This may be explained by the NATO bombing raids that resulted in lower use of health services, while the number of visits peaked in 2005 reaching 5836 (Table 32). In 1998, the average number of children aged 0-6 per doctor was 607, reaching 674 in 2007, still illustrating superstandard provision (850 children per pediatrician) (2) (Figure 68).

Figure 68. Number of children aged 0–6 per physician, Serbia, 1997–2007



Source: Institute of Public Health of Serbia

In 2007 health care services for children recorded 4,220,492 visits to doctors' offices for sick children, with 60% share of first visits. In the period 1997-2007 no major aberrations were noted in the number of visits to doctor's offices for sick children, with the number of first visits around 60%. In the whole studied period, any child aged 0-5 used pediatric services 5 times on the average for diagnostics and treatment of a condition or disease.

In the period 1997-2007, the counseling services for infants recorded between 447,918 visits (in 1997) and 462,904 visits (in 2007). On the average, any infant made 6 visits in the course of the first year, which is above the planned scope that is set at 5 visits during the first year of life (7), suggesting traditionally good operation of the health monitoring and preventive care provided by the service (Table 33). The highest number of visits was recorded in the period up to 2 months of age.

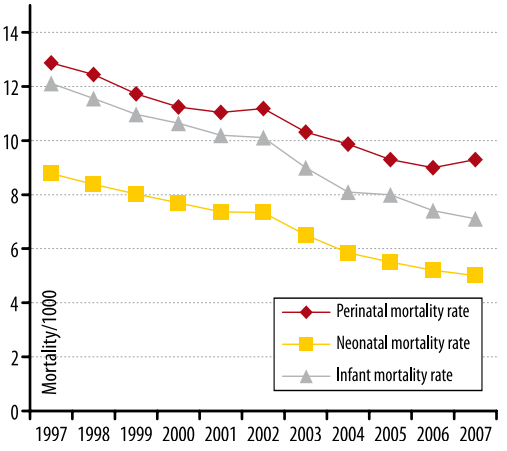
The number of visits to the counseling service for pre-school children (infants are not included) in the period 1997-2007 ranged from 348,013 (in 1997) to 360,287 (in 2007) without major oscillations. Over the whole studied period, the coverage of children aged 1-6 by systematic check-ups and follow-up examinations was about 80%.

In the period 1997-2007 the number of visits of family nurse services per infant rose from 4.9 (1997) to 6.2 (2007), exceeding the planned 2 regular visits and 4 visits for children exposed to risks (7).

Main features of health status of infants

In the period 1997-2007 the perinatal mortality rate (stillbirths and number of children dying between 0 and 6 days of life per 1,000 births, including the stillbirths) had a declining trend, from 12.8 in 1997 to 9.3 in 2007. The rate of neonatal death (number of children aged 0-28 days per 1000 live births) fell from 8.8 in 1997 to 5.0 in 2007. The same trend was recorded for the infant mortality rate (the number of infant deaths per 1000 live births): 13.8 in 1997 to 7.1 in 2007 (Figure 69). The falling trend of these indicators is suggestive of improved conditions and quality of health care of women and children. In 2005, the infant mortality rate in Roma settlements was estimated at 26 (5).

Figure 69. Perinatal, neonatal and infant mortality rates (per 1000 live births), Serbia, 1997–2007



Source: Institute of Public Health of Serbia; Statistical Office of Republic of Serbia

The neonatal mortality rate (per 1,000 live births) in the South-East European countries and CIS region was in average 18 in 2000, while it was substantially lower in Serbia at the time, amounting to 7.7 (9).

In 2006, the infant mortality rate (per 1,000 live births) was 7.4, i.e. substantially lower that the average value in the CEE/CIS region where it was 24.0 (9).

In Serbia, in comparison with some other neighboring countries, the infant mortality rate in 2000 and 2006 when it was 11 and 7, respectively, was lower than in Romania, Albania, Bulgaria, Bosnia and Herzegovina, and Macedonia, but higher than in Slovenia, Croatia and Austria (10) (Figure 70).

The most common causes of infant death in 2006 belonged to ICD-10, Chapter XVII i.e. peri-natal conditions, congenital malformations, deformations and chromosomal abnormalities, as well as symptoms, signs and abnormal laboratory results covered by Chapter

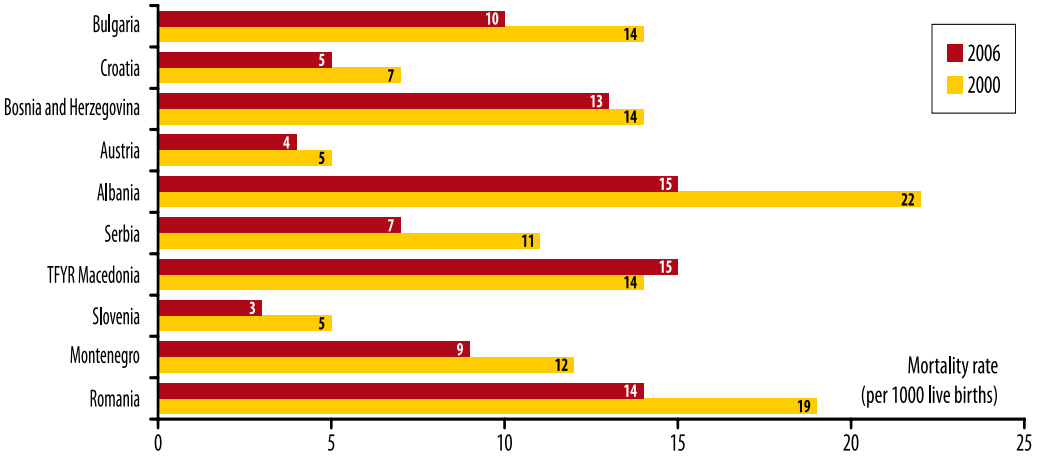
VIII. In 2006 the 61.7% of all causes of infant death accounted for peri-natal conditions, congenital malformations, deformations and chromosomal abnormalities (11).

One of important indicators of infant health status is the proportion of low birth weight children, i.e. those born with less than 2500 g. The birth weight is an indicator of mother's health and nutritional status, but also an indicator of survival chances of a newborn with adequate physical and psychosocial development. In 2007 in Serbia 5.6% children were born with less than 2500g (12). The chances of Roma children and poorest children to have low birth weight (under 2500g) were twice the average (2). Nevertheless, the percentage of children with low birth weight in our country is lower than the CEE/CIS region where it was 7% in 2006 (13).

Exclusive breast feeding in the first six months of life is very important for infant health. Breastfeeding up to the second year of life with adequate supplementary diet provides for a good nutritional status and has a beneficial effect on children's health. Over the studied period in Serbia great efforts were made to increase the number of children breastfed pursuant to recommendations given in "Program of Promotion, Support and Care for Breastfeeding and Baby-Friendly and Mother-Friendly Health Institutions" (14). This yielded positive results, but the percentage of infants fed by exclusive breastfeeding is still low (Figure 71).

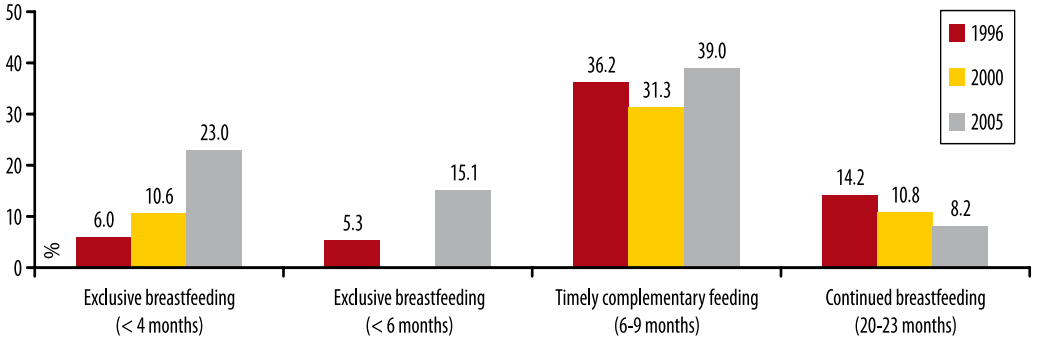
Breastfeeding is particularly supported by the Baby Friendly Hospital initiative where mothers and babies are accommodated in the same rooms. The number of maternity wards with pertinent WHO Certificates rose from 10 in 1997 to 49 in 2007 (15).

Figure 70. Infant mortality rate (per 1000 live births) in Serbia and neighboring countries, 2000 and 2006



Source: WHO data base: Statistical Information System, http://www.who.int/whosis/e

Figure 71. Indicators of breast feeding practices, Serbia, 1996, 2000 and 2005



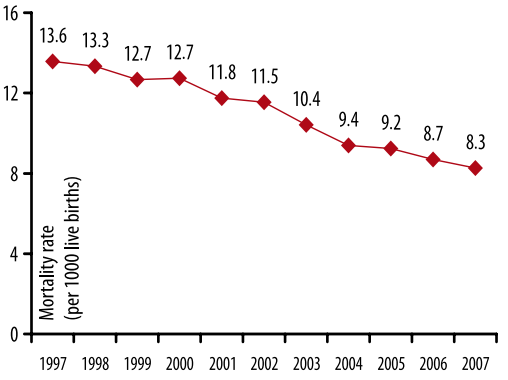
Source : UNICEF, Multiple Indicator Cluster Survey, 2005

Main features of health status of pre-school children

In 2005, the mortality rate of children under 5 (number of deaths of children under 5 per 1,000 live births), which is one of the key indicators of health status of small children was 9.2 which is below the average mortality rate of children under 5 in countries in transition in South East European countries, which was 17 in the same year (16). In the period 1997-2007 the indicator had a continuously dicreasing trend (Figure 72). The rate was significantly higher among the Roma in Roma settlements and in 2005 it was estimated at 28 per 1,000 live births (2) highlighting the very poor health status of this marginalized group.

In health care services for pre-school children in Serbia, the total number of registered diseases and conditions in 2007 amounted to 2,778,588, with the disease rate of 5,308.8 per 1,000 children aged 0-6 yrs (or 5.3 per child), which is a rate higher by 28.5% than in 1997 when it was 4,131.4 (i.e. 4.1 per child).

Figure 72. Mortality rate of children under 5 years of age (per 1000 live births), Serbia, 1997–2007



Source: Statistical Office of Republic of Serbia, Institute of Public Health of Serbia

In the structure of registered out of hospital morbidity in pre-school children the top five places were taken by respiratory diseases (ICD-10 chapter X) with continuously falling trend of the share in total morbidity over the studied period from 78% in 1997 to 59% in 2007: infectious and parasitic diseases (ICD-10, Chapter I) with the increasing share from 3.3% in 1997 to 4.8 in 2007; diseases of the ear and mastoid process (ICD-10, Chapter VIII) with

almost constant share of 4%; diseases of the skin and subcutaneous tissues (ICD-10 chapter XII) with constant share of somewhat under 4%; and digestive diseases (ICD-10 chapter XI) that after 2000 are no longer among the top five causes of morbidity (Table 34) due to introduction of factors influencing health status and contact with health services.

State of nutrition is an important indicator of health status of children. According to the Multiple Indicator Cluster Survey (MICS) that UNICEF conducted in Serbia in 1996, 2000 and 2005 covering the population under 5, it was noted that the prevalence of underweight and overweight children did not change substantially, contrary to prevalence of stunting particularly among the Roma in Roma settlements (2) (more detailed information in the chapter of nutritional status of the population in general).

Table 32. Supply and workload of health professionals in primary health care settings for children, Serbia, 1997–2007

Year	Number of physicians	Percentage of specialists in total number of physicians	Number of health workers with secondary and college education	Health workers with secondary and college education-doctors ratio	Yearly average number of visits per physician
1997	817	72.6	1338	1.6	5385
1998	912	70.9	1530	1.7	4786
1999	866	84.4	1454	1.7	4202
2000	847	78.3	1486	1.8	4944
2001	818	78.1	1475	1.8	5320
2002	821	79.3	1460	1.8	5431
2003	788	81.0	1430	1.8	5162
2004	824	81.9	1442	1.8	5077
2005	772	83.7	1333	1.7	5836
2006	767	84.5	1295	1.7	5527
2007	777	85.1	1439	1.9	5432

Source: Institute of Public Health of Serbia

Table 33. Utilization indicators of primary health care settings for children, Serbia, 1997–2007

Year	Visits in doctor's office			Visits in infants' counseling department		
	Total number of visits in doctor's office	Percentage of first visits in total number of visits in doctor's office (%)	Number of first visits in doctor's office per child	Total number of visits to the doctor in infants' counseling department	Percentage of first visits in total number of visits in infants' counseling department (%)	Number of visits in infants' counseling department per infant
1997	4,399,849	59.5	4.6	447,918	25.6	5.8
1998	4,364,925	58.4	4.6	436,463	26.8	5.9
1999	3,639,013	59.3	4.0	386,995	27.8	5.4
2000	4,187,948	58.5	4.6	406,134	26.8	5.7
2001	4,351,442	59.4	5.0	448,678	26.5	6.1
2002	4,459,184	55.7	4.8	449,448	26.7	5.9
2003	4,067,552	59.0	4.6	440,937	27.0	5.6
2004	4,183,105	59.4	4.8	455,849	26.6	5.8
2005	4,505,708	58.0	5.0	486,037	26.3	6.5
2006	4,239,258	62.0	5.0	472,013	25.9	6.6
2007	4,220,492	60.0	4.8	462,904	28.5	6.5

Source: Institute of Public Health of Serbia

Table 34. Registered diseases in primary health care settings for children, Serbia, 1997–2007

Year	Total number of diseases	Morbidity rate per 1000 children aged 0–6	Percentage of the most frequently registered diseases in total number of diseases					
			Diseases of the respiratory system	Diseases of the ear and mastoid process	Factors influencing health status and contact with health services	Diseases of the skin and subcutaneous tissue	Certain infectious and parasitic diseases	Diseases of the digestive system
1997	2,332,630	4131.4	78.34	3.9	-	3.6	3.3	3.4
1998	2,442,802	4414.8	78.12	4.3	-	3.6	3.5	3.2
1999	1,975,719	3654.6	77.95	4.2	-	3.7	3.1	3.2
2000	2,432,193	4594.6	68.94	3.6	10.1	3.5	3.3	-
2001	2,488,228	4776.0	68.56	3.9	9.9	3.5	3.4	-
2002	2,495,699	4828.0	67.39	3.9	10.8	3.4	3.7	-
2003	2,482,344	4797.0	66.32	3.9	11.7	3.2	4.1	-
2004	2,481,954	4767.5	64.87	4.0	11.4	3.5	4.4	-
2005	2,596305	4965.3	65.4	4.1	11.1	3.4	4.4	-
2006	2,824,054	5395.7	60.5	3.9	14.5	3.6	4.4	-
2007	2,778,588	5308.8	59.1	4.1	15.0	3.7	4.8	-

Source: Institute of Public Health of Serbia

References

1. National Action Plan for Children of the Republic of Serbia, Belgrade, 2004. (In Serbian)

2. UNICEF. Monitoring the situation of children and women. Multiple Indicator Cluster Survey. Belgrade: UNICEF Belgrade, 2005.

3. Statistical Office of Republic of Serbia. Living standard measurement study – Serbia 2002–2007. Belgrade: Republic Office, 2008.

4. DevInfo Serbia database on Internet. Belgrade: Statistical Office of Republic of Serbia
Available at:
http://webrzs.statserb.sr.gov.yu/axd/devinfo/downloads.htm

5. UNICEF. The state of children in Serbia 2006. Povery and social exclusion. Belgrade: UNICEF Belgrade, 2005.

6. Krstić G, Sula V. The primary document of trends and poverty profile in Serbia: 2004-2006. Belgrade: Statistical Office of Republic of Serbia, 2007.

7. Book of Rules on Content and Scope of Health Care Rights within Mandatory Health Insurance and Co-payment for 2008, Official Gazette of the Republic of Serbia, No. 14/08, 20/08.

8. Book of Rules on Detailed Conditions for Execution of Health Care in Health Care Institutions and Other Forms of Health Care Service, Official Gazette of the Republic of Serbia, No. 43/06.

9. UNICEF.The state of the the world's children 2008 Executive summary. UNICEF, 2007.
Available at:
http://www.unicef.org/publications/index_42625.html

10. WHO Statistical Information System.
Available at:
http:// www. who.int/whosis/en

11. Health statistical yearbook of Republic of Serbia 2006. Institute of Public Health of Serbia, Belgrade, 2007.

12. Statistical Office of Republic of Serbia. Notification of births. Unpublished data for year 2007.

13. Database „Health for All", WHO.
Available at:
http://data.euro.who.int/hfadb/

14. WHO, UNICEF, Programme for breastfeeding promotion, support and protection and maintaining mother and baby friendly health institutions, 1988.

15. The yearly report on realization of the Programme „Breastfeeding promotion, support and protection and maintaining mother and baby friendly health institutions", Belgrade: Institute of Public Health of Serbia, 2008.

16. United Nations. The Millenium Development Goals Report 2007. New York: United Nations, 2007. UNSD_MDG_Report_2007.
Available at:
http: // mdgs.un.org/unsd/mdg/ Resources/ Static/Products/ Progress2007

Health status of school children and adolescents

School children and adolescents most commonly suffer from respiratory diseases, while injuries and poisoning are most common causes of death.

The category of school children covers the ages 7-14, and the adolescents are those between 15 and 19 years of age. The period from enrollment to elementary school to completion of secondary school is characterized with processes of growth and psycho-physical maturation, socialization, upbringing and education, as well as preparation for entrance to the world of labor or continuation of education. Health status and quality of life in this period is determined by family milieu, environmental factors and other important contributing components relating to the schooling process. Thus, sanitary-hygienic state of school facilities (drinking water supply, waste disposal), conditions for exercise and recreation, accessibility of school buildings, microclimate and adequate school furniture are important factors for health of school children.

School children and adolescents may, according to health indicators, be considered the healthiest of all age groups. However, due to many specific features of this period (sexual and psycho-physical development) and risk to take on dangerous behaviors that may jeopardize health it is necessary to undertake adequate health educational interventions to promote healthy behavior and life styles.

In 2007 in Serbia schoolchildren and adolescents accounted for 14.7% of the population. In 1997 the number of children and adolescents aged 7-19 was higher, as so was their proportion in the total population (16.6%).

Provision and utilization of primary health case services for school children

On the primary level, health care of school children and adolescents aged 7-19 is provided by health care services for children at the primary health care centers.

In 2007 health care of school children and adolescents was provided by 689 medical doctors, out of which 476 specialists (69.1%) and 918 nurses/medical technicians. In the period 1997-2007 the number of health professional engaged in health care of school children and adolescents increased, including the rise of the number of specialists.

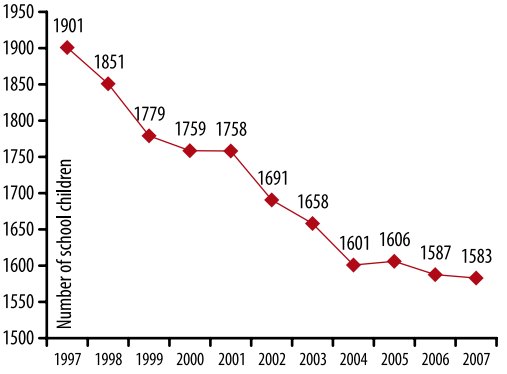
The level of coverage by physicians was satisfactory in 2007 (1583 children aged 7-19 per doctor) and corresponded approximately to the standard 1500 children per physician (1). Number of school children per physicians was poorer in 1997 when it was 1901/per physician (Figure 73).

In 2007, health services for school children recorded 3,900,306 visits, i.e. somewhat less than in 1997 (4,035,408 registered visits). In the analyzed period the share of first visits was about 60%. Each child had 3.5 visits for injury or disease. Over the studied period, there were no major aberrations in the number of visits of school children illustrating the balanced use of primary health care in this population (Table 35).

Main features of health status of school children

Mortality of school children and adolescents was lower than in any other age group.

Figure 73. Number of school children per physician, Serbia, 1997-2007



Source: Institute of Public Health of Serbiae

In 1997 the mortality rate of school children aged 10-14 was 26.5 per 100,000. In 2007 it was significantly lower, i.e. 16.5/100,000. In 1997 the mortality rate of adolescents aged 15 to 19 was 64.8/100,000 falling to 43.7/100,000 in 2007.

The predominant place in the structure of deaths pertained to injuries and poisoning (ICD-10 Chapter XIX). In the first year of the studied period (1997) the mortality rate specific to diseases and conditions in this group per 100,000 school children aged 10-14 amounted to 8.4. The value in the group of adolescents was almost five times higher, i.e. 39.3/100,000 suggesting the higher risk in adolescence associated with all other risk behaviors and conditions (including abuse of psychoactive substances) impairing caution and increasing the risk of fatal injuries. In 2007 the fall of specific mortality rates in both studied groups of children and adolescents ensued, i.e. 6.4/100,000 children aged 10-14 and 25.8/100,000 children aged 15-19. In 2007 the male to female death ratio was 3:1.

In 2007 the remaining causes of death of schoolchildren and adolescents were tumors

(ICD-10 Chapter II), circulatory disorders (ICD-10 Chapter IX), symptoms, signs and abnormal laboratory results (ICD-10 Chapter XVIII), and nervous system diseases (ICD-10 Chapter VI).

Morbidity registered on the primary care level in health services for school children and adolescents experiences no major oscillations.

In 2007 the total number of registered diseases and conditions in schoolchildren in Serbia amounted to 2,516,945, i.e. 2.3 diseases per schoolchild.

In terms of frequencies of diseases and conditions in the 2007 morbidity structure the respiratory diseases lead (ICD-10 Chapter X), with the 53.2% share. They are followed by factors affecting health status and contacts with health services (ICD-10 Chapter XXI) with 15.1%, infectious and parasitic diseases with 4.2%, diseases of the skin and subcutaneous tissues (ICD-10 Chapter I) with 4.9%, injuries, poisoning and consequences of external causes (ICD-10 Chapter XIX) (ICD-10 Chapter XXII) with 4.1%. The listed five groups of diseases prevail in the structure of morbidity for years now, accounting for 81.5% of all diseases and conditions in the structure of morbidity of schoolchildren in 2007 (Table 36).

In 2007, at regular comprehensive checkups of elementary schoolchildren deformations of the spinal column were diagnosed in 10.2%, of the chest in 2.8%, and feet in 13.9% of all examined children. Over the studied period of ten years, spinal column deformities had a mild rising trend, as opposed to the falling trend of chest and feet deformities.

In 2007, in secondary school students deformities of the spinal column, chest and feet were recorded in 17.5%, 2.7% and 8.4% students, respectively. In 1997-2007 a rise in the chest and spinal column deformities was noted in this population (Table 37).

Table 35. Supply and workload of health professionals and utilization indicators in primary health care settings for school children, Serbia, 1997-2007

Year	Number of physicians	Percentage of specialists in total number of physicians	Number of health workers with secondary and college education	Health workers with secondary and college education-doctors ratio	Yearly average number of visits per physician	Number of first visits per child	Total number of visits in doctor's office	Percentage of first visits in total number of visits in doctor's office (%)
1997	664	61,0	897	1,4	6077	3,2	4,035,408	58.6
1998	673	62.6	974	1.4	6147	3.3	4,136,676	59.0
1999	692	65.5	980	1.4	4034	2.3	2,791,338	60.8
2000	691	67.0	998	1.4	5690	3.2	3,931,697	58.8
2001	682	66.7	1043	1.5	6343	3.6	4,325,930	59.0
2002	701	69.2	1033	1.5	5820	3.4	4,079,735	57.4
2003	703	71.3	1074	1.5	5947	3.6	4,181,076	59.1
2004	713	70.8	1081	1.5	5477	3.4	3,905,244	58.9
2005	695	71.9	1026	1.5	5914	3.7	4,109,912	58.8
2006	687	69.9	1009	1.5	5516	3.5	3,789,561	60.9
2007	689	69.1	1000	1.5	5661	3.6	3,900,306	60,9

Source: Institute of Public Health of Serbia

Table 36. Registered diseases in primary health care settings for school children, Serbia, 1997–2007

Year	Total number of diseases	Morbidity rate per 1000 children aged 7–19	Percentage of the most frequently registered diseases in total number of diseases				
			Diseases of the respiratory system	Factors influencing health status and contact with health services	Certain infectious and parasitic diseases	Diseases of the skin and subcutaneous tissue	Injury, poisoning and certain other consequences of external causes
1997	2,309,022	1829.6	73.4	*	3.3	3.9	3.5
1998	2,480,131	1990.9	72.7	*	3.8	3.9	3.6
1999	2,216,470	1800.5	72.9	*	3.6	4.0	3.7
2000	2,325,182	1913.4	61.6	12.7	2.9	3.9	3.3
2001	2,594,518	2163.7	50.7	18.1	6.1	4.1	3.9
2002	2,479,796	2092.2	64.7	10.8	2.8	3.5	3.2
2003	2,547,118	2184.9	61.3	12.8	4.3	3.3	3.2
2004	2,411,608	2112.8	63.7	10.3	3.1	3.6	3.4
2005	2,525,169	2262.6	59.4	12.9	5.1	3.5	3.3
2006	2,528,504	2318.5	55.4	13.8	4.7	3.9	4.0
2007	2,516,945	2307.9	53.2	15.1	4.9	3.7	3.6

Source: Institute of Public Health of Serbia

Table 37. Regular check-ups of children attending elementary and secondary school, Serbia, 1997-2007

Year	Elementary school			Secondary school		
	Percentage of children with deformity of spinal column	Percentage of children with deformity of chest	Percentage of children with deformity of feet	Percentage of children with deformity of spinal column	Percentage of children with deformity of chest	Percentage of children with deformity of feet
1997	8.8	4.6	16.8	12.4	3.8	10.0
1998	10.0	4.5	16.1	18.7	4.1	10.4
1999	7.5	4.1	12.8	15.0	3.7	8.7
2000	12.6	6.4	25.1	16.0	3.9	11.0
2001	9.8	4.0	15.4	15.0	3.7	9.7
2002	10.6	4.4	17.0	15.9	4.2	10.1
2003	10.7	4.4	15.9	14.9	3.5	8.6
2004	9.9	4.0	15.0	15.3	3.9	10.0
2005	10.5	3.8	16.3	16.2	3.6	8.5
2006	11.4	4.5	16.0	16.8	3.6	12.0
2007	10.2	2.8	13.9	17.5	2.7	8.4

Source: Institute of Public Health of Serbia

References:

1. Book of Rules on Detailed Conditions for Execution of Health Care in Health Care Institutions and Other Forms of Health Care Service, Official Gazette of the Republic of Serbia, No. 43/06.

Health status of adult population

Health status of adult population is characterized with mild increase of general morbidity rate dominated by respiratory diseases, circulatory diseases and diseases of the musculoskeletal system and connective tissue, while the main causes of morality were diseases of the circulatory system and malignant tumors. The use of health services has remained unchanged, while coverage by doctor has been improved.

Adult population, i.e. older than 19 yrs is the largest age group accounting for 78.2% of the total population of Serbia. In the structure of adult population further increase of the share of older age groups is prominent, where the proportion of +65 yr age group rose from 14.8% in 1997 to 17.2% in 2007.

Provision and utilization of primary health care of adult population

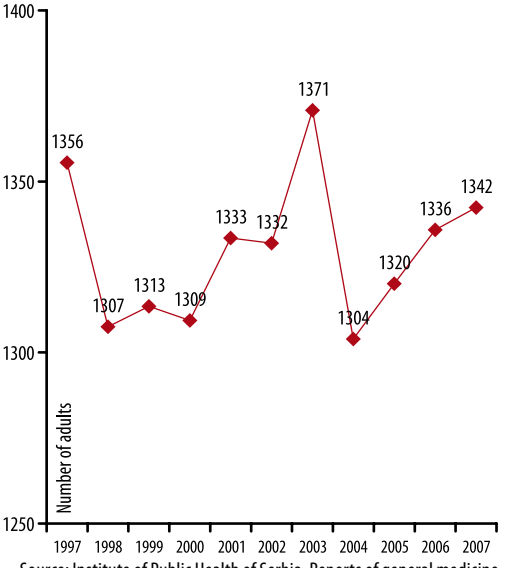
On the primary level, heath care of adult population is provided by general medicine/practice and occupational medicine services at the primary health care centers.

General medicine is a service within primary health care centers and the pillar of primary heath care for the population over 19 years of age, while the occupational medicine services provide out-patient care to the working population.

In 2007 health care at the general medicine and occupational medicine services was provided by 4319 medical doctors. Out of these, 2044 i.e. 47.3% were specialists. The percentage of specialists of the total number of medical doctors was continuously rising from 1997 to 2005, and in 2006, as a result of staff rationalization measures in health institutions of Serbia a decrease followed. The ratio of physicians versus health professionals with secondary and college degrees was fairly constant ranging from 1.5 in 1997 to 1.6 in 2007, with somewhat higher values recorded in 2002 and 2003 (Table 38). The average number of adults per physician in the general medi-

cine and occupational medicine services in 1997 amounted to 1356, while in 2007 the number fell to 1342 (Figure 74).

Figure 74. Number of adults per physician in the services of general medicine and occupational health care, Serbia, 1997–2007



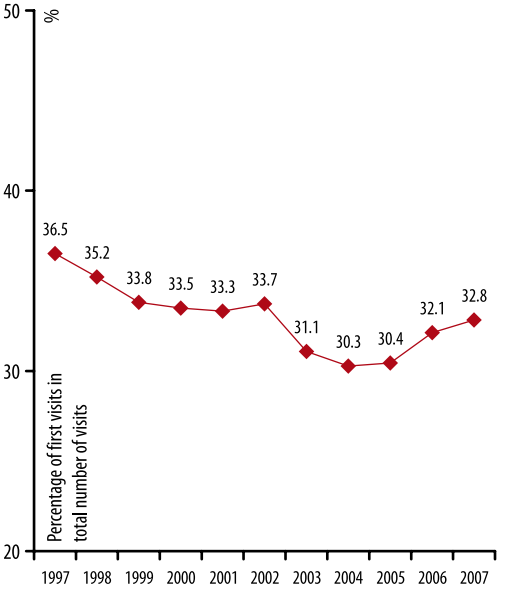
Source: Institute of Public Health of Serbia, Reports of general medicine and occupational health care service

In 2007, the general medicine and occupational medicine services registered the total of 50,808,035 visits, out of which 27,133,764, i.e. 53.5% were to physicians and the remaining 46.5% were visits to other health professionals. The average number of visits per adult was 8.8 in 2007, being unchanged in comparison with 1997. The lowest average number of visits was recorded in 1999: 7.9. The reason for such reduction in the use of health services was difficult access to health institutions due to bombing raids of Serbia by the NATO forces in the period May through June 1999.

The average number of visits to physician per adult was 4.7 in 2007, which is somewhat more than 4.5 in 1997. The lowest number (4.0) was registered in 1999, and the highest (4.9) in 2005 (Table 38).

Out of the total number of visits to physician's office one third accounted for the first visits, where the share of first visits fell from 36.5% in 1997 to 32.8% in 2007 (Figure 75).

Figure 75. Percentage of first visits in total number of visits in doctor's office in the services of general medicine and occupational health care, Serbia, 1997–2007



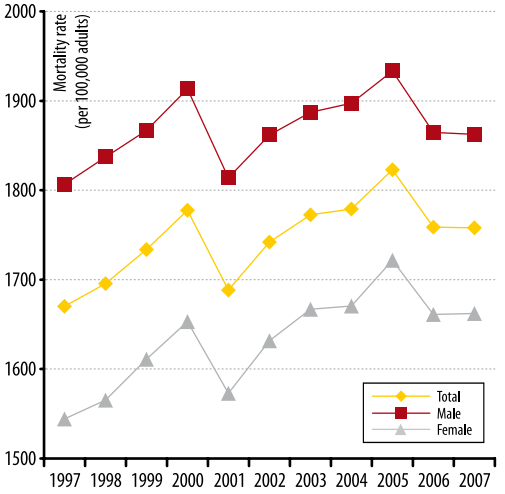
Source: Institute of Public Health of Serbia, Reports of general medicine and occupational health care service

Main features of health status of adult population

Adult population participates with 99.1% (98.8% men and 99.3% women) in the total mortality (all causes combined). In

1997 the overall mortality rate was 1670.3 per 100,000 population (1806.5 men and 1544.4 women); in 2007 it was somewhat higher, i.e. 1758.1 (1862.6 men and 1662.1 women) (Figure 76).

Figure 76. Mortality rate (per 100,000 adult population) by gender, Serbia, 1997–2007



Source: Statistical Office of Republic of Serbia

The most common cause of death of adult population were circulatory diseases with the 58.5% share in the total mortality in 1997 and 56.0% in 2007. They were followed by malignant tumors with 17.5% in 1997 and 20.1% in 2007. The circulatory disorders were more common in women, while malignancies were more common in men.

In the youngest subgroup of adults, i.e. 20-34 age group, the leading cause of death were injuries and poisoning (48.6% in 1997 versus 50.8% in 2007), followed by malignant tumors with the 13.2% and 15.6% shares in the overall mortality in 1997 and 2007, respectively.

In terms of single causes of death, most adults died of cardiomyopathy, ICD-10:I42 (16.8% in 1997 and 12.4% in 2007).

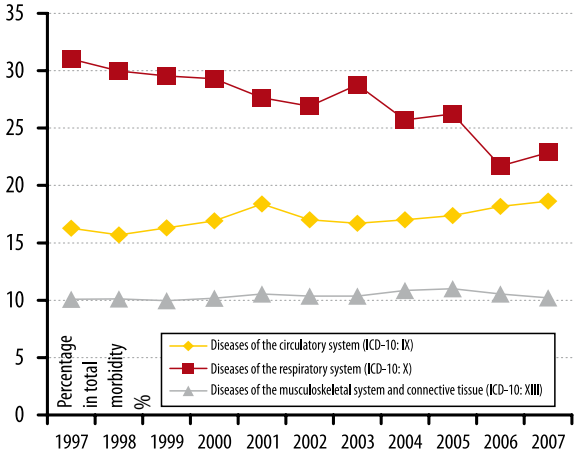
In 1997 the second most common cause of death was acute myocardial infarction, ICD-10:I21 with the 7.7% share versus 6.4% in 2007. In 2007 it was cerebral infarction -ICD-10:I21 with 7.3% share, which is substantially more than in 1997 when the corresponding proportion was 4.4%.

In order to evaluate health status of adult population in addition to mortality, indicators of morbidity recorded in general medicine and occupational medicine services are also very important. In 2007 these services registered the total of 8,543,792 diseases and conditions with the morbidity rate of 1473.7 per 100,000 population, meaning that each adult citizen of Serbia had somewhat below 1.5 diseases. This is an increase in comparison with 1997 when the morbidity rate was 1404.2/100,000.

In the period 1997-2007 morbidity structure of adults did not show major changes. Over the whole studied period, respiratory diseases followed by circulatory diseases and diseases of the musculoskeletal and connective tissues diseases predominated in the morbidity structure of adult population in Serbia (Figure 77).

In terms of single diseases, the most commonly registered one was essential hypertension (ICD-10:I10) with the 11.8% share in overall morbidity in 2007; it was followed by acute tonsillitis (ICD-10: J02 and ICD-10: J03) with 10.7% and some diseases of the back (ICD-10: M40-M49 and M53-M54) with 5.88%. The most prominent increase in the studied period was

Figure 77. Percentage of three most frequent groups of diseases in total morbidity registered in the services of general medicine and occupational health care, Serbia, 1997–2007



Source: Institute of Public Health of Serbia, Reports of general medicine and occupational health care service

noted in elevated blood pressure where the rate per 100,000 population increased from 8,491.2 in 1997 to 17,417.6 in 2007 (Table 39).

Table 38. Supply and workload of health professionals and utilization indicators in primary health care settings for adult population, Serbia, 1997–2007

Year	Number of physicians	Percentage of specialists in total number of physicians	Number of health workers with secondary and college education	Health workers with secondary and college education-doctors ratio	Number of adults per physician	Yearly average number of visits per physician	Yearly average number of visits in doctor's office per adult	Percentage of first visits in total number of visits in doctor's office
1997	4258	41.8	6546	1.5	1356	6175	4.6	36.5
1998	4412	45.6	7042	1.6	1307	5947	4.5	35.2
1999	4392	46.7	7175	1.6	1313	5272	4.0	33.8
2000	4408	47.7	7253	1.6	1309	6163	4.7	33.5
2001	4337	47.5	7719	1.8	1333	6330	4.7	33.3
2002	4353	49.6	7861	1.8	1332	6100	4.6	33.7
2003	4229	49.8	7752	1.8	1371	6398	4.7	31.1
2004	4449	49.0	7678	1.7	1304	6300	4.8	30.3
2005	4395	49.3	7389	1.7	1320	6460	4.9	30.4
2006	4340	46.8	7284	1.7	1336	6055	4.5	32.1
2007	4319	47.3	7018	1.6	1342	6302	4.7	32.8

Source: Institute of Public Health of Serbia, Reports of general medicine and occupational health care service

Table 39. Most frequent diseases and conditions registered in the services of general medicine and occupational health care, Serbia, 1997–2007

Year	Acute upper respiratory infections of multiple and unspecified sites (J00-J01, J05-J06)		Acute pharyngitis and acute tonsillitis (J02 and J03)		Essential hypertension (I10)		Persons encountering health services for examination and investigation (Z00-Z12)		Other dorsopathies (M30-M49, M53-M54)	
	Percentage in the total number of diagnoses	Morbidity rate per 100,000 inhabitants	Percentage in the total number of diagnoses	Morbidity rate per 100,000 inhabitants	Percentage in the total number of diagnoses	Morbidity rate per 100,000 inhabitants	Percentage in the total number of diagnoses	Morbidity rate per 100,000 inhabitants	Percentage in the total number of diagnoses	Morbidity rate per 100,000 inhabitants
1997	10.4	14,602.8	9.0	12,626.6	6.0	8491.2	3.1	4369.4	2.5	2534.8
1998	4.9	6917.3	9.9	13,894.9	7.6	9089.5	3.5	4193.5	4.6	5438.9
1999	5.5	7691.6	9.2	12,892.8	8.0	9441.6	4.6	5405.1	4.8	5728.8
2000	4.5	6288.7	10.5	14,694.1	9.1	11,533.5	5.2	6632.8	5.5	6942.5
2001	4.3	6041.1	12.1	17,047.5	11.1	15,682.3	4.5	6415.4	5.8	8210.5
2002	3.9	5515.6	11.6	16,327.8	9.8	12,877.2	5.4	7173.3	5.9	7724.9
2003	3.9	5440.9	12.3	17,250.5	9.9	14,428.5	5.1	7428.8	5.9	8639.1
2004	3.9	5480.3	11.5	16,090.2	9.9	13,444.0	5.4	7316.2	6.4	8641.4
2005	4.1	5811.3	11.5	16,205.7	10.7	14,438.1	4.6	6225.1	6.2	8440.2
2006	3.6	5115.7	10.0	14,052.9	11.5	16,410.7	4.5	6427.0	6.1	8743.5
2007	4.3	5972.0	10.7	14,967.6	11.8	17,417.6	5.0	7352.3	5.9	8665.3

Source: Institute of Public Health of Serbia, Reports of general medicine and occupational health care service

Health status of women

Breast cancer and cervical cancer are leading causes of death in women in the reproductive age illustrating a negative response to insufficient and low coverage of women by preventive examinations.

Health of women is particularly important not only because of high sensitivity of this population group, but also due to the fact that women care for their own health, but they also are caregivers for their children, parents and other family members. Promotion of health and quality of life of women thus has a beneficial impact on the whole family.

Health of women depends on social and economic conditions, as well. It is important that socio-economic indicators of women's health are the same as the corresponding indicators of health of the male part of the population. However, in our country, according to results of the 2002 census the proportion of women in the total number of illiterate persons above 10 years of age women was 85% (1).

In 2002 households headed by women were more affected by poverty, but the difference melted in 2007. In terms of employment, women are in a more difficult position than men. In the total workforce they participate with 43%, and the employment rate of 46.8% in 2007 is almost 30% lower than for men (2).

In the period 1997-2007 the share of women over 15 in the overall population ranged between 42.7 and 43.7, while the share of women in their reproductive age, i.e. 15-49 yrs, ranged from 24.5 to 23.3% in the same period.

Provision and utilization of primary health care of women

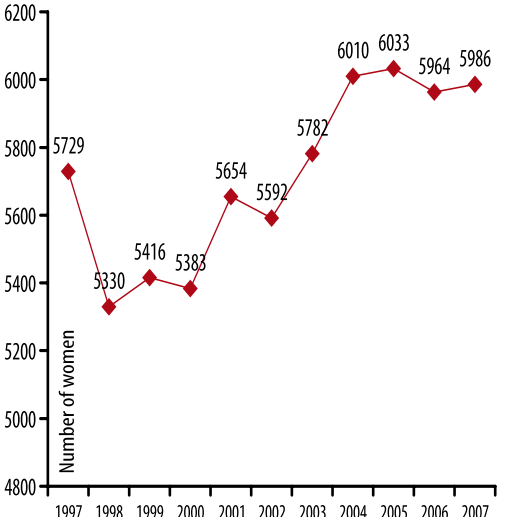
Primary health care of women is provided at the women's health care services at the primary health care centers.

Health care of women at the women's health care services was provided by 542 medical doctors out of which 94.3% special-

ists of gynecology and 883 health professionals with secondary or college degree. In the period 1997-2007 the ratio of medical doctors and professionals with secondary or college degree at the women's health care services was more or less constant, peaking in 2000 when it reached 2.0 (Table 40).

In the period 1997-2007, coverage by doctors was persistently higher than the 6500 women/doctor standard (3). The average number of women over 15 yrs of age per doctor in 1997 was 5729, where the number increased to 5986 in 2007 (Table 78).

Figure 78. Number of women per physician in primary health care settings for women, Serbia, 1997-2007



Source: Institute of Public Health of Serbia

In the period 1997-2007 the total number of examinations at the women's health care services ranged from 1,9867,528 in 1997 to 1,724,698 in 2007. Over the whole studied period the proportion of the first visits was about 50%. In the same period about 60% of women over 15 yrs of age required these services for a disease or condition.

The average number of visits to doctors (not taking into account visits to the counseling services) in the period of ten years was the lowest in 1999 (2621) which is explained by the NATO bombing raids that resulted in reduced use of health services and poorer reporting. The highest average number of visits to physician was recorded in 1997 (3504), which fell to 3182 in 2007.

At the counseling services for women a low coverage of women over 15 by preventive examinations (under 10%) was recorded. The lowest coverage (6.2%) was noted in 1999 and the highest, 10.3% in 2007.

At the family planning counseling services the number of visits ranged from 177,503 in 1997 to 148,969 in 2007. The highest number (190,755) was registered in 1998. The ratio of first and subsequent visits was on the 1.1 level during the whole period. Only about 5% of women in the reproductive age used these services, illustrating a very low coverage.

In the period 1997-2007, the number of first visits of pregnant women to the pregnancy counseling service ranged from 84,536 in 1997 to 74,709 in 2007. The fall of the number of visits was expected since the birth rate fell, as well. The highest number of first visits pertained to the first three months of pregnancy. The ratio of the first and subsequent visits rose from 1:5 (1997) to 1:6.5 (2007), suggesting that pregnant women more regularly monitored their health (Table 41).

In the period 1997-2007 at about 60% of primary health care centers, following recommendations of the "Program of Promotion,

Support and Care for Breastfeeding and Baby-Friendly and Mother-Friendly Health Institutions" (4) "Schools for Pregnant Women and Parenting" were set up, and in about 30% of primary health centers services such as psycho-physical preparation for pregnancy and delivery were also provided (5).

In 2007, the family nurse services made 0.8 visits per pregnant woman, which is below the set volume. Insufficient number of visits to pregnant women was noted over the whole studied period. Almost 30% of pregnant women received no visit of the family nurse services during the pregnancy. As to the visits to women after childbirth, they show a rising trend in the period 1997-2007, reaching 4.7 in 2007, close to the planned scope of the family nurse services.

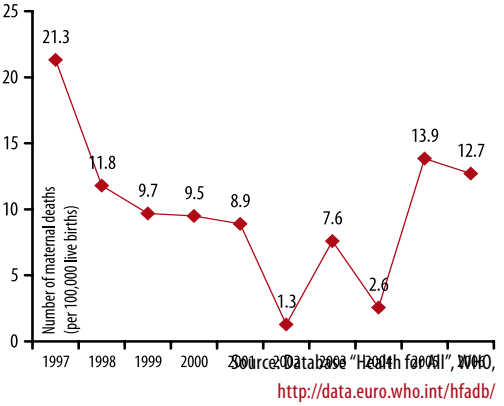
Health status of women

In the total number of women cardiovascular diseases were the most common cause of death in the period 1997-2007.

Breast cancer and cervical cancer are the leading causes of death relating to female organs. Although these diseases belong to the group of preventable ones, the high morbidity and mortality rates reflect an insufficient coverage of women by preventive examinations (details are presented in the chapter on morbidity and morality relating to chronic noncommunicable diseases).

Maternal death, i.e. death of women relating to diseases and conditions in pregnancy and six weeks after childbirth is an important indicator of health of women in their reproductive age as well as the quality of health care provided. In the studied ten years maternal death rate was significantly reduced from 21.3 per 100,000 live births in 1997 to 11.3 in 2006. Over the studied period the maternal mortality values varied a great deal, showing the lowest value in 2002 when one women per 100,000 live births died of diseases and conditions in pregnancy, during labor and 6 weeks after, in comparison with 2 women in 2004 (Figure 79).

Figure 79. Maternal mortality per 100,000 live births, Serbia, 1997-2007



Source: Database "Health for All", WHO, http://data.euro.who.int/hfadb/

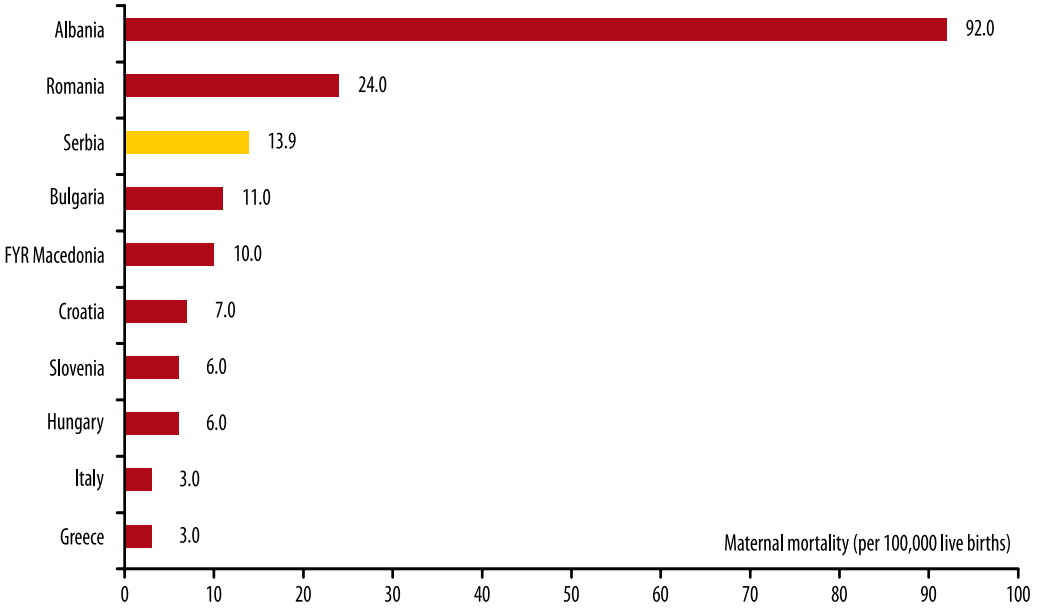
In 2006 maternal mortality (12.7/100,000 live births) in Serbia was on the level of average for the European region (12.8/100,000 live births) but higher than in the EU countries (6.2/100,000 live births) (7). In comparison with countries in the neighborhood, maternal mortality in Serbia was higher than in more developed countries in the neighborhood (Figure 80).

In the period 1997-2007, the number of registered diseases in the women's health service of the primary health centers ranged from 867,016 in 1997 to 1,091,479 in 2007. The morbidity rate was 266.9/1,000 in 1997

and 335.2/1,000 in 2006 without major oscillations in the period. A condition or diseases was diagnosed in 25-30% women over 15 years of age in the studied period.

The total morbidity structure in the registered services for health care of women is led by diseases of the urogenital system that predominated in the morbidity structure with 50% share, without major aberrations in the studied period; factors influencing health status and contact with health services had 33% share in 1998 and 37% in 2007; pregnancy, childbirth and postnatal period had 8.7% share in 1997 followed by a falling trend to 2.6% in 2007; infectious and parasitic diseases had about 3% share over the whole studied period, and tumors had 3.5% in 1997 and 3.4% in 2007 (Table 42).

Figure 80. Maternal mortality per 100,000 live births in Serbia and neighbouring countries, 2005



Source: WHO Statistical Information System, available at http://www.who.int/whosis/en

Table 40. Supply and workload of health professionals in primary health care settings for women, Serbia, 1997–2007

Year	Number of physicians	Percentage of specialists in total number of physicians	Number of health workers with secondary and college education	Health workers with secondary and college education-doctors ratio	Yearly average number of visits per physician
1997	567	85.9	963	1.7	3503.6
1998	610	85.2	1011	1.7	2958.5
1999	601	86.7	993	1.7	2621.1
2000	605	89.1	988	1.6	3180.2
2001	576	90.8	1015	1.8	3308.8
2002	584	92.0	1022	1.7	3071.9
2003	564	93.8	1024	1.8	3053.1
2004	542	74.9	1044	2.0	3340.2
2005	539	93.7	939	1.7	3383.9
2006	544	90.6	905	1.7	3107.1
2007	542	94.3	883	1.6	3182.1

Source: Institute of Public Health of Serbia

Table 41. Utilization indicators of primary health care settings for women, Serbia, 1997–2007

Year	Total number of visits in doctor's office	Average number of visits per physician	Number of regular check-ups	Percentage of women 15+ yrs of age who underwent regular check-ups (%)	Total number of visits in family planning counseling office	Percentage of first visits in total number of visits in family planning counseling office (%)	Total number of first visits in pregnancy counseling office	Percentage of first visits in total number of visits in pregnancy counseling office (%)
1997	1,986,528	3503.6	-	-	177,503	45.7	84,536	-
1998	1,804,706	2958.5	233,318	7.2	190,755	47.8	76,697	15.6
1999	1,575,295	2621.1	200,544	6.2	164,611	47.5	76,668	16.5
2000	1,924,005	3180.2	240,267	7.4	183,368	48.6	81,487	16.5
2001	1,905,879	3308.8	231,605	7.1	168,562	47.9	84,903	16.9
2002	1,793,984	3071.9	254,781	7.8	168,631	47.0	83,448	15.9
2003	1,721,926	3053.1	269,715	8.3	169,319	47.5	86,266	15.7
2004	1,810,403	3340.2	283,398	8.7	176,957	46.3	83,077	14.6
2005	1,823,938	3383.9	294,477	9.1	163,490	52.3	78,239	13.5
2006	1,690,262	3107.1	291,011	9.0	154,323	50.3	78,382	13.7
2007	1,724,698	3182.1	335,449	10.3	148,969	47.2	74,709	13.3

Source: Institute of Public Health of Serbia

Table 42. Registered diseases in primary health care settings for women, Serbia, 1997–2007

Year	Total number of diseases	Morbidity rate per 1000 women 15+ yrs of age	Percentage of the most frequently registered diseases in total number of diseases				
			Diseases of the genitourinary system	Factors influencing health status and contact with health services	Pregnancy, childbirth and the puerperium	Certain infectious and parasitic diseases	Tumors
1997	867,016	266.9	-	-	-	-	-
1998	1,146,533	352.6	53.0	33.0	5.4	4.3	3.0
1999	1,042,140	320.2	53.7	32.5	5.4	4.3	2.9
2000	1,183,921	363.5	54.6	32.1	4.6	4.5	2.9
2001	1,175,413	360.4	55.6	30.9	4.3	4.7	3.0
2002	1,124,024	344.2	55.2	32.2	4.2	4.1	2.8
2003	1,088,418	333.8	52.7	35.1	4.5	3.8	2.7
2004	1,162,948	357.0	52.4	35.1	3.8	4.3	2.7
2005	1,152,385	354.4	50.4	35.3	3.5	4.6	2.7
2006	1,087,598	335.2	52.3	36.0	3.3	3.9	3.3
2007	1,091,479	336.4	52.3	37.3	2.6	3.2	3.4

Source: Institute of Public Health of Serbia

References:

1. Statistical Office of Republic of Serbia. Statistical yearbook 2007. Belgrade: Republic Office, 2008.
2. Statistical Office of Republic of Serbia. Living standard measurement study – Serbia 2002–2007. Belgrade: Republic Office, 2008.
3. Book of Rules on Detailed Conditions for Execution of Health Care in Health Care Institutions and Other Forms of Health Care Service, Official Gazette of the Republic of Serbia, No. 43/06.
4. WHO, UNICEF, Programme for breastfeeding promotion, support and protection and maintaining mother and baby friendly health institutions, 1988.
5. Institute of Public Health of Serbia. Yearly report on Programme for promotion, support and protection of breastfeeding in 2007, 2008. (In Serbian)
6. Book of Rules on Content and Scope of Health Care Rights within Mandatory Health Insurance and Co-payment for 2008, Official Gazette of the Republic of Serbia, No. 14/08, 20/08.
7. Database „Health for All", WHO. Available at: http://data.euro.who.int/hfadb/

Dental health care of children, school children and adults

In Serbia dental health care was marked by improvement in providing dental health care of preschool and school children, but also by marked reduction of the use of dental health care of adults and their inadequate behavior relating to oral health.

Dental health care is funded from the Health Insurance Fund through primary health care centers, student's health centers, workers' health centers, Dentistry Institute in Kragujevac and Vojvodina Institute of Dentistry.

Based on the available data it may be concluded that at the beginning and end of the studied periods the values of the parameters have remained on the same level, that since 1999 the number of visits and interventions was falling continuously to 2001 after which gradual rise in the number of visits and treatment interventions was noted. The reasons for reduced use of dentistry services in the period 1999-2002 resulted from broader social and political changes occurring at the time.

Over the period 1994-2002 the Program of Preventive Dental Care was conducted (1). The preventive dental care covered pregnant women, infants, children aged 3-5, preschool children, school children and adolescents.

The Health Insurance Law (2) introduced changes in funding of dental care and consequences of the changes are most obviously reflected in reduced use of dental health care for adults over 18 years of age that have to pay out of pocket for almost all dental health services (with some exceptions), which is regulated by the Rulebook on Prices for Health Services for Prevention, Examination and Treatment of Diseases of the Teeth and Mouth (3).

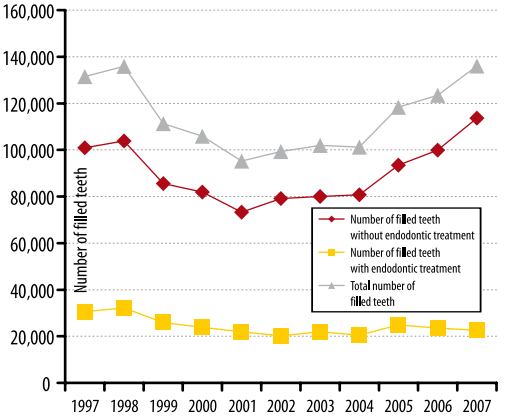
Dental health care of preschool children

The total number of visits of preschool children to dentists in the studied period amounted to 450,000 such visits per year. In the late nineties the number was somewhat higher from the period average when marked reduction of the number to 395,758 ensued in 2001, and after hitting the bottom the number gradually increased to 2007, reaching 465,608 visits of preschool children to dental health services. Interestingly, the proportion of first visits in the total number of visits was the highest in 2000 (39.5%). In 2007 the fall was recorded to 34.2% of first visits. These data illustrate reduced coverage of preschool children by preventive dental and follow-up dental examinations.

In the studied period, the average number of visits per preschool child was under 1, with the lowest value of 0.7 visits per child recorded in 2001, and the highest of 0.9 recorded in 2007.

Data on dental interventions in this age group show a steep fall in the number of treated cavities in 2001 after which the number was rising to reach 113,584 filled cavities in a single visit (no previous treatment required) in 2007. The data on dental interventions implying endodontic treatment and multiple visits show continuously falling number of such treatments each year. In 2007 the number of treated teeth was one third lower than the number registered in 1997 (Figure 81).

Figure 81. Treatment of caries in the population of preschool children, Serbia, 1997-2007



Source: Institute of Public Health of Serbia, Report of dental health care service

The number of tooth extractions was also falling over the period and in 2007 there were 17% less extracted teeth than in 1997. The number of extracted teeth in comparison with the filled cavities was also falling reaching the lowest in 2007 (Table 43). Since all extracted teeth are recorded, including the ones extracted for natural replacement by permanent teeth, the data do not provide exact information on teeth extracted for caries. However, these data still suggest that in the period 2001-2007 timely treatment of the oral cavity and teeth was in place, i.e. the care of oral cavity and teeth was undertaken before major destruction requiring endodontic treatment or even extraction were required.

In accordance with the rising number of visits and reduced number of dentists working with preschool children, from 307 in 1997 to 210 in 2007, continuous rise of workload of dentists was noted, as well. In 1997 there were

1488 visits per dentist, while in 2007 there were as many as 2217 visits per dentist

Dental health care of school children and adolescents

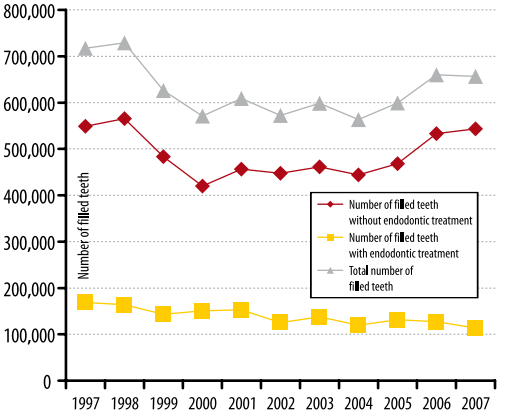
In addition to the aforementioned institutions, dental health care of school children is organized and provided in dental surgeries situated within the facilities of elementary and secondary schools.

The total number of school children and adolescents over the studied period shows the same oscillations identified for preschool children. In 1997 and 1998 over 2,100,000 visits were recorded. A sudden fall was registered in 1999-2001 with 200,000 visits less. Ever since, the number was rising peaking in 2007 at 2,146,941 visits. The share of first visits varied only slightly. The ratio of the first and subsequent visits was 1:3. The average number of visits per schoolchild was about 2, with the exception of the 1997-1998 period when reduction ensued, and in 2007 the rate picked up reaching 2.4 visits per child.

The data on the reduced absolute number of children in this age group by 15% in the period 1997-2007 and the data on increased number of first visits suggest continuously increasing coverage of children by preventive dental examinations and interventions on the teeth and mouth in this population.

The number of dental services including conservative treatment of caries in a single visit has not changed substantially over the studied period. Conversely, the number of endodontic treatments was continuously falling (Figure 82), resulting from more appropriate treatment of diagnosed diseases before any caries complications ensued.

Figure 82. Treatment of caries in the population of school children, Serbia, 1997-2007



Source: Institute of Public Health of Serbia, Report of dental health care service

The number of extracted teeth also showed a falling trend, but still unacceptably high number of extracted teeth in this age group. Although there were continuously fewer extracted teeth versus filled cavities, the ratio of fillings versus extractions is still unsatisfactory in this age group (Table 44).

The least variation in the number of employed dentists in the period 1997-2007 was registered for dentists working with schoolchildren. From 827 dentists in 1997, the number fell to 786 in 2007. The workoad of dentists was increased in the last two years (2006 and 2007) which may be explained by the fact that over that period dentists applied the Rulebook (3) implying funding corresponding to the number and type of services rendered and invoiced to the Health Insur-

ance Fund, promoting the higher number of provided dental services.

Comparison of the data obtained by the 2006 Health Survey in Serbia (4) with the 2000 Health Status, Health Needs and Use of Health Services of the Population of the Republic of Serbia positive changes in respect to oral and dental health were noted. In 2006 in Serbia every other schoolchild (53.5%) had his/her own dentist, which is significantly more than 42.5% recorded in 2000. Percentage of children and adolescents who visited a dentist in the previous year also rose from 58.9% in 2000 to 63.7% in 2007. A positive change and reduced number of children and adolescents who had never visited a dentist were also reduced from 8.5% in 2000 to 3.2% in 2006.

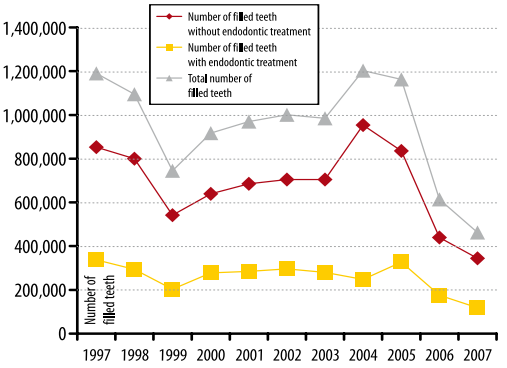
Dental health care of adults

Changes brought about by the Health Insurance Law (2) were reflected most in the use of dental health care of adults over 18 years of age.

The total number of visits of adults to dentists in the period 1997-2005, with minor oscillations, ranged between 3,250,000 and 4 million visits. The 2005 Health Insurance Law (2) limited the entitlement of adults to free dental health care, and as of the following year abrupt fall of the use of dental health care was recorded. The total number of visits fell in 2006 by 44% in comparison with 2005, with additional 11% fall ensuing in 2007. The average number of visits per person was the highest at the onset of the studied period in 1997 when it was 0.7. In the subsequent years it was continuously falling with an abrupt fall in and after 2005, reaching 0.3 which remained unchanged to 2007.

The number of dental services comprising management of caries and its complications were significantly reduced after 2005. In 2007 there were 59% less fillings than in 2005. The fall was even sharper for caries complications, 64% for endodontic treatment before the final filling in 2007 than in 2005 (Figure 83).

Figure 83. Treatment of caries in the adult population, Serbia, 1997-2007



Source: Institute of Public Health of Serbia, Report of the dental health care service

Consequences of the significant reduction of the use of dental services may be expected in the years to come with increased number of extracted teeth and more toothless patients, and consequently other health problems.

In the light of the results of the 2006 Health Survey in Serbia where only 8.5% of adult population had all their teeth, 9.3% had no own teeth, and a quarter of the population (26.6%) lacked more than 10 teeth, we

may expect even worse overall results in future surveys. With exception of the information that 15% of the Serbian population visited a dentist in 2005 only to check their oral health, which is significantly more than 8.6% in 2000, all other forms of behavior of adults to their oral and tooth health were worse in 2006 than in 2000. This particularly applies to oral hygiene where only 40.7% of adults brushed their teeth more than once a day, in comparison with 56.7% in 2000. The survey data illustrating that 30.7% of adults visited a dentist in 2007, in comparison with 36.8% in 2000 only substantiated the data of routine statistics on reduced use of dental care among this population.

Over the studied period the number of dentists working with adults was continuously falling. The major fall was recorded in 2006 when the number fell by 27% in comparison with the preceding year. In 2007 an additional fall by 9% ensued. However, the workload per dentist is significantly lower in the light of the reduced number of visits and services rendered (Table 45).

Table 43. Indicators of dental health care in the population of preschool children, Serbia, 1997-2007

Year	Percentage of first visits in total number of visits (%)	Average number of visits per preschool child	Extracted and filled teeth ratio	Average number of visits per dentist	Average number of preschool children per dentist
1997	37.6	0.8	0.5	1487.9	1839
1998	34.6	0.8	0.5	1773.1	2128
1999	35.9	0.7	0.5	1481.1	2002
2000	39.5	0.8	0.6	1582.8	2020
2001	36.0	0.8	0.6	1595.8	2101
2002	35.1	0.8	0.6	1802.8	2228
2003	38.0	0.8	0.6	1663.3	2104
2004	38.3	0.8	0.5	1706.5	2178
2005	38.7	0.8	0.4	1767.0	2134
2006	38.4	0.8	0.5	1899.9	2246
2007	34.2	0.9	0.4	2217.2	2492

Source: Institute of Public Health of Serbia

Table 44. Indicators of dental health care in the population of school children, Serbia, 1997-2007

Year	Percentage of first visits in total number of visits (%)	Average number of visits per school child	Extracted and filled teeth ratio	Average number of visits per dentist	Average number of school children per dentist
1997	33.3	2.0	0.4	2604.4	1275
1998	34.1	2.0	0.4	2966.7	1465
1999	31.4	2.0	0.5	2363.6	1192
2000	36.5	1.9	0.5	2236.3	1159
2001	34.4	2.0	0.5	2461.6	1257
2002	33.9	2.0	0.5	2318.0	1132
2003	34.7	2.1	0.5	2306.5	1099
2004	35.0	2.1	0.5	2444.8	1179
2005	34.2	2.2	0.4	2567.9	1165
2006	34.7	2.3	0.4	2738.9	1187
2007	30.5	2.4	0.4	2731.5	1144

Source: Institute of Public Health of Serbia

Table 45. Indicators of dental health care in the adult population, Serbia, 1997-2007

Year	Percentage of first visits in total number of visits (%)	Percentage of first visits in total number of visits (%)	Extracted and filled teeth ratio	Average number of visits per dentist	Average number of adults per dentist
1997	43.3	0.7	0.9	1648.4	2486
1998	43.0	0.6	0.9	2062.0	3301
1999	32.8	0.6	0.9	1446.6	2593
2000	45.6	0.6	1.0	1522.0	2646
2001	46.0	0.6	1.1	1591.1	2608
2002	44.9	0.6	1.0	1601.4	2712
2003	46.1	0.6	1.0	1527.8	2659
2004	46.7	0.5	0.7	1538.4	2846
2005	44.5	0.6	0.8	1869.0	3010
2006	40.4	0.3	0.8	1432.1	4096
2007	38.1	0.3	1.0	1351.6	4346

Source: Institute of Public Health of Serbia

References:

1. Program of preventive dental health care of the population of Serbia. Official Gazette of the Republic of Serbia No. 24/94.

2. Health Insurance Law. Official Gazette of the Republic of Serbia No. 107/05.

3. Book of Rules on Pricing List for Prevention, Examinations and Treatment of Oral Health Diseases. Official Gazette of the Republic of Serbia No. 97/07.

4. Ministry oh Health of Republic of Serbia. National Health Survey Serbia 2006. Belgrade: Ministry of Health, 2007.
Available at:
http://www.batut.rs

5. Institute of Public Health of Serbia. Health status, health needs and health care utilization of population of Republic of Serbia. Glasnik 2002; 76 (1-2): 107-110.

IV Hospital Morbidity and Utilization of Hospital Care

Hospital care is characterized with increased efficiency reflected in continuous reduction of the average length of stay and increased bed occupancy.

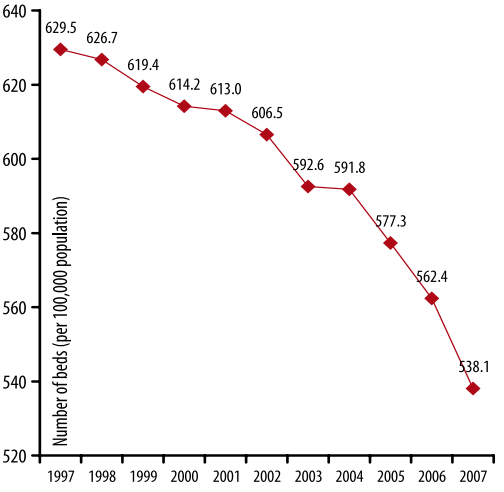
Hospital care is an integral part of the health care system. The main function of hospitals is to provide in-patient treatment of sick and injured persons and provide specialized services, as well as to participate in implementation of preventive measures within their scope of activities.

The utilization of health care and hospital care in particular, does not depend only on the needs of users, but also on the development and accessibility of health services.

Provision

In 2007, the total number of beds (day hospitals excluded) in hospitals in Serbia was 39,880, i.e. 538.1 per 100,000 population. The number is slightly lower than in 1997 when there were 47,833 beds, i.e. 629.5/100,000 (Figure 84).

Figure 84. Number of hospital beds per 100,000 population, Serbia, 1997–2007



Source: Institute of Public Health of Serbia, Aggregated hospital reports

The average number of beds in the region of Europe is 674/100,000, and some-

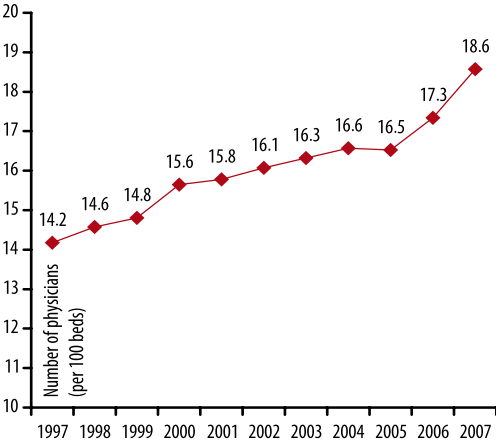
what less in the EU countries, 576 beds per 100,000 (Figure 85).

In 2007 hospitals in Serbia employed the total of 7406 physicians, i.e. 18.6 per 100 patient beds. The number of physicians per bed was continuously rising over the studied period, resulting from both increased number of physicians and reduced number of beds (Figure 86).

Utilization

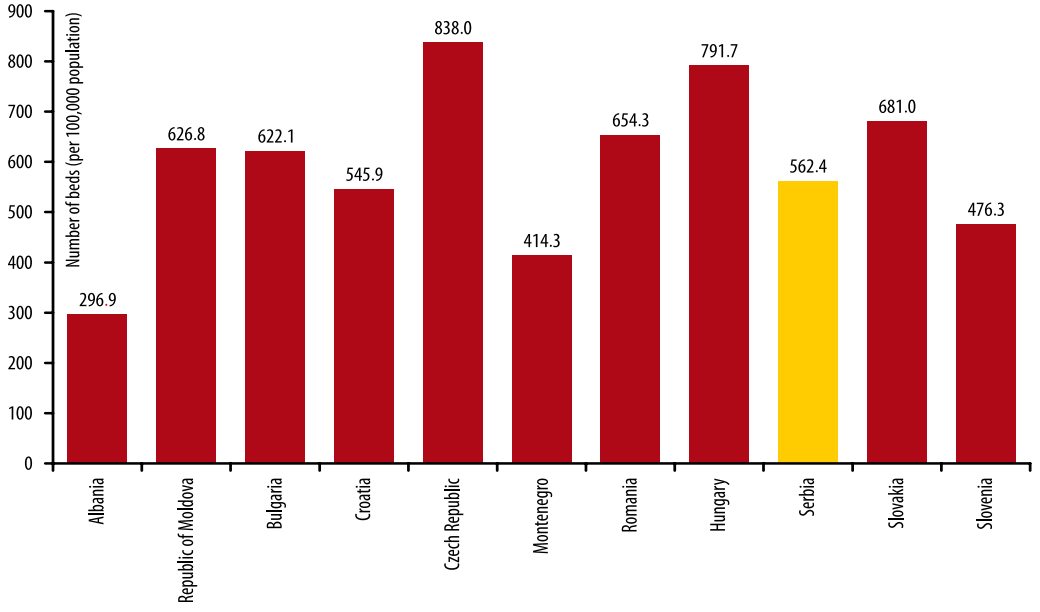
The hospitalization rate for hospitals in Serbia over the studied period was continuously rising, except for 1999 when the lowest value was recorded: 11.1/100 population, resulting from impaired access to health institutions due to bombing raids on Serbia by the NATO forces from May to June 1999 (Figure 87).

Figure 86. Number of physicians per 100 hospital beds, Serbia, 1997–2007



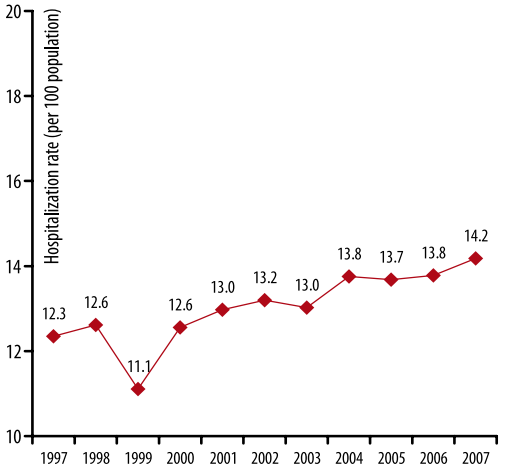
Source: Institute of Public Health of Serbia, Aggregated rospital reports

Figure 85. Number of hospital beds per 100,000 population in Serbia and selected European countries, 2006



Source: WHO/Europe, European Health for all Database, http://data.euro.who.int/hfadb

Figure 87. Hospitalization rate per 100 population, Serbia, 1997–2007



Source: Institute of Public Health of Serbia, Aggregated hospital reports

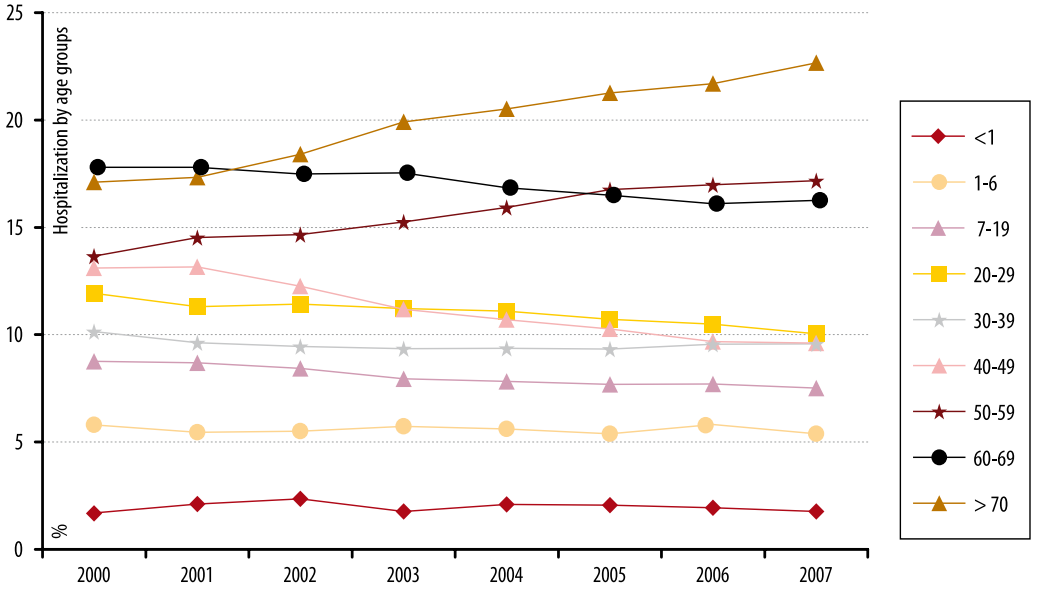
One of the reasons for increased hospitalization rate, in addition to population aging, is also increased utilization of hospital care by the oldest age groups. Thus, the share of people over 70 years of age in the total number of hospitalized patients rose from 17.1 in 2000 to 22.7% in 2007 (Figure 88).

If we compare the hospitalization rate in hospitals in Serbia with the rate in other countries, in spite of the permanent increase it is still substantially lower in Serbia than in most European countries (Figure 89).

The average length of stay in hospitals in Serbia was reduced by one quarter over the studied period, from 13.3 days in 1997 to 10.0 days in 2007 (Figure 90). In spite of the constant reduction, Serbia is still among the countries with the longest average length of hospital stay (Figure 91).

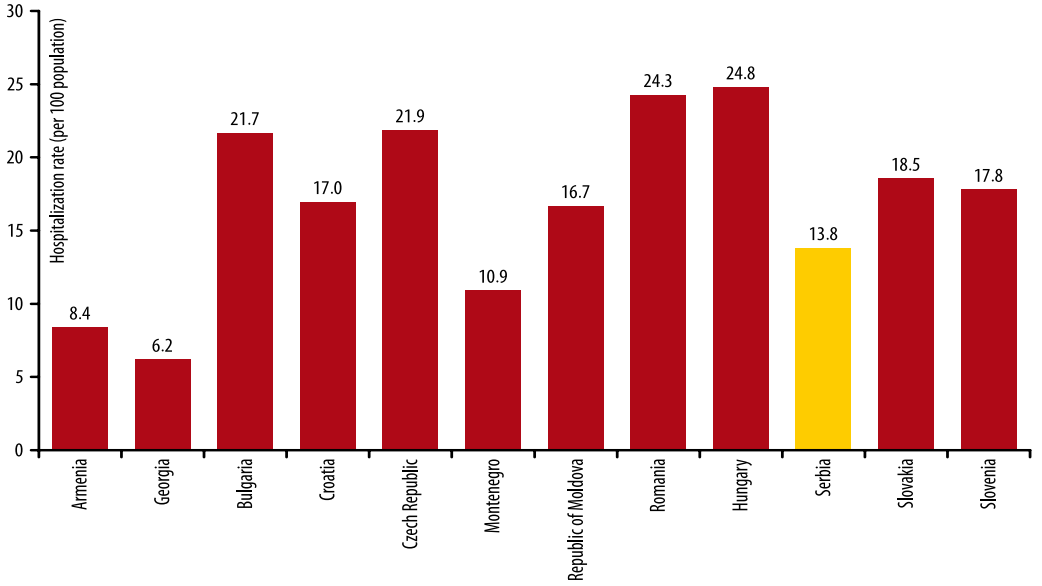
The average occupancy rate in hospitals in Serbia was about 70% over the period 1997-

Figure 88. Hospitalization by age groups, Serbia, 2000–2007



Source: Institute of Public Health of Serbia, Individual hospital reports

Figure 89. Hospitalization rate per 100 population in Serbia and selected European countries, 2006



Source: WHO/Europe, European Health for all Database, http://data.euro.who.int/hfadb

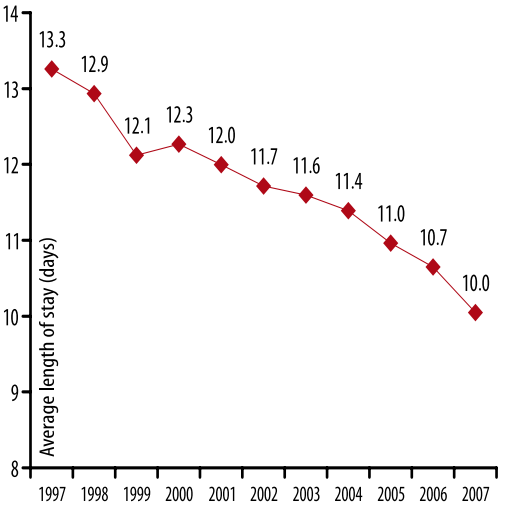
2007 with the exception of 1999 when it was 59.5% (Figure 92).

Morbidity registered in in-patient health care

Over the studied period, there was a continuous increase of hospitalizations for circulatory diseases and malignant tumors. By single diagnoses (excluding hospitalizations for spontaneous delivery) tightness in the chest, i.e. angina pectoris, was the most common cause of hospitalization (ICD-10: I20), followed by cerebral infarction – cerebral tissue necrosis (ICD-10: I63) and essential hypertension (ICD-10: I10).

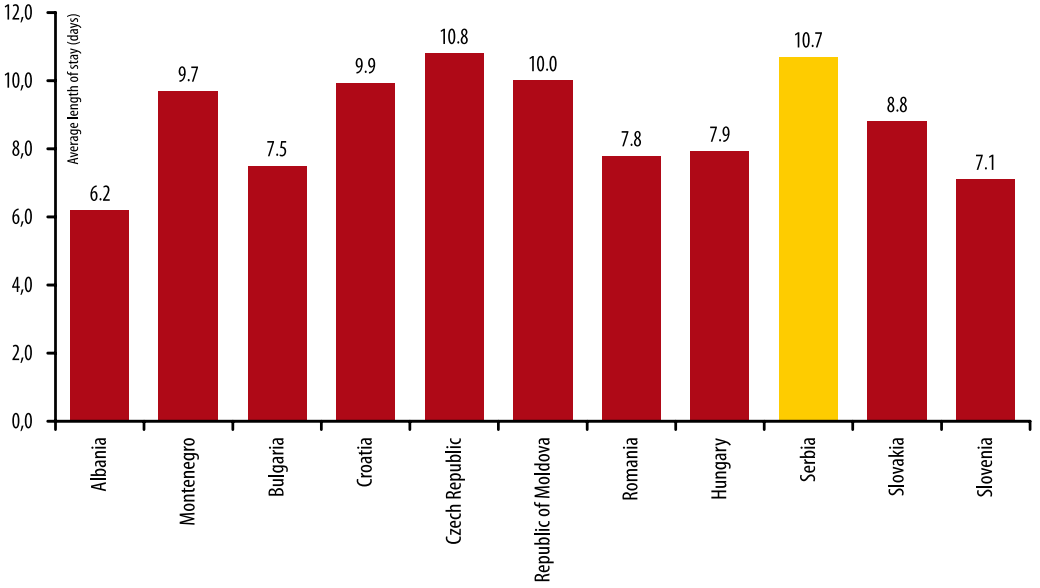
In 2000 angina pectoris, was the seventh most common cause of hospitalization with

Figure 90. Average length of stay in hospitals, Serbia, 1997–2007



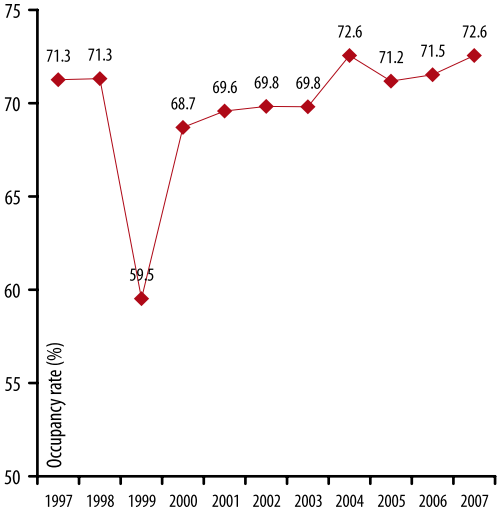
Source: Institute of Public Health of Serbia, Aggregated hospital reports

Figure 91. Average length of stay in hospitals in Serbia and selected European countries, 2006



Source: WHO/Europe, European Health for all Database, http://data.euro.who.int/hfadb

Figure 92. Bed occupancy rate in hospitals, Serbia, 1997–2007



Source: Institute of Public Health of Serbia, Aggregated hospital reports

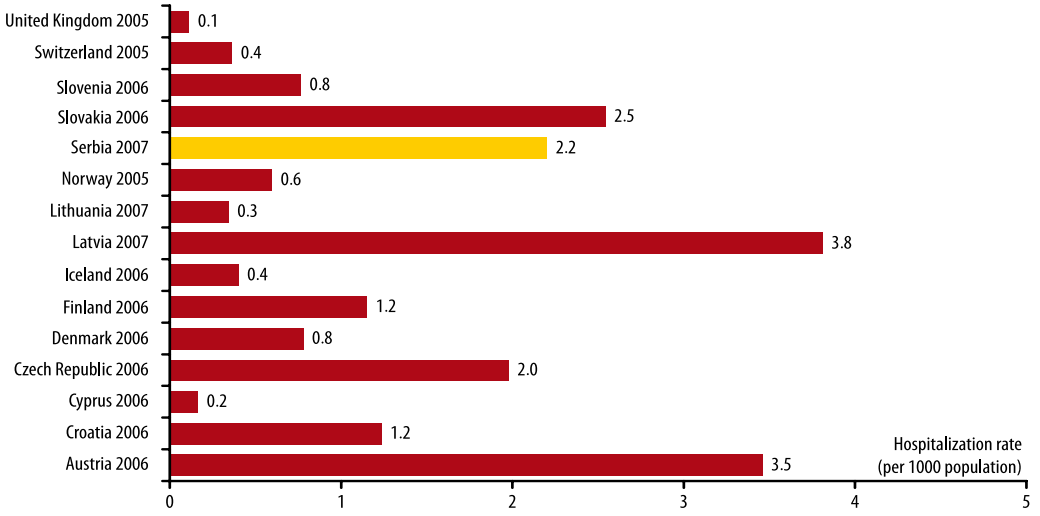
1.5 per 1,000 population. In 2007 had a higher hospitalization rate for this diagnosis than most of European countries (Figure 93).

In 2000 cerebral infarction – cerebral tissue necrosis (ICD-10: I63) was the ninth most common cause of hospitalization with the rate of 1.1 per 1,000 population, but in 2007 it became the second with the rate of 2.3, which is more than in most of European countries (Figure 94).

Over the studied period, the most common reason for hospitalization of men was inguinal hernia (ICD-10: K40) with the rate ranging from 3.3/1,000 in 2000 to 4.1 in 2004 and 2005 (Figure 95).

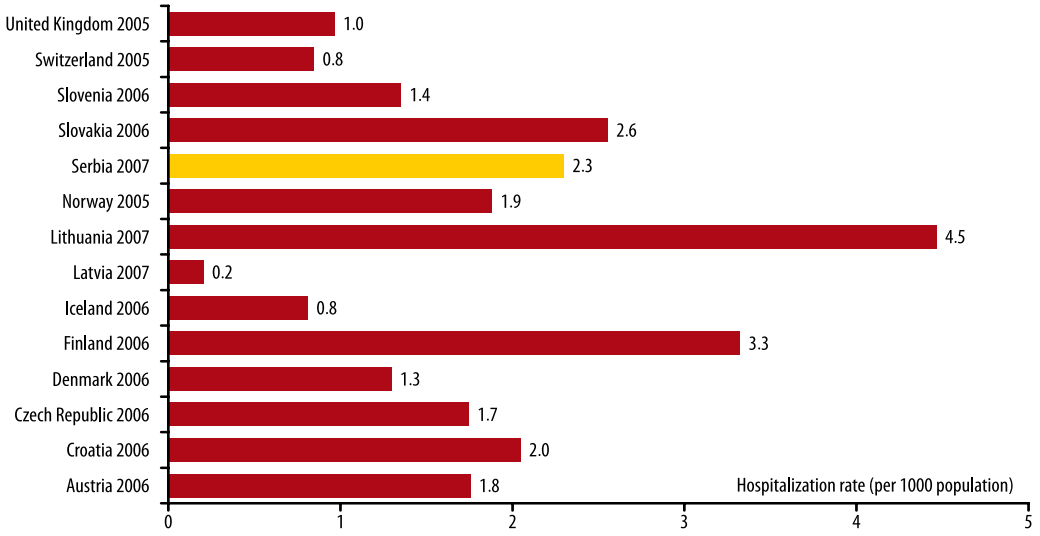
The second most common reason for hospitalization of men was tightness in

Figure 93. Hospitalization rate per 1000 population, caused by Essential (primary) hypertension (I10) in Serbia and selected European countries



Source: WHO/Europe, European Hospital Morbidity Database, http://data.euro.who.int/hmdb/; Institute of Public Health of Serbia, Individual hospital reports

Figure 94. Hospitalization rate per 1000 population, caused by Cerebral infarction (I63) in Serbia and selected European countries

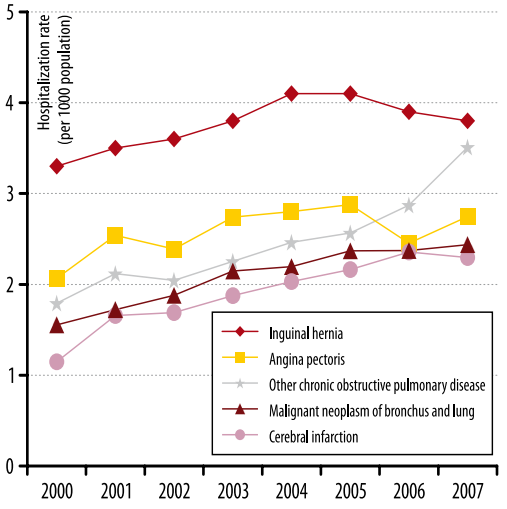


Source: WHO/Europe, European Hospital Morbidity Database, http://data.euro.who.int/hmdb/; Institute of Public Health of Serbia, Individual hospital reports

the chest, i.e. angina pectoris (ICD-10: I20) followed by chronic obstructive pulmonary diseases (ICD-10: J44), malignant tumors of the bronchi and lungs (ICD-10: C34) and cerebral infarction – cerebral necrosis (ICD-10: I63). A rising trend was

noted for all these causes of hospitalization (Figure 95).

Figure 95. Hospitalization rate among males caused by five most frequent diagnoses per 1000 population, Serbia, 2000–2007



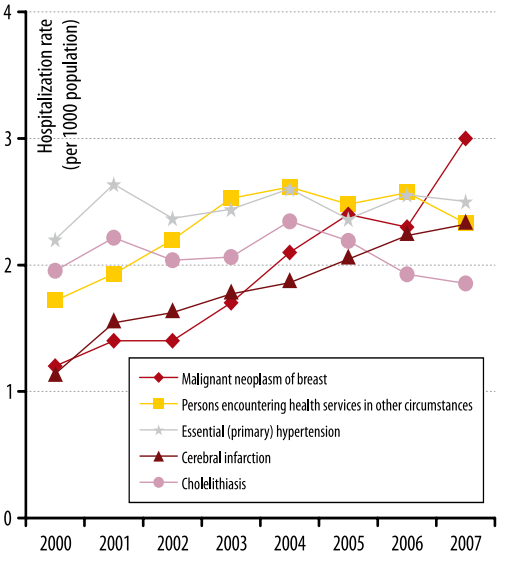
Source: Institute of Public Health of Serbia, Individual hospital reports

In women, major changes were noted in the most common causes of hospitalization. Spontaneous childbirth (ICD-10: O80) was continuously the most common causes of hospitalization, but a marked reduction nevertheless took place. At the same time, the number of deliveries by Cesarean section (ICD-10: O82) was significantly increased, from 5002 in 2000 to 9667 in 2007. The share of Cesarean sections in the total number of childbirths was significantly increased over the studied period, from 8.3% in 2000 to 14.4% in 2007.

Excluding hospitalization for spontaneous childbirth, malignant breast cancer remains (ICD-10: C50) the most common cause of hospitalization of women in 2007. A reason for concern is the fact that the disease was not among top ten reasons for hospitalization of women in 2000, with 1.2 per 1,000 population. In 2007 the breast cancer hospitalization rate was 3.0/1,000.

Other most common causes of hospitalization are persons encountering health services in other circumstances (ICD-10: Z76), essential hypertension (ICD-10: I10), cerebral infarction (ICD-10: I63), and gallbladder stone (ICD-10: K80) (Figure 96).

Figure 96. Hospitalization rate among females caused by five most frequent diagnoses per 1000 population, Serbia, 2000–2007



Source: Institute of Public Health of Serbia, Individual hospital reports

V Health Services

Health Service Organization

Definitions of health care and health institution that provide related health service, onset of decentralization in the area where effectiveness of such approach had previously been verified, and reduction of the total bed capacity highlighted the main changes in health service organization.

The main organizational structure in the system of health care is composed of a network of healthcare institutions owned by the state or privately.

Types of health case institutions in Serbia are regulated under the Health Care Law, and the number, structure, capacities and spatial distribution of health institutions owned by the state (public institutions) are regulated under the Decree on Health Institutions Network Plan (hereinafter: Network Plan) (1,2). The network of public health institutions is organized on three levels of health care providing.

The health care institutions are set up by municipalities on the primary care level, while the Republic, Province and City of Belgrade are founders of institutions on the secondary and tertiary levels.

The total number of public health institutions that have the status of legal entities (independent health institutions) rose from 229 in 1997 to 310 in 2007 (Table 46).

Table 46. Health institutions as independent legal bodies according to types, Serbia 1997 and 2007

Institution type	Number of health institutions	
	1997	2007
Primary Health Care Centre – Dom zdravlja	58	116
General Hospital	1	16
Health Care Centre	31	22
Special Hospital	14	37
Institute – Zavod	47	22
Public Health Institute	23	23
Clinic	11	6
Institute	14	16
Clinical-hospital Centre	5	4
Clinical Centre	2	4
Pharmacy	22	35
TOTAL	228	301

Source: Institute of Public Health of Serbia

The number of private health institutions in 2007 amounted to 5,000 as substantiated by the data in the registry of businesses held with the Statistical Office of the Republic of Serbia processed at the Institute of Public Health of Serbia.

Types of health institutions have not been changed from the 1992 Health Care Law (3), but the numbers of institutions changing the category changed due to requirements to be met to belong to a certain type of institution and different approach to health care organization stipulated in the 2005 Law. Namely, in the process of reorganization of health institutions with decentralization of the primary health care function to the lower level of public administration (from the national to the municipal level), primary health care centers and general hospitals were separated from health centers. Health centers comprised general hospitals for several municipalities and primary health care centers for each of the municipalities; they were founded by the Republic, while now municipalities are founders of primary health care centers. Thus, the number of these primary health care centers fell from 31 in 1997 to 22 in 2007, while the number of independent primary health care centers doubled, from 58 to 116, and the number of general hospitals rose from 1 to 16. The total number of primary health care centers and general hospitals, regardless of their legal status, did not change over the studied period (157 primary health care centers and 40 general hospitals). In 2007 22 health centers comprised 24 more general hospitals and 41 primary health care centers. With the establishment of the Novi Sad Clinical Center in 1997, the total number of teaching hospitals and institutes was reduced because some of them were integrated in the Clinical Center. When the Kragujevac Clinical-hospital Center became the Clinical Center in 2005, Serbia was enriched for two more university clinical centers, in addition to the ones in Belgrade and Nis. The four institutions provide the top level of health care. In addition to these health institutions there are also specialized institutes, primarily those for rehabilitation that were renamed into special hospitals. Thus, when we compare 1997 and 2007, the number of institutes fell by the same number by which the number of special hospitals was increased (Table 46). In case of Institutes of Health Protection that were renamed into Institutes of Public Health, the change of name was accompanied with adjustment of these institutions to the principles and functions that new public health has in the modern world.

According to the data obtained from health statistics reports provided by health institutions to public health institutes, the total bed capacity of Serbian hospitals amounts to 39,880 patient beds (day hospitals are not included), which is 17% less than in 1997 when there were 47,833 beds available. The aforementioned changes in organizational structure of health institutions were accompanied with pertinent changes in distribution of the bed capacity so that the number of beds was reduced in health centers and increased in general hospitals as legal entities, and in institutes (zavodi) it was reduced from 3949 in 1997 to only 55 in 2007 (Table 47).

The bed capacity stipulated in the 2006 Network Plan was 37,629 which is 13% (5500) less than specified in the 1995 Network Plan (43,295) (2,4).

More beds in the health statistics reports from the number specified in the Network Plan in both studied years resulted from the reporting of some institutions, particularly those for specialized rehabilitation, since they report all their capacity, not only the one included in the Network Plan. The reason for higher percentage of reduction of the number of beds in 2007 versus 1997 (17%) than the planned reduction in the Network Plan (13%) resulted from decrease of the difference between total capacity and capacity specified in the Network Plans in 1995 and 2006. In 1997 the difference amounted to 4,500 beds, it was halved in 2007 (2,400 beds) illustrating better regulation of the hospital system and orientation not only to bed capacity but to its utilization as a measure of efficiency.

Table 47. Hospital beds (day beds excluded) according to type of health institution, Serbia 1997 and 2007

Institution type	Number of hospital beds	
	1997	2007
Primary Health Care Centers	343	348
General Hospitals	335	6947
Special Hospitals	6839	8704
Institutes – Zavodi	3949	55
Clinics	1443	1121
Institutes	5303	4134
Health Care Centers	18,450	8567
Clinical-hospital Centers	4264	2367
Clinical Centers	6907	7637
TOTAL	47,833	39,880

Source: Institute of Public Health of Serbia

References:

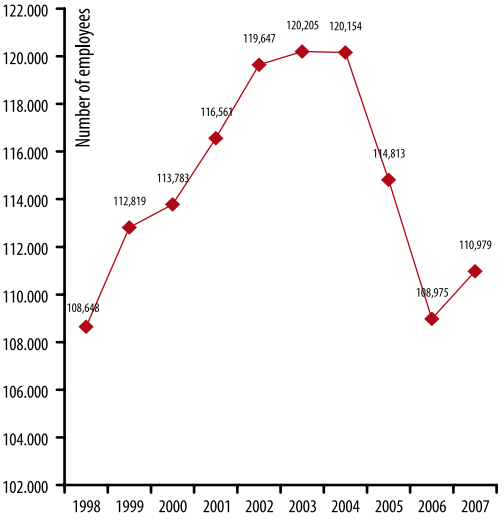
1. Low on Health Care (in Serbian). Official Gazette of the Republic of Serbia, No 107/05.
2. Decree on Health Institutions Network Plan (in Serbian). Official Gazette of the Republic of Serbia, No 42/06.
3. Low on Health Care (in Serbian). Official Gazette of the Republic of Serbia, No 17/92, 50/92, and 25/96.
4. Decree on Health Institutions Network Plan (in Serbian). Official Gazette of the Republic of Serbia, No 13/97.

Human Resources

Increased number of staff in state health institutions in Serbia was marked by the change of structure of human resources shifting to health professionals.

In 2007 state health institutions in Serbia had 110,979 staff, i.e. 2% more than 10 years earlier, before the economic transition. The total number of staff in the previous decade rose till 2005, when a significant fall of the number of staff ensued due to implementation of rationalization plan implemented by the Ministry of Health of the Republic of Serbia, implying annual reduction by 1% in the following two years (1). Nevertheless, the trend of the total number of staff in the Serbian health care system still preserved a mild rising trend (Figure 97).

Figure 97. Total number of employees in state owned health institutions, Serbia, 1998–2007



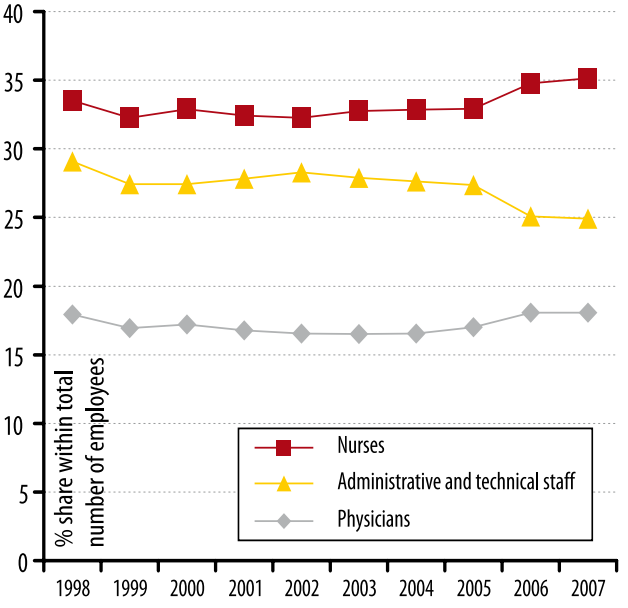
Source: Institute of Public Health of Serbia, Report on organizational structure and staffing in health institutions in Republic of Serbia

Most prominent changes in the structure of human resources were effectuated in the total numbers of physicians, nurses and administrative and technical staff (Figure 98).

While the proportion of physicians and nurses in the total number of staff rose since 2005, the proportion of administrative and technical staff fell from 29.1 in 1998 to 24.9 in 2007. The number of physicians and nurses per 100,000 population rose from 1998 reaching 272 and 528, respectively in 2007 (Table 48).

In comparison with the average values of these indicators in European countries and EU countries in particular, coverage by physicians and nurses in Serbia is much lower, while it is higher than in many neighboring countries (Figure 99 and Figure 100).

Figure 98. Percentage of physicians, nurses, and administrative and technical staff within total number of employees, Serbia, 1998–2007



Source: Institute of Public Health of Serbia, Report on organizational structure and staffing in health institutions in Republic of Serbia

Table 48. Number of physicians and number of nurses per 100,000 population, Serbia, 1998–2007

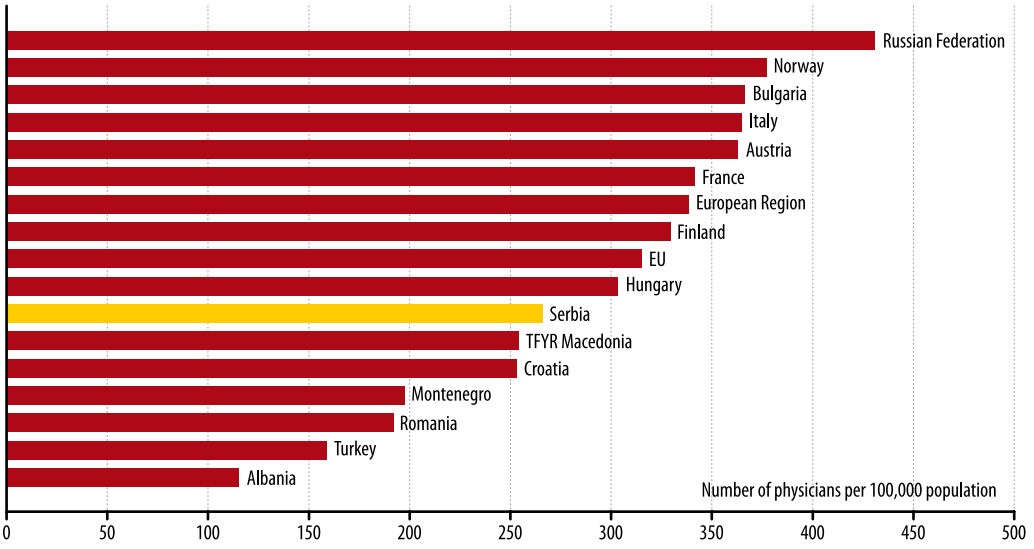
Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Physician	257	254	261	260	264	265	266	263	266	272
Nurse	481	483	498	504	515	526	529	508	511	528

Source: Institute of Public Health of Serbia, Report on organizational structure and staffing in health institutions in Republic of Serbia

Like in many countries worldwide, development of health care human resources in Serbia was accompanied with marked increase of female staff (2). The number of female doctors was continuously rising from 1998, so that the share of women rose from 58.2% in 1998 to 63.5% in 2007. Age-wise, increasing numbers are recorded in the 45-55 age group (most of employed doctors, 36% in 2007) and those over 55, while the proportion of doctors under 44 years of age was continuously declining (Figure 101).

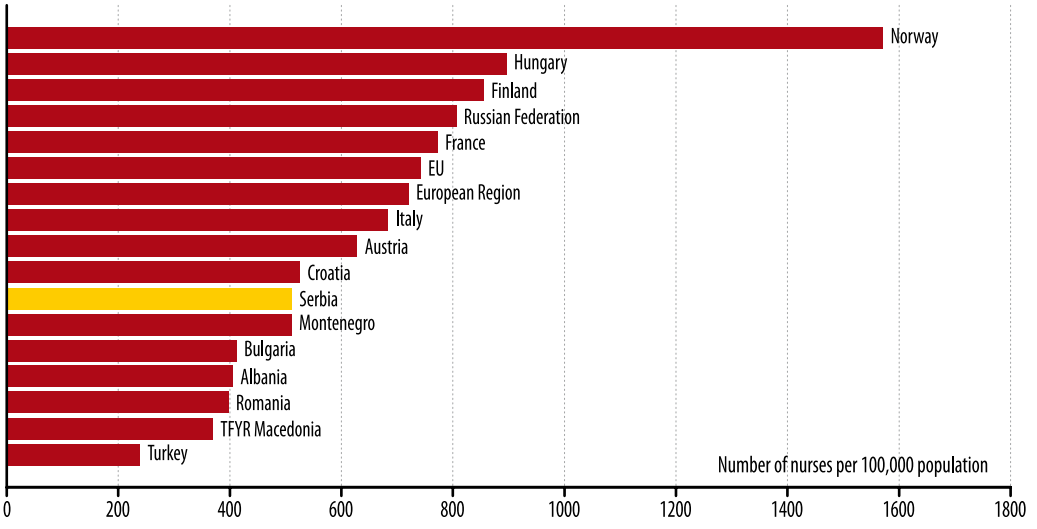
Development of medical science and practice in Serbia is characterized with more intensive processes of specializations and sub-specializations resulting in increased number of

Figure 99. Number of physicians per 100,000 population in Serbia and selected countries, 2006



Source: „Health for all" database, WHO, http://data.euro.who.int/hfadb/

Figure 100. Number of nurses per 100,000 population in Serbia and selected countries, 2006



Source: „Health for all" database, WHO, http://data.euro.who.int/hfadb/

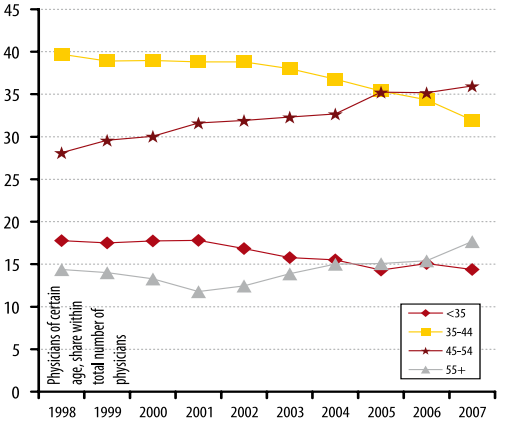
specialists among medical doctors, reaching as much as 76% of the total number of doctors in 2007. This is illustrated by the increased number of specialists from 181/100,000 population in 1998 to 2007/100,000 in 2007. In the last ten years major expansion was observered

in the area of gynecology and obstetrics where the number of specialists per 100,000 women in reproductive age increased from 58 (1998) to 69 (2007. On the other hand, the number of midwives varied over the same period without a rising trend, which may be interpreted as a response to reduced number of childbirths in Serbian health institutions (Figure 102).

Health care provided in in-patient institutions still employed most of the doctors, two fifths of the total number. Nevertheless, the proportion of doctors in health institutions in the total number of doctors fell from 46.7% in 1999 (118/100,000 population) to 39.3% in 2007 (107/100,000 population). Work of the hospital doctors also was more efficient – the number of hospital discharges per doctor rose from 99 (1999) to 146 (2007), with registered reduction of average length of hospital stay from 12.9 days (1998) to 10.0 days (2007), suggesting improved efficiency of hospitals as well (Table 49).

In 2007 one in five doctors in Serbia was employed at a GP/occupational medicine services of primary health care centers (the total of 4319, i.e. 75/100,000 adults). The number has remained stable over ten years. On the other hand, the number of visits per doctor in GP/occupational medicine services rose from

Figure 101. Physicians by age groups within total number of physicians, Serbia, 1998–2007



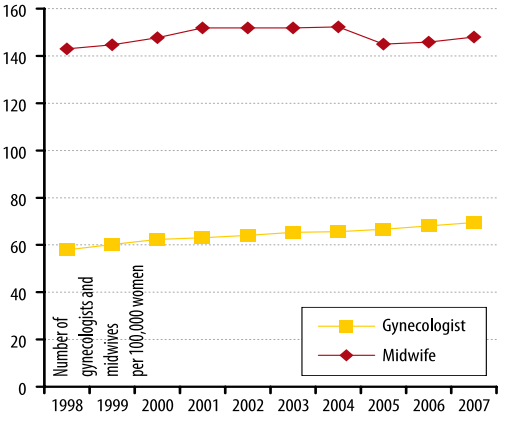
Source: Institute of Public Health of Serbia, Report on organizational structure and staffing in health institutions in Republic of Serbia

Table 49. Average length of stay and number of hospital discharges per physician, Serbia, 1998–2007

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Average length of stay	12.9	12.1	12.3	12.0	11.7	11.6	11.4	11.0	10.7	10.0
Number of hospital discharges per physician	-	99	107	110	110	108	114	119	143	146

Source: Institute of Public Health of Serbia

Figure 102. Number of gynecologists and number of midwives per 100,000 women in reproductive age, Serbia, 1998–2007



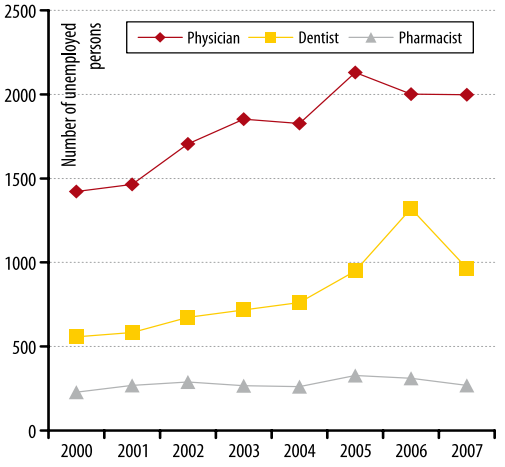
Source: Institute of Public Health of Serbia, Report on organizational structure and staffing in health institutions in Republic of Serbia

5947 (1998) to 6302 (2007), suggesting greater workload for these doctors.

The number of dentists employed at state health institutions was 3537 in 1998, fell to 2307 in 2007 both due to intensive development of the private sector and change of funding of dental health care in the state sector. Conversely, the number of pharmacists employed at state health institutions rose by about 200 in the last ten years reaching 1947 in 2007.

According to the data of the National Employment Service the number of unemployed physicians, dentists and pharmacists was rising from 2000 (Figure 103), so that in late 2007 there were 1998, 966 and 269 unemployed physicians, dentists and pharmacists, respectively.

Figure 103. Unemployed physicians, dentists and pharmacists, Serbia, 2000–2007



Source: National Employment Service

Another aspect explains the rise of unemployed highly educated human resources by the rising number of graduated physicians, dentist and pharmacists (Table 50).

Table 50. Graduate medical doctors, dentists and pharmacists, 2001–2005

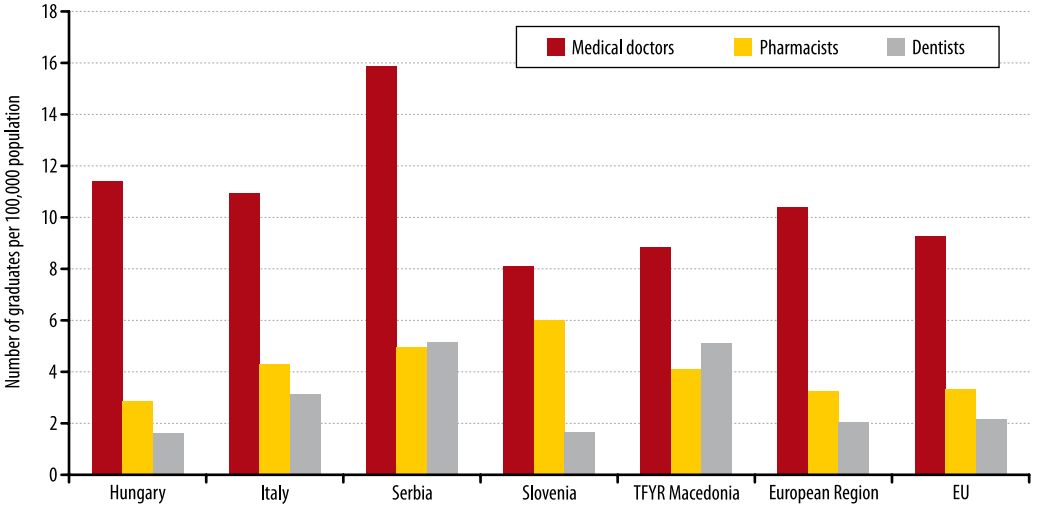
	2001	2002	2003	2004	2005
Medical doctor	1092	871	977	1084	1180
Dentist	216	245	376	302	384
Pharmacist	262	270	243	310	369

Source: Statistical yearbook of Serbia 2007, Statistical Office of the Republic of Serbia

The number of graduated physicians, dentist and pharmacists per 100,000 population in other countries illustrates hyperproduction of health human resources in Serbia (Figure 104).

All of the above suggests that harmonization of education of health human resources (enrollment policy, diversification of the curricula) and health care system (employment, utilization, continuous education) are absolutely necessary within the health care system reform in Serbia.

Figure 104. Number of graduate medical doctors, dentists, and pharmacists per 100,000 population in Serbia and selected countries, 2005



Source: „Health for all" database, WHO, http://data.euro.who.int/hfadb/

References:

1. Danijela Davidov Kesar. Burden of Overstaffing (in Serbian). NIN – special issue, Health system in Serbia 2002–2008 – disease and recovering. 2008, august.

2. Shelley Ross. The Feminization of Medicine. Medicine and society. 2003, September, 5:9.

VI Conclusions

On the basis of selected indicators of health of the Serbian population in the period 1997-2007, the conclusions are presented as key favorable and unfavorable trends.

	Favorable	Unfavorable
Population	◆ Mild trend of increased life expectancy at birth.	◆ Reduced number of live births. ◆ Negative growth rate of population. ◆ Increased population average age.
Socio-economic conditions	◆ Stable growth of gross domestic product. ◆ Increased salaries. ◆ Relatively stable level of proportion of expenses for health care in gross domestic product. ◆ Increased expenses for health care allocated by the Health Insurance Fund per capita.	◆ High unemployment rate. ◆ Unfavorable structure of household expenses (most for food). ◆ Low health expenses in absolute amount in terms of Purchasing Power Standard (PPS).
Drinking water	◆ Improving trend in physico-chemical quality of drinking water. ◆ Most common causes of microbiological unsafety of drinking water from urban water supply systems are aerobic mesophilic bacteria that have no impact on health.	◆ Absence of systematic control of water health safety in small rural water supply systems and individual water wells. ◆ Not all parameters of drinking water safety that affect human health are monitored.
Air	◆ Increased number of measuring sites and number of settlements in which air pollution is monitored. ◆ According to national regulations, the mean annual values of sulfur dioxide and black smoke did not exceed the annual mean emission limits values.	◆ Coverage of population in settlements in which air pollution is monitored is still insufficient, in spite of certain improvement.

	Favorable	Unfavorable
Foodstuffs and items of general use	◆ Increased volume of control and fall of unsafe food. ◆ Increased control of items of general use and reduced microbiological non-compliance of controlled samples.	
Liquid and solid waste	◆ High coverage of households with improved disposal of liquid waste. ◆ National Waste Management Strategy adopted.	◆ In spite of efforts of competent institutions, still no major improvement in the area of disposal and processing of solid waste. ◆ Few municipalities with waste water-processing plants. ◆ Small amount of treated communal waste water.
Eating habits, diet and state of nourishment	◆ Increased proportion of population eating fresh fruits and vegetables every day. ◆ Decreased number of underweight children.	◆ Fall of average consumption of several groups of foodstuffs. ◆ Increase of overweight and obese children. ◆ Still, every other adult is overweight.
Smoking	◆ Intensified activities on tobacco control. ◆ Raised awareness on adverse effects of smoking and exposure to smoking on health. ◆ Important results of campaigns against smoking and tobacco smoke. ◆ Reduced prevalence of smoking among adults, more in men than in women.	◆ Great exposure of population to tobacco smoke, particularly at home, at work and among younger population. ◆ Small number of smokers uses the anti-smoking counseling services.
Alcohol and psychoactive substances	◆ Raised awareness on adverse effects of psychoactive substances.	◆ After a falling trend, current trend of increased consumption of alcohol. ◆ Boys start drinking alcohol early, and drink larger amounts. ◆ Widespread use of cannabis in the form of marihuana or hashish among high school students.

	Favorable	Unfavorable
Chronic non-communicable diseases – major public health problem	◆ Decrease of mortality rates associated with diseases of the heart and blood vessels. ◆ Decrease of mortality rates associated with chronic non-communicable lung diseases. ◆ Mild decrease of number of traffic accidents with fatal outcome. ◆ After an increasing trend, current decreasing trend of the number of suicides both in men and women.	◆ Burden of ischemic heart diseases and cerebrovascular diseases leads in the total burden of diseases. ◆ Over three quarters of all causes of death are associated with diseases of the heart and blood vessels and malignant tumors. ◆ The greatest increase in mortality associated with malignancies and diabetes. ◆ Increased incidence and mortality associated with all malignant tumors combined, and all leading cites of malignancies except for gastric cancer. ◆ Morbidity and mortality rates of cervical cancer among the highest in Europe. ◆ Standardized diabetes mortality rates almost double the ones in EU countries. ◆ Persistent high prevalence of leading risk factors for the occurrence of chronic non-communicable diseases. ◆ Increased number of traffic accidents and persistent rate of injuries at approximately same level. ◆ Risk of suicide particularly marked in men and the oldest age group.
Communicable diseases	◆ Absence of communicable diseases as direct cause of death among the leading causes of death in the last five years. ◆ Implemented DOTS strategy in tuberculosis prevention and control. ◆ Intensified surveillance of hospital infections. ◆ HIV morbidity and mortality rates have a decreasing trend. ◆ Preservation of the “polio-free” country status. ◆ Preservation of the diphtheria-free status. ◆ Absence of neonatal tetanus demonstrated. ◆ National plan for elimination of measles adopted and reduced morbidity rate of congenital rubella syndrome.	◆ Unsafe sex with persons of the same or opposite sex is the predominant mode of HIV transmission. ◆ Inadequate coverage of marginalized populations by immunization jeopardizes the country polio-free status, maintenance of diphtheria-free status and elimination of measles. ◆ Difficulties in establishment of active high quality surveillance for priority communicable diseases.

	Favorable	Unfavorable
Health status and use of primary health care by the age groups	◆ Fall of perinatal mortality rate. ◆ Fall of neonatal mortality rate. ◆ Fall of infant mortality rate. ◆ Fall of mortality rate of children under 5 years of age. ◆ Good functioning of systematic monitoring of health and preventive health care of infants. ◆ High coverage of infants and women after childbirth by family nurse visits. ◆ Good coverage of all population groups by professionals in pertinent services. ◆ Unchanged utilization of primary health care by all age groups of the population. ◆ Complete coverage of pregnant women by systematic preventive check-ups. ◆ Increased number of "Schools for Pregnant Women and Parenting" at primary health care centers. ◆ Reduced number of extracted and endodontically treated teeth in preschool children as a response to timely implementation of preventive and treatment measures. ◆ Increased coverage of school children and adolescents by preventive dental examination and control of diseases of the teeth and mouth.	◆ High infant mortality rate among Roma in Roma settlements. ◆ Increasing trend of stunting in preschool children, particularly Roma children in Roma settlements. ◆ Increasing, but still unsatisfactory trend of exclusive breastfeeding. ◆ Increased number of health institutions with WHO certificate of Baby-friendly Hospitals, but stagnating further development of program activities. ◆ Injuries and poisoning predominant in the mortality structure of school children and adolescents. ◆ Increasing rate of spinal column deformities in children in elementary and secondary schools. ◆ Respiratory, circulatory, musculoskeletal and connective tissue diseases predominate in adult population morbidity, with hypertension as the leading disease. ◆ Injuries and poisoning, followed by malignant tumors, are leading cause of death in the 20-34 yrs age group; ◆ Low coverage of females over 15 years of age by preventive check-ups. ◆ Insufficient coverage of women in reproductive age by first visits to family planning counseling services. ◆ Lower utilization of health care services for women. ◆ High morbidity and mortality rates of breast and cervical cancer among women. ◆ Insufficient number of preschool children covered by dental health care. ◆ Reduced use of dental health care by adults.

	Favorable	Unfavorable
Morbidity and utilization of hospital care	◆ Reduced overall bed capacity. ◆ Better provision of physicians in respect to the number of patient beds. ◆ Reduced average length of hospital stay. ◆ Increased average bed occupancy.	◆ Most common causes of hospitalization: angina pectoris, cerebral infarction-cerebral tissue necrosis, and essential hypertension. ◆ Breast cancer has become the most common cause of hospitalization of women (except for childbirth).
Health services	◆ Defined levels of health care and pertinent health institutions. ◆ Initiated process of decentralization of health care. ◆ Reduced proportion of administrative-technical staff and increased proportion of doctors and nurses in the total number of staff.	◆ Lack of balance between the educational system and health care system in terms of education and planning of health human resources.

Notes

Notes

Notes

Notes

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

314:61(497.11)"1997-2007"(0.034.2)

HEALTH of Population of Serbia [Elektronski izvor] : analitical study 1997-2007. / [editor Jasmina Grozdanov ; translator Vesna Kostic]. – Beograd : Institute of Publich Health of Serbia „Dr Milan Jovanović Batut", 2009 (Zemun : Alta nova). – 1 elektronski optički disk (CD-ROM) : tekst, slika ; 12 cm

Nasl. sa naslovnog ekrana. – Tiraž 10. –
Bibliografija uz svako poglavlje.

ISBN 978-86-7358-048-7
1. Grozdanov, Jasmina [уредник]
а) Здравље – Србија – 1997-2007
COBISS.SR-ID 167189004