World Health Organization
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Better noncommunicable disease outcomes: challenges and opportunities for health systems

Country assessment

SERBIA

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Abstract

Despite positive trends, life expectancy in Serbia is well below the average for the WHO European Region. The probability of dying from one of the main noncommunicable diseases (NCDs) between the ages of 30 and 69 years is 20%. This has significant socioeconomic consequences for the development of the country and calls for an immediate strengthening of the health system to respond to the growing burden of NCDs. Despite significant progress and political commitment in Serbia, the outcomes of NCDs could still be improved. This report reviews the challenges and opportunities facing the health system in Serbia in scaling up core services for the prevention, early diagnosis and management of NCDs. The report also provides examples of good practice in care. Policy recommendations are made for further action, based on the assessment.

Keywords
CHRONIC DISEASE – prevention and control
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SERBIA

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The country assessment was produced under the overall guidance of Dr Hans Kluge, Director of the Division of Health Systems and Public Health and Dr Gauden Galea, Director of the Division of Noncommunicable Diseases and Promoting Health through the Life-course in the WHO Regional Office for Europe.

Acronyms and abbreviations

ACEi	angiotensin-converting-enzyme inhibitors
ACS	acute coronary syndrome
AMI	acute myocardial infarction
CCU	coronary care units
CVD	cardiovascular disease
GDP	gross domestic product
GP	general practitioner
EU	European Union
FINDRISC	Finnish Diabetes Risk Score
IPHS	Institute of Public Health of Serbia "Dr Milan Jovanovic Batut"
ICD-10	International Classification of Diseases, 10th Revision
NCD	noncommunicable disease
PHC	primary health care
RHIF	Republican Health Insurance Fund
SDR	standardized death rates

Introduction and rationale

Noncommunicable diseases (NCDs) are the leading cause of death, disease and disability in the WHO European Region, accounting for nearly 86% of deaths and 77% of the disease burden. They thus put an increasing strain on health systems, economic development and the well-being of large parts of the population, in particular for people aged over 50 years. The four major NCDs (cardiovascular disease (CVD), cancer, chronic obstructive pulmonary diseases and diabetes) account for by far the largest part of the disease burden and of premature mortality in the Region *(1)*.

NCDs also have a significant macroeconomic impact and exacerbate poverty. Most NCDs are chronic and require repeated interactions by patients with the health system and recurring and continuous medical expenses which often lead to catastrophic, impoverishing expenditure. It has been estimated that the loss of productivity due to NCDs is significant: for every 10% increase in NCD mortality, economic growth is reduced by 0.5% *(2)*.

Several policy documents have called for a comprehensive health system response to reduce the burden of NCDs. There is, however, a lack of pragmatic and implementable policy recommendations on which such a response should be based.

This country assessment is part of a project by the WHO Regional Office for Europe to increase support to Member States in strengthening their health systems for better NCD outcomes. Eleven country assessments have been conducted to date in Armenia, Belarus, Croatia, Estonia, Hungary, Kazakhstan, Kyrgyzstan, the former Yugoslav Republic of Macedonia, the Republic of Moldova, Tajikistan and Turkey. The same approach and multidisciplinary assessment teams were used for all the assessments, which are based on a structured guide outlined in a background paper on the role of health systems in reducing NCDs *(3)*. While the same guide has been used for all the country assessments, the recommendations are tailored to the context of each country.

The objectives of this country assessment were twofold. The first was to identify factors limiting the ability of the Serbian health system to perform up to its full potential and to provide useful policy recommendations for health system strengthening in order to improve NCD outcomes. This assessment places special emphasis on population-based interventions, and its policy recommendations aim to indicate the elements of a comprehensive NCD action plan that could incorporate existing action. Secondly, as part of a regional project, the assessment will contribute to understanding common health system challenges, opportunities for NCD control and promising approaches towards tackling NCDs and related issues.

To meet these objectives, a multidisciplinary WHO expert team visited Serbia twice, in November 2016 and April 2017, when they met a wide range of stakeholders and other experts involved with NCDs. During the April visit, the team also carried out a more detailed review of cancer prevention and control as a follow-up to a previous ImPACT report *(4)*. This has been delivered separately.

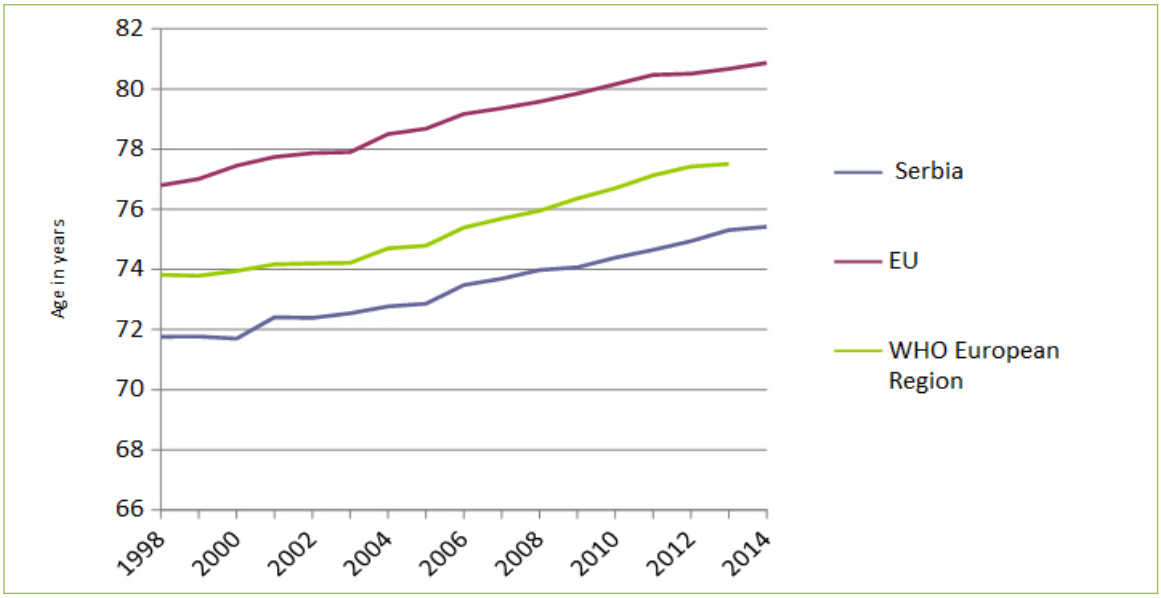
The first section of this report outlines trends in NCD outcomes in Serbia. The second section reports on current NCD and public health activities and reviews the coverage of core population-based interventions for NCDs. The third presents the achievements of the health system while also reporting on barriers in the way of NCD interventions and services. The fourth concludes the report with policy recommendations. Annex 1 describes the data sources and methods, Annexes 2 and 3 give the criteria for scoring interventions and Annex 4 lists the participants in the assessment.

1. Noncommunicable disease outcomes

In the 1990s, changes in the political, social and economic systems gradually affected central and eastern European countries, reaching Serbia a decade later.

In the past 15 years, the life expectancy of the Serbian population has improved. Fig. 1 shows that life expectancy at birth increased for both men and women from 71.76 years (69.05 years for men and 74.52 years for women) to 75.42 years (72.85 years for men and 78.00 for women) in the period 1998–2014 *(5)*, while the gap in life expectancy between men and women decreased in this period. Despite this positive trend, however, a gap in life expectancy remains between Serbia and the countries of the European Union (EU). Even compared to other countries in the WHO European Region, Serbian life expectancy was found to be below average *(5)*.

Fig. 1. Life expectancy at birth, Serbia, EU, WHO European Region, 1998–2014



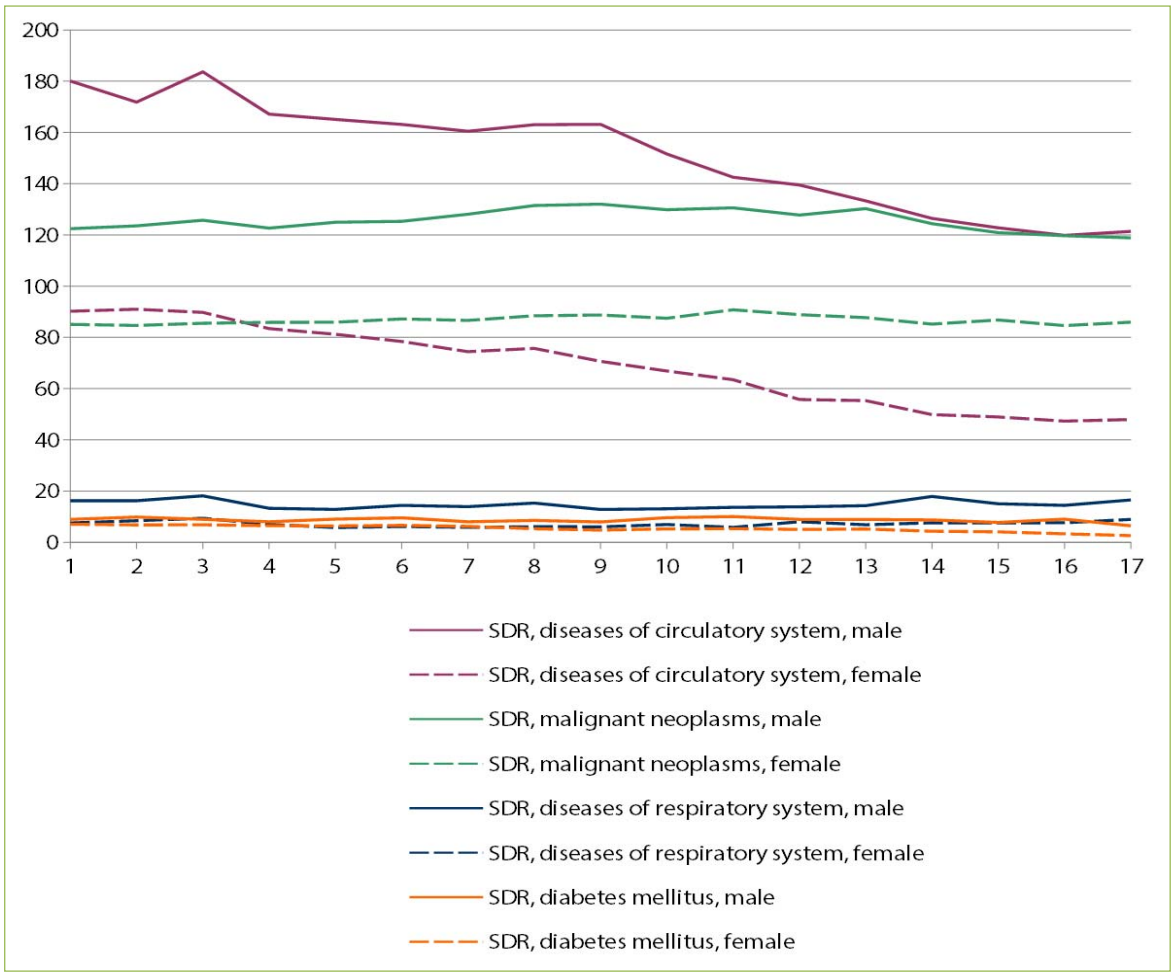
Source: WHO Regional Office for Europe *(5)*.

According to the WHO global health estimates, NCDs accounted for 94% of all deaths in Serbia in 2014 *(6)*. The probability of dying from one of the main NCDs at age 30–70 years was estimated to be 20.4% in 2015, higher for males (26.1%) than females (15.0%) *(7)*. In 2015, the main causes of mortality for all ages included diseases of the circulatory system, malignant neoplasms and diseases of the respiratory system *(8)*.

The standardized death rates (SDRs) for the four major NCDs in Serbia are higher compared to those for countries in the EU and the Region *(5)*. Nevertheless, the SDRs for the main causes of NCD mortality have decreased, most significantly for diseases of the circulatory system. For all diseases, a gap has been observed in mortality rates between males and females (Fig. 2).

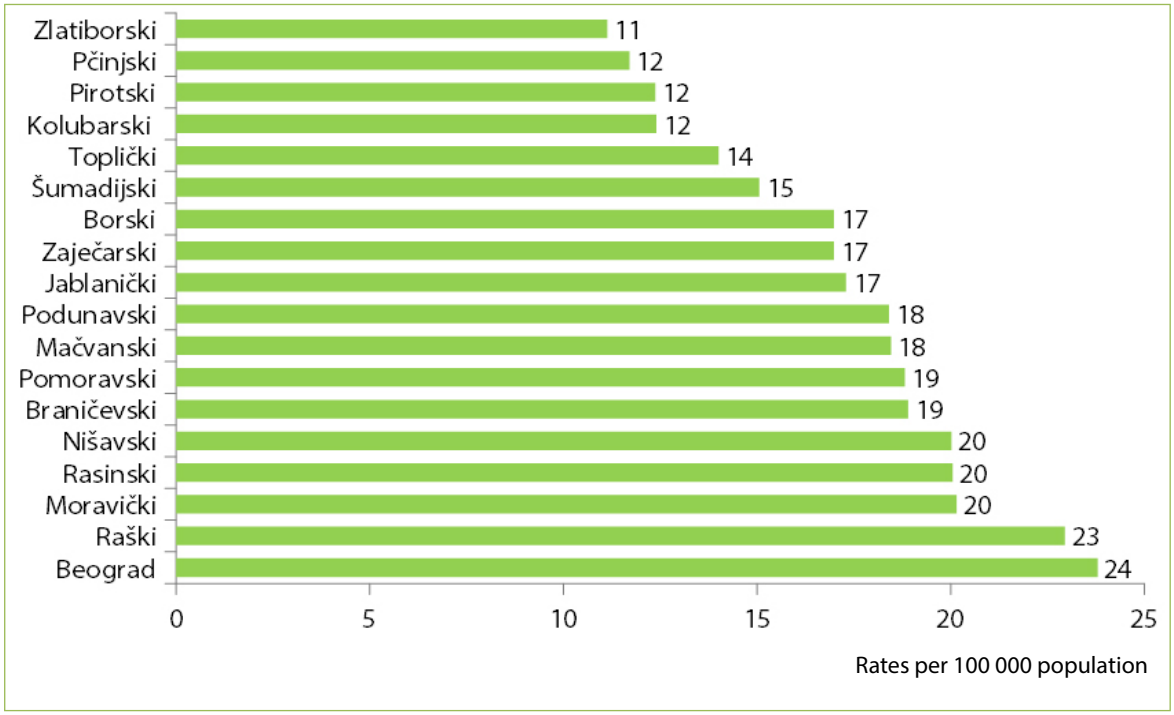
In 2013, the highest incidence and mortality from malignant diseases in men came from lung (30.5%), colon (12%) and prostate cancer (8.1%), while most women were affected by breast (17.9%), lung (15.2%) and colorectal cancer (10.5%). Regional differences in mortality rates from breast cancer for women and lung cancer for men are significant (Fig. 3, 4) *(9)*.

Fig. 2. SDRs from main causes of mortality per 100 000 population, 0–64 years, Serbia, 1996–2014



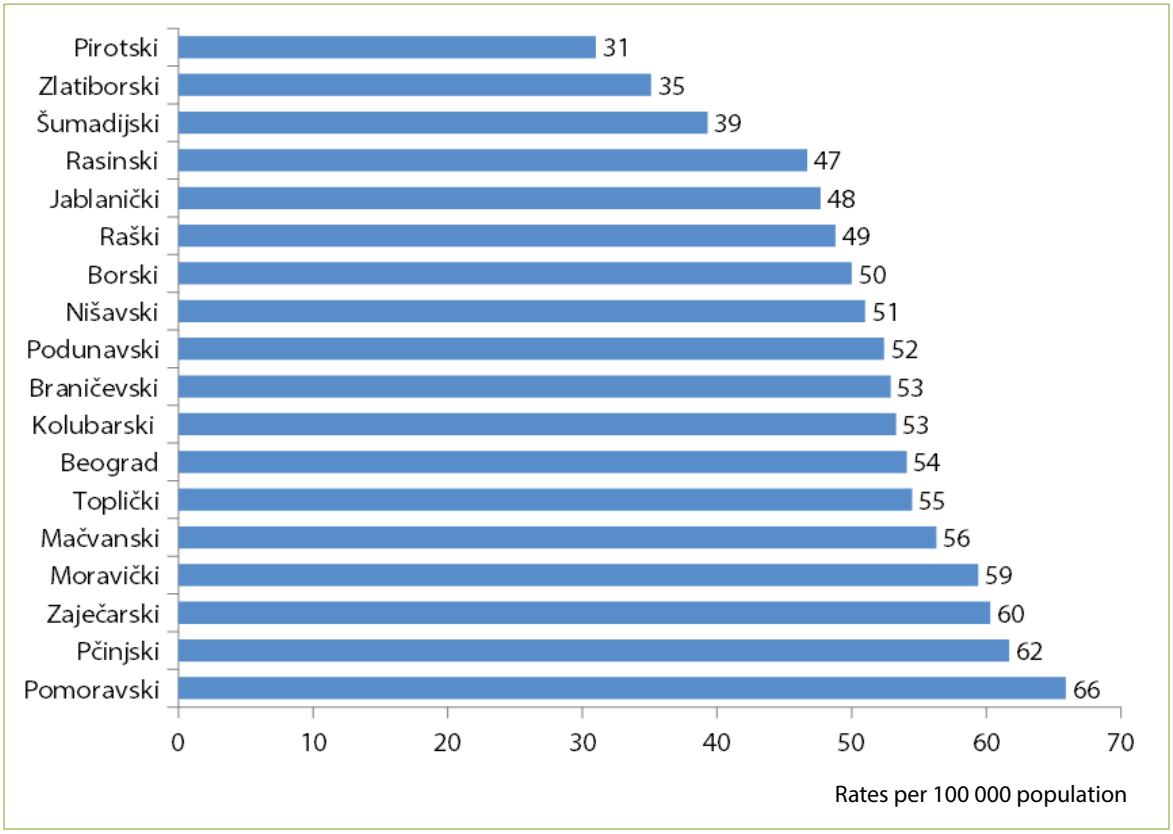
Source: WHO Regional Office for Europe *(5)*.

Fig. 3. Standardized mortality rates from breast cancer, women, selected regions in Serbia, 2013



Source: Institute of Public Health of Serbia "Dr Milan Jovanovic Batut" (IPHS) *(9)*.

Fig. 4. Standardized mortality rates from lung cancer, men, selected regions in Serbia, 2013



Source: IPHS *(9)*.

2. Coverage by NCD interventions and services

According to WHO, up to 80% of heart diseases, strokes and type 2 diabetes as well as over a third of cancers could be prevented by eliminating common risk factors such as tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol *(10)*.

This section explores the coverage by core population interventions related to tobacco, alcohol and nutrition which have been closely linked with improving NCD outcomes. Core services are evidence-based, have a high impact and are cost-effective, affordable and feasible to implement in a variety of health systems. The core services reviewed in the country assessments are closely linked to the Global action plan for the prevention and control of noncommunicable diseases 2013–2020 *(10)* and the Action plan for the prevention and control of noncommunicable diseases in the WHO European Region *(11)*. A standard set of core interventions and services are used for all country assessments (Annex 2). The assessment teams evaluated each service on a three-point scale (limited, moderate and extensive). The criteria for scoring were developed by WHO and can be found in the assessment guide *(3)*.

2.1. Risk factor trends and population interventions

Population-based interventions can make a significant contribution to reducing the burden of NCDs and improving health outcomes. With its long history of a strong public health infrastructure and established framework and expertise, Serbia has the potential to make remarkable progress in scaling up coverage by core population-based interventions for NCD prevention.

Strategies and/or programmes for population interventions, such as those aiming to prevent tobacco smoking and alcohol abuse and to promote healthy nutrition and physical activity, have been drafted but are awaiting further action from the Ministry of Health. They include the strategy for tobacco control and action plan, the programme on prevention of the harmful use of alcohol, the food and nutrition action plan and the childhood obesity programme. A strategy for obesity prevention is currently under development. Coherence needs to be established between these documents and the expired NCD strategy, as well as with the new (still to be endorsed) public health strategy and action plan.

2.1.1. Tobacco

Based on the current levels of adult smoking in Serbia, estimated to be 2.5 million smokers in 2016, premature deaths attributable to smoking are projected to be more than 1.2 million of these current smokers and may increase in the absence of stronger policies *(12)*. With a stronger set of policies consistent with the WHO Framework Convention on Tobacco Control, smoking prevalence in Serbia could be reduced by 29% within five years, by 37% within 15 years and by 44% within 40 years, resulting in almost 535 000 deaths to be averted in the long term *(12)*.

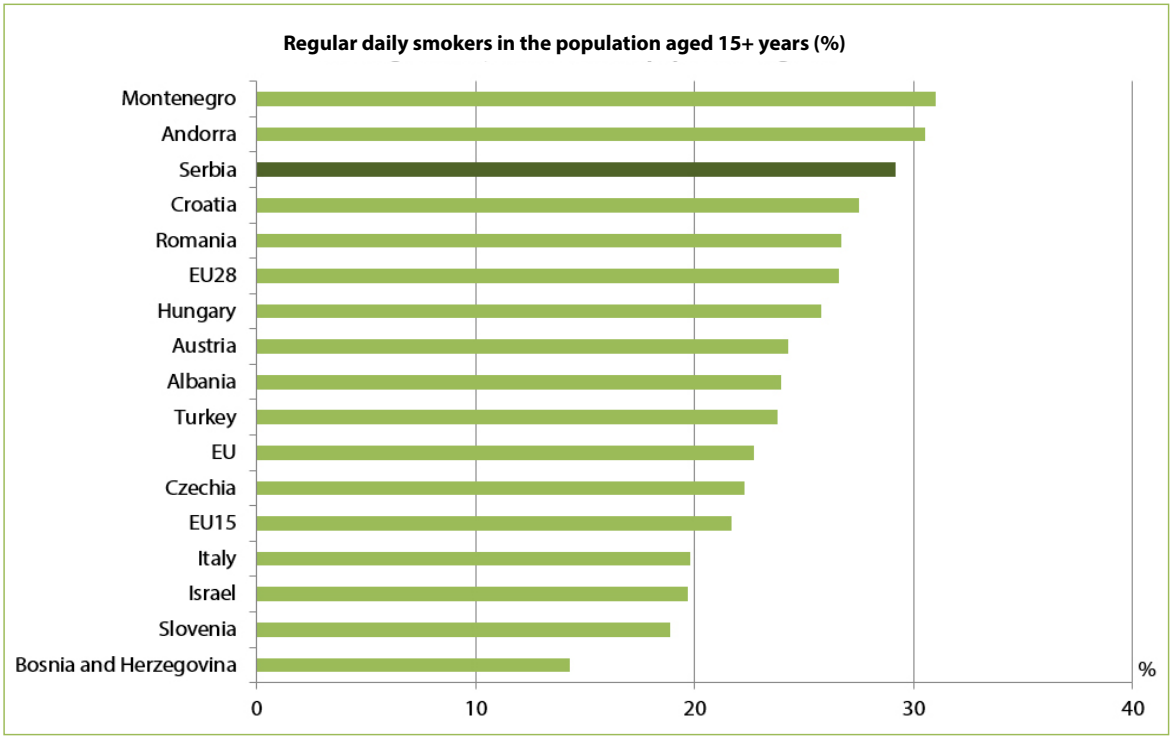
According to WHO's estimates of smoking prevalence, Serbia is the third top country in southern and eastern Europe for the highest prevalence of regular smokers, and the second top country for the highest prevalence of regular smokers in women (Fig. 5).

According to the National Health Survey of 2013 *(13)*, the prevalence of current smoking among adults (daily and occasional) was 34.7%, with 37.9% of males and 31.6% of females smoking. The highest prevalence was observed in the group aged 35–44 years (47%). People living in urban areas were more likely to smoke compared to those living in rural areas (36.4% vs 32.2%) as well as people with the lowest income (38.2%). The majority of smokers were daily smokers. While the

prevalence of daily smoking among men declined from 40.6% to 32.6% between 2000 and 2013, it remained almost unchanged among women (Fig. 6).

The rates of current tobacco smoking are also high among Serbian youth, as shown by the Global Youth Tobacco Survey *(14)*. According to the results of the 2013 Survey, smoking prevalence among young people increased to 13.0% in 2013 after a decrease from 12.8% in 2003 to 9.3% in 2008. Serbian girls were found to be as likely as boys to be current cigarette smokers (13.3% vs. 12.7%) (Fig. 6).

Fig. 5. Prevalence of regular daily smokers in population aged 15 years and older in selected European countries



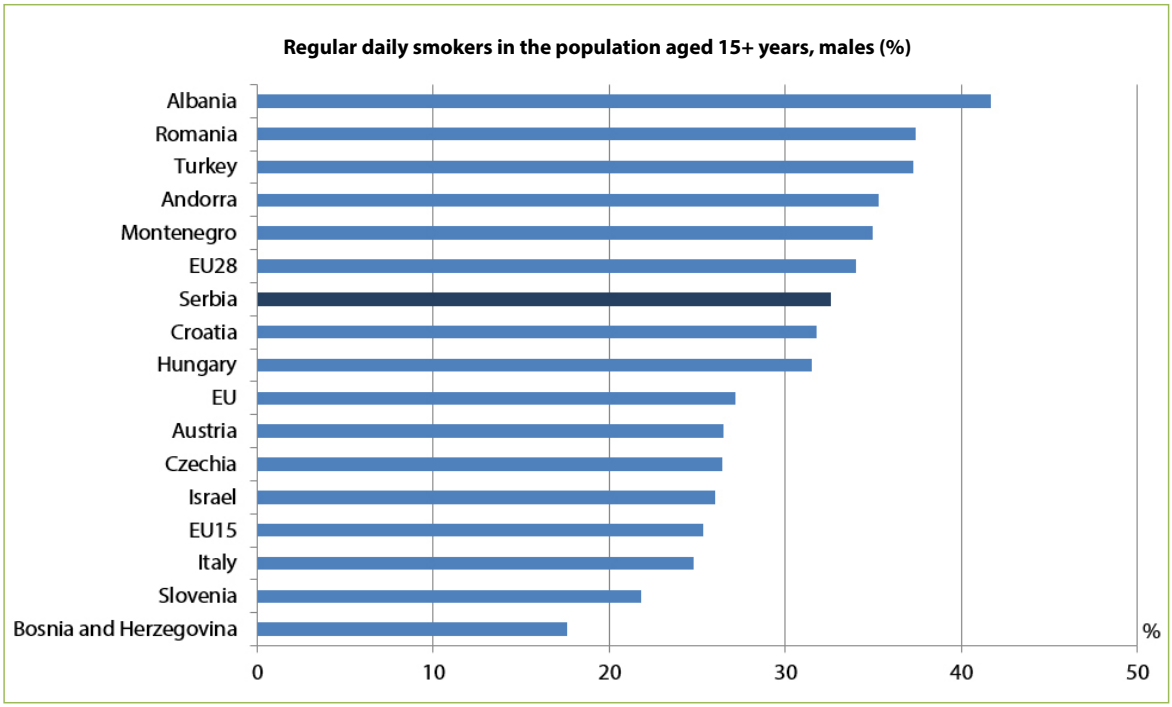
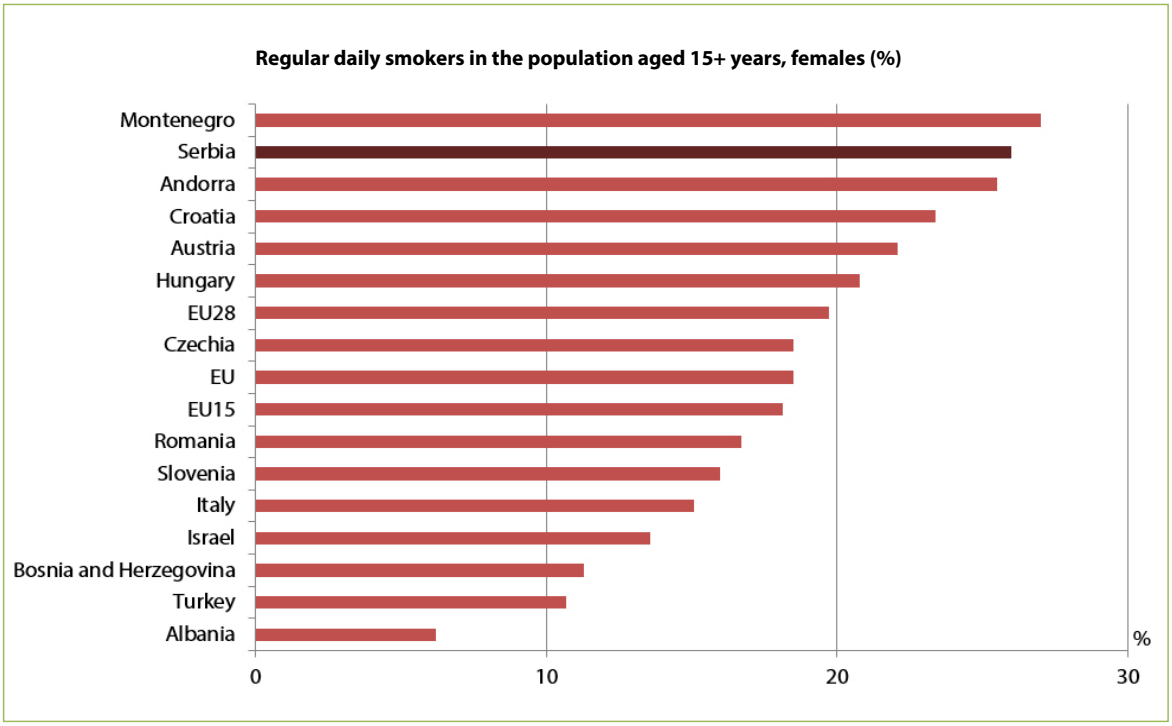


Fig. 5. Continued



EU15 Countries belonging to the EU before 1 May 2004.
EU28 Countries belonging to the EU since May 2004.
Source: WHO Regional Office for Europe *(5)*.

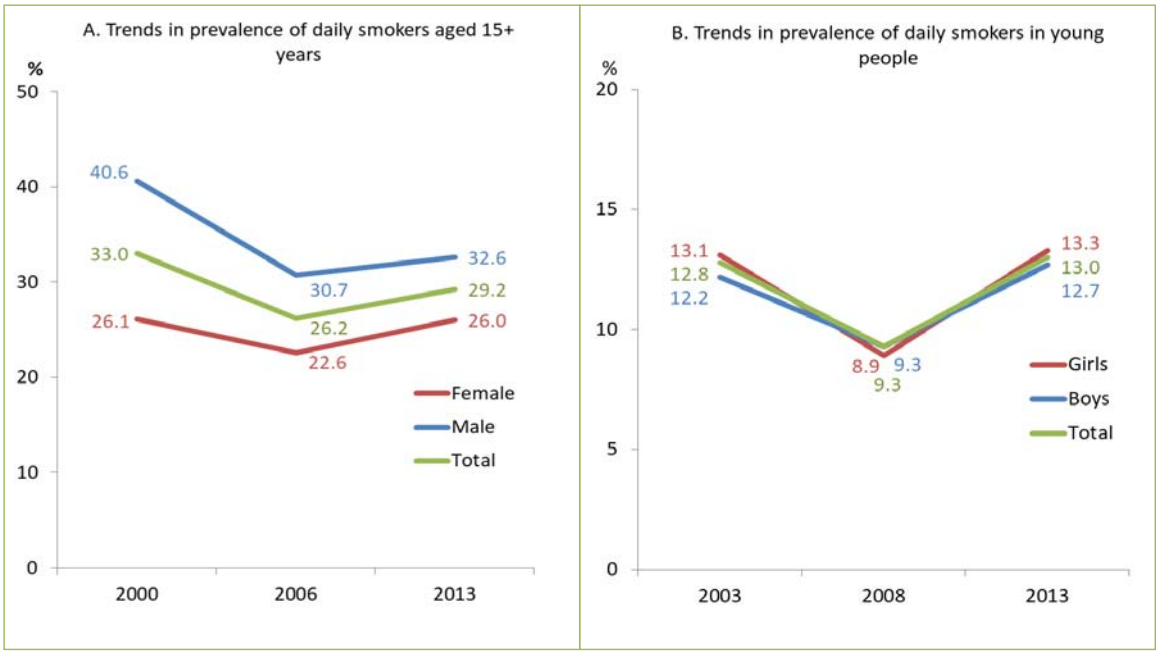
The 2013 National Health and Global Youth Tobacco Surveys revealed a reversing trend in the discernible decrease in tobacco smoking prevalence in Serbia between 2000 and 2006, showing an increase in smoking prevalence from around 2006 to 2013 in both adults and young people (Fig. 6). Although the percentage of adult daily smokers was lower in 2013 compared to 2000, a considerable increase was revealed in comparison with 2006. The change in the number of daily female smokers is particularly significant when compared to 2006 (Fig. 6). This reflects the trends related to the poorer implementation of tobacco control policies in the country.

In Serbia, the WHO Framework Convention on Tobacco Control entered into force on 9 May 2006, and the Strategy of Tobacco Control 2007–2015 and the Action Plan 2007–2011 were approved by the government in 2007. Notwithstanding the existence of these policies, several initiatives and regulations regarding tobacco control have since been stopped. For example, the Council for Tobacco Control of Serbia was established in 2006 but ceased to be active after 2011, and earmarking of revenues from tobacco products was established in 2005 but cancelled in 2012.

Action taken to implement the tobacco control policy is fragmented: four different laws are in place to regulate the sales, consumption, tax, and advertising, promotion and sponsorship of tobacco. The laws, which were drawn up by different ministries, are inadequately implemented and enforced, resulting in a lack of comprehensive coverage by population-based interventions in tobacco control *(12)*.

- The Law on the Protection of Citizens from Exposure to Tobacco Smoke of 2010 *(15)* introduced a total ban on smoking in public enclosed spaces. With the exception of the hospitality sector, however, it is not compliant with the Framework Convention on Tobacco Control, article 8 and its guidelines.
- The Tobacco Law of 2005 (as amended in 2007 and 2013) *(16)*, together with the Law on Consumer Protection of 2014 (as amended in 2016), imposed a ban on sales of tobacco products to minors *(17)*.

Fig. 6. Trends in prevalence of daily smokers in Serbian population (adults and young people), 2000–2013



Source: A – IPHS *(13)*; B – Global Youth Tobacco Survey *(14)*.

- The Excise Tax Law of 2001 (as amended in 2007, 2009, 2013, 2015 and 2017) regulates the taxation of tobacco products *(18)*.
- The Law on Advertising of 2016 *(19)* introduced bans on: (i) direct and indirect advertising of tobacco products on television and radio and in the print and other media (including the internet); (ii) sponsorship by the tobacco industry of media, sports, cultural events, music and housing; (iii) the free distribution of tobacco products; and (iv) the advertising of electronic cigarettes in all places where tobacco advertising is banned.

Smoking cessation services, including brief advice, are not provided routinely in health care facilities. Some government-funded cessation services are available in a limited number of health clinics where smoking-cessation counselling centres have been organized. There is no national quit-line for smoking cessation, and smokers have to cover the full cost of nicotine replacement therapy and bupropion, which are provided over the counter.

Thus population interventions regarding tobacco control are limited due to gaps in the legislation and the inadequate enforcement of and low levels of compliance with the laws. The new strategy for tobacco control 2016–2025 has been drafted and the action plan 2016–2020 has been prepared by the National Committee for Tobacco Control of the Ministry of Health, along with the new public health strategy and action plan for the Republic of Serbia 2017–2025. The targets and indicators in these documents should be aligned with each other and with the European and global action plans for the prevention and control of NCDs *(10,11)* and the European Directive for Tobacco products *(20)*.

Intersectoral action is needed, led by the government: activities need to be coordinated between the tobacco control expert committee and working group, the relevant ministries and the established efficient law enforcement mechanisms so as to improve the implementation of the tobacco control policy. Effective communication policies might increase risk perception and health literacy among the general population and thus contribute to better compliance zith the law and with a socially supportive tobacco-free environment. The current policy needs to be revised in line with the Framework Convention on Tobacco Control and the EU *acquis communautaire*.

Table 1 shows the score-card made in 2016 with respect to population-based antismoking interventions.

Table 1. Score-card for population-based tobacco control interventions, Serbia, 2016

Intervention	Rating	Criteria for rating
Raise tobacco taxes	**Moderate**	In 2014, a pack of the most frequently sold cigarettes cost 170 dinars (US$ 1.95), of which 77.92% was tax (61.25% excise taxes and 16.67% value added tax). Tax on the most frequently sold brand of roll your own was 55.67% (39% excise tax and 16.67% value added tax).
Smoke-free environments	**Limited**	100% smoke-free environments exist in health care, educational and government facilities and public transport, with medium compliance in most of them apart from a 100% ban in the hospitality sector.
Warnings of dangers of tobacco and smoke	**Limited**	Warning labels are mandated to cover 30% of the front and 40% of the back of the packs, text only, no pictorial warnings.
Bans on advertising and sponsorship	**Limited**	Bans exist on several forms of direct advertising, with limited bans (and low compliance) on indirect advertising, promotion and sponsorship.
Quit-lines & nicotine replacement therapy	**Limited**	There are no quit-lines. Some government-funded cessation services are available in a limited number of health clinics, although brief advice is not common in primary care facilities. Nicotine replacement therapy is available at full cost to the smoker.

2.1.2. Alcohol

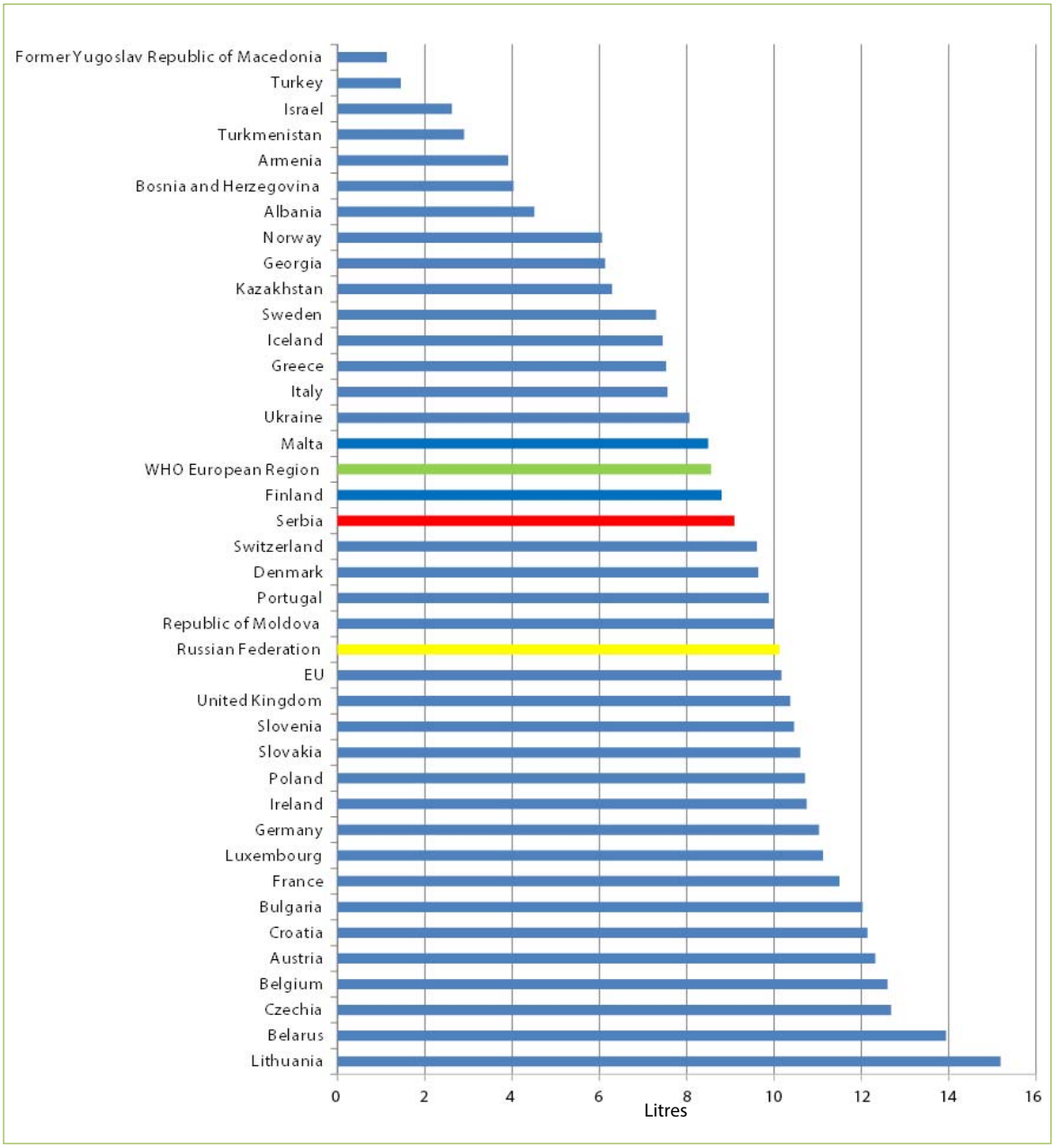
Drinking alcoholic beverages is socially acceptable behaviour in Serbia. The current situation is characterized by a high prevalence of alcohol use, particularly among young people, which (together with other factors) is a consequence of alcohol use being considered part of tradition, customs and culture.

According to the WHO Health for All database *(5)*, alcohol consumption per capita increased from 7.42 L of pure alcohol in 2004 to 9.09 L in 2014, with its highest value of 9.85 L in 2008, putting Serbia in 17th place for per capita alcohol consumption among the countries in the Region (Fig. 7).

Data from the national survey on lifestyles of Serbian citizens in 2014 *(21)* have shown that most alcohol consumption can be attributed to a relatively small population subgroup: around half (50.3%) of the alcohol consumed was drunk by 7.5% of the consumers. The same survey revealed that 13.3% of the adult population (580 000–664 000 people, 22.1% male, 4.6% female) met the criteria for risky drinkers and 6.2% met the criteria for harmful or problematic drinking (257 000–318 000 people). The majority were men and approximately one third were young adults aged 18–34 years *(21)*.

The results of the Serbian National Health Survey in 2013 *(11)* showed that 53.9% of adults aged over 15 years had consumed alcohol in the previous 12 months. Among adolescents aged 15–19 years, 58.9% of boys and 46.0% of girls had consumed alcohol. Daily drinking increased from 3.4% in 2006 to 4.7% in 2013, with significant differences between geographical regions. In 2013, 5.7% of the inhabitants of Vojvodina consumed alcohol on a daily basis, considerably more than in Šumadija and Western Serbia regions, where the lowest prevalence was found (3.6%). A special risk was excessive drinking, defined as drinking more than six alcoholic drinks per occasion, recorded among both the general population and among adolescents. In 2014, 4.3% of the population drank excessively at least once a week (7.8% of men and 1% of women), with the highest prevalence in the group aged 25–34 years (5.4%), while 27% of men, 6% of women and 16% of the adolescent population drank excessively at least once a month *(21)*.

Fig. 7. Per capita alcohol consumption in the WHO European Region (in litres of pure alcohol) among people aged 15+, 2014



Source: WHO Regional Office for Europe *(5)*.

There are several strategic national mandates to tackle the issues of alcohol-related harm:

- the Law on Excise Tax of 2015 introduced a tax paid by litre, differing according to type of alcoholic beverage *(18)*;
- the Law on Road Safety of 2015 introduced a blood alcohol limit of 0.30 mg/ml, with zero tolerance for novice and professional drivers *(22)*;
- the Law on Consumer Protection of 2016 prescribed a ban on selling, serving and giving alcoholic drinks to minors (aged under 18 years) *(17)*;
- the Law on Advertising of 2016 set a threshold of 20% of alcoholic content of the beverage for advertising *(19)*.

A strategic document on the prevention and repression of harmful use of alcohol, with an action plan, is due to be adopted in 2018. This document will include reference to incentives and support for local government units with regard to limiting the availability of alcoholic

beverages. It will also refer to training for staff working in primary health care (PHC) in recognizing persons with problems of excessive alcohol use and in applying short intervention methods.

In summary, despite the existing regulatory framework for the restriction of alcohol consumption, there is no comprehensive single strategic document that focuses on the development and implementation of cost-effective ("best buy") interventions at the population level as recommended by the Global action plan for the prevention and control of noncommunicable diseases 2013–2020 *(10)* and by the European action plan to reduce the harmful use of alcohol 2012–2020 *(23)*. In addition, the weak enforcement of laws that restrict the availability of alcohol (especially for young people), the lack of a ban on advertising of beverages with less than 20% alcohol, and the tolerant attitude of the population towards the use of alcohol impose significant obstacles to reducing alcohol consumption. It is particularly worrying that almost every fifth adolescent aged 15–19 years (17%) engages in excessive drinking at least once a month (22.7% boys and 10.6% girls).

A single strategic document entitled Healthy people, health in all policies: a public health strategy in the Republic of Serbia 2017–2015, is to be developed and approved by 2018, which is a great opportunity to study the existing documents, available capacities and priority strategic directions. The latter could include levying special taxes on alcohol products that are attractive to young people, extending the ban on advertising to include products with an alcohol percentage of less than 20% as per the Law on Advertising under the Ministry of Trade, improving enforcement of the rules regarding the age for buying alcohol and decreasing the blood alcohol level allowed for driving to 0.1 g/L.

Table 2 shows the score-card made in 2016 with respect to population-based interventions to prevent harmful alcohol use.

Table 2. Score-card for population-based interventions to prevent harmful alcohol use, Serbia, 2016

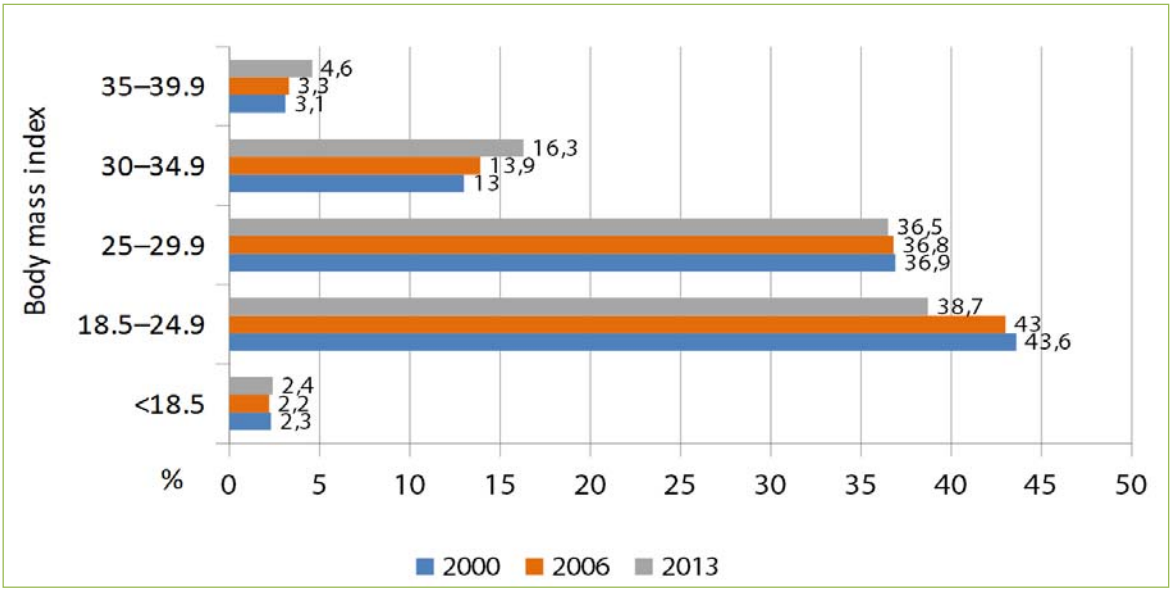
Intervention	Rating	Criteria for rating
Raise taxes on alcohol	**Limited**	Alcohol taxes following the price index exist but there are no special taxes on products attractive to young people.
Restrictions, bans on advertising and promotion	**Moderate**	Regulatory frameworks exist to regulate the content and volume of alcohol marketing, including direct and indirect marketing and sponsorship.
Restrictions on availability of alcohol in retail sector	**Limited**	Regulatory frameworks exist on the serving of alcohol in government and educational institutions, including a ban on beverages with more than 20% alcohol.
Regulation and enforcement of the minimum purchase age	**Limited**	The minimum age for purchase of all alcohol products is 18 years. There are penalties for violations of the law but enforcement is weak.
Allowed blood alcohol level for driving	**Moderate**	The blood alcohol content for novice and professional drivers is a maximum 0.3 g/L and zero, respectively.

2.1.3. Nutrition and physical activity

Comprehensive plans have been outlined to improve the population profile for nutrition and physical activity in draft documents on nutrition and the prevention of childhood obesity. However, these await adoption by the Ministry of Health, and implementation of population-based approaches has been limited.

Data from the National Health Survey 2013 showed that 35.1% of the adult population (aged ≥20 years) were overweight (body mass index 25.0–29.9 kg/m^2) and 21.2% obese (body mass index ≥ 30 kg/m^2) *(13)*. During the last 15 years, data have shown increasing body mass index values and an increase in overweight and obesity prevalence in both adults and children (Fig. 8).

Fig. 8. Nutritional status of adults aged 20+ years, according to body mass index



Source: IPHS *(13).*

Obesity predisposes individuals to a series of risk factors for NCDs and is often associated with conditions such as dyslipidemia, arterial hypertension, insulin resistance and diabetes, contributing to the occurrence of cardio- and cerebrovascular events (which constitute the highest burden of disease in Serbia) and multimorbidity.

More than half the population (56.3%) is overweight or obese, with the percentage of obesity increasing significantly from 17.3% to 21.2% between 2006 and 2013. The National Health Surveys also revealed an increase in overweight children from 2.6% in 2006 to 4.9% in 2013. Significantly larger percentages of moderately obese (13.2%) and obese children (7.5%) were observed among children aged 11–14 years. Underweight was found in 8.6% and moderately underweight in 15.7% of children aged 7–10 years *(13)*.

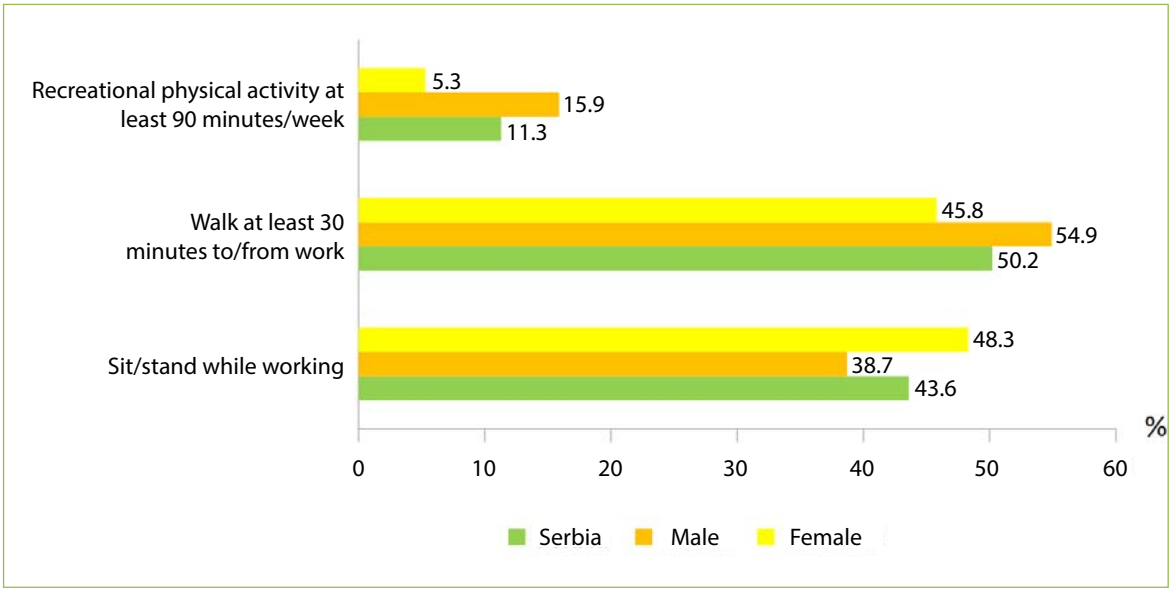
Only around half of adults and children consume fresh fruit or vegetables daily *(13)*. There are no national school fruit schemes or subsidies to make fruit and vegetables more affordable.

Some sociodemographic differences have been observed: 58.7% of children from Šumadija and Western Serbia regions consumed fruit daily, while the lowest percentage of children eating fruit was found in Vojvodina (48.4%) *(13)*.

Together with an unhealthy diet, physical inactivity (a sedentary lifestyle) is recognized as an underlying cause for the increase in body weight. Physical activity has known health benefits which include a reduced risk of cardiovascular disease, hypertension, diabetes and certain forms of cancer *(24)*. According to data on physical activity in 2013 *(13)*, 43.6% of adults had sedentary jobs and only every second adult walked at least 30 minutes to/from work, while only 11% of adults engaged in recreational physical activity at least three times per week (Fig. 9). The National Programme on Prevention and Treatment of Cardiovascular Diseases includes a section (3.1.8) which explains the effects of increased physical activity on the rate of cardiovascular diseases.

According to the data from household budget surveys, daily average salt consumption per person is high, although it has been falling over the past 15 years *(25)*. The amount of salt consumed, expressed as daily average consumption per household member in grams, was highest in 2003 (14.3 g) and lowest in 2015 (8.8 g). Data on the population-level intake of salt are lacking and no specific strategy exists for product reformulation (although this has been mentioned in the draft nutrition action plan and child obesity plan).

Fig. 9. Physical activity at work, commuting and leisure time in adults, by gender, Serbia, 2013



Source: IPHS *(13)*.

The former regulation on food labelling has been upgraded through new by-laws on the labelling and advertising of food enacted in 2013 and 2017. The 2017 by-law supersedes that of 2013 and will be applicable from 15 June 2018. Although both by-laws refer to all packaged and unpackaged food, set a reference salt intake for adults of six grams a day and require mandatory nutritional declaration and salt content labelling, the 2017 by-law is broader in scope than the 2013 by-law. There are also differences in nutritional declaration requirements between the two by-laws. The 2013 by-law mandates the labelling of sodium content, expressed in grams per 100 g or 100 ml of the contents of the package, whereas the 2017 by-law requires the salt content to be labelled in grams.

There are no limits on the content of trans fats in foods and the population-level intake is not surveyed. Although Serbia joined the European Network on Reducing Marketing Pressure on Children in 2008, there has been no action to reduce the marketing of foods that are high in fat, sugar and salt *(26)*.

Physical activity levels have been found to be low, with recent estimates showing that 54.9% of men and 45.8% of women report walking at least 30 minutes a day. Physical activity levels are slightly better among children, with 86.7% of boys and 77.8% of girls reporting that they participated in physical activity at least once a week in their free time (13). Action has been taken to promote physical activity, with mandatory physical education in schools, the inclusion of physical activity in general teacher training and a national sport for all campaign *(27)*. Nutrition education is not mandatory in schools, nor have schools adopted the health promoting schools framework. However, the institutes of public health, the Ministry of Health, nongovernmental organizations and academic institutions have all implemented interventions to promote nutrition and physical activity through education campaigns *(27,28)*, and primary care facilities offer health promotion services such as counselling.

It is important to adopt a comprehensive, integrated set of intersectoral activities to improve nutrition through the life-course. Many of these activities have been outlined in the draft nutrition action plan and national child obesity strategy, which are awaiting further action from the Ministry of Health. Stakeholders have also emphasized the need to prioritize physical activity in primary care. Government leadership is needed to foster comprehensive and intersectoral strategies, as recommended in the European Food and Nutrition Action Plan 2015–2020 *(29)*

and the Nutrition-Friendly Schools Initiative *(30)*. Targeted subsidies or the provision of fruit and vegetables in schools have been suggested as potentially promising options to improve the population's diet, as well as the provision of nutritious school meals *(29)*. Implementation of the latter would require substantial changes in the school environment, as school meals are currently only provided for primary classes one and two and are usually delivered by external caterers. A good start in this regard is the working group established between the Ministry of Health and the Ministry of Education to improve the nutritional standards in schools, including targeted interventions.

Table 3 shows the score-card made in 2016 for population-based interventions to improve diet and physical activity.

Table 3. Score-card for population-based interventions to improve diet and physical activity, 2016

Intervention	Rating	Criteria for rating
Reduce salt intake and salt content in foods	**Limited**	No data or evidence available on salt intake.
Virtually eliminate trans fatty acids from the diet	**Limited**	No data or evidence that trans fats have been significantly reduced in the diet.
Reduce free sugar intake	**Limited**	The aim to reduce the intake of free sugars is mentioned in the policy documents but no action has been taken.
Increase intake of fruit and vegetables	**Limited**	The aim to increase the intake of fruit and vegetables is mentioned but no monitoring data have been collected to support it.
Reduce marketing pressure for food and non-alcoholic beverages to children	**Limited**	Marketing of foods and beverages to children is noted as a problem but has not been translated into specific action in government-led initiatives.
Promote awareness about diet and physical activity	**Moderate**	A workforce is being developed for nutrition and physical activity. Nutrition and physical activity are starting to be considered as priority elements in primary care.

2.2 Individual services

This section assesses individual services for delivering core NCD interventions and for achieving the relevant global NCD targets, in particular that at least 50% of eligible people receive therapy and counselling (including glycaemia control) to prevent heart attacks and strokes and that a 25% relative reduction in prevalence of raised blood pressure is achieved or the prevalence of raised blood pressure is contained. These aims would be supported by action to achieve an additional global target, such as 80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major NCDs in both public and private facilities. The core interventions are selected from the list of very or moderately cost-effective interventions identified by WHO in the global NCD action plan *(10)* and updated at the Seventieth World Health Assembly in May 2017 *(31)*.

The services include early detection, proactive disease management and secondary prevention for CVD, diabetes and selected interventions for cancer. For most of these services to be delivered effectively, PHC should be people-centred with well-organized links to population outreach activities in acute and chronic care settings.

2.2.1. Cardiovascular disease

The team's assessment of the implementation of individual-level interventions is shown in Table 4.

Table 4. Summary assessment of individual-level interventions: CVD

Intervention	Rating	Criteria for rating
Risk stratification in primary care	**Moderate**	CVD risk is part of the health check (at ages over 35/45 years), based on the European Society of Cardiology Systematic COronary Risk Evaluation (SCORE) chart. It should be documented in health records but this is not happening systematically and it is not easy to extract high-risk scores or individual risk factors for PHC population risk stratification and oversight of control.
Effective detection and management of hypertension	**Moderate**	There is no information on the proportion of hypertensives or diabetics detected in PHC. Branded drugs are prescribed and reimbursed but there is no assessment of patient adherence.
Effective primary prevention in high-risk groups	**Moderate**	Prescribers are aware of indications for primary prevention but there is no oversight of the target population or their risk factor control. Acetylsalicylic acid is prescribed when needed.
Effective secondary prevention after acute myocardial infarction (AMI)	**Extensive**	It appears that >75% of patients after AMI receive key medication. Drugs are available free.
Rapid response and secondary care after AMI and stroke	**Moderate**	More than 50% of patients with AMI apparently receive diagnosis and care (percutaneous coronary intervention) within six hours of the first symptoms. Stroke patients receive diagnosis and care but the national network is less developed and has fewer treatment options compared with acute coronary syndrome (ACS).

Risk stratification in primary care

Under the contract with the Republican Health Insurance Fund (RHIF), the PHC system is requested to implement population-based screening and early detection of cardiovascular risks for adults (males aged 35–69 years, females aged 45–69 years). The national guidelines recommend use of the SCORE risk prediction charts of the European Society of Cardiology, either on paper or in the information technology system as pdf documents. Nevertheless, the doctors interviewed were not able to demonstrate quick access to the SCORE test in the software with patient records or to provide evidence that cardiovascular risk is recorded and that they have summarized data on how their population is stratified for NCD risk.

As part of the accreditation of health care institutions, indicators for PHC centres include the number of preventive visits out of all visits to the doctor and the percentage of registered patients whose blood pressure, body mass index and smoking status have been checked and recorded and who have received health counselling at least once a year. According to the plan of services published by the RHIF for 2015, annual coverage of adults by preventive services is planned for 20% or more *(32)*. Data from 2015 on PHC performance indicate that 37% of adults received preventive check-ups that included measurements of their blood pressure and weight and assessment of their smoking status as well as counselling on a healthy lifestyle *(33)*. Statistics from one of the PHC centres visited (Valjevo), however, indicated that only a very small proportion of the population had been screened. Figures for the proportion of patients with one or more main CVD risk factors or a 10-year CVD risk of ≥ 30% are not available (see Challenge 5 below).

The implementation of cardiovascular risk stratification in Serbia and other countries is monitored by WHO through the WHO Country Capacity Survey. In the 2017 report *(34)*, Serbia scored fully achieved for the global target for drug therapy/counselling for high-risk persons being implemented in over 50% of PHC facilities.

Effective detection and management of hypertension

WHO estimates that 33.8% of males and 25.2% of females aged over 18 years (age-standardized rate) have raised blood pressure (systolic blood pressure ≥ 140 or diastolic blood pressure ≥ 90) *(7)*. Data from the RHIF for 2015 give the number of registered adult patients with arterial hypertension (International Classification of Diseases, 10th Revision (ICD-10) code I10–I15) as 1 477 000, that is, 28.6% of the adult population registered with a chosen doctor.[1,2] This is a relatively high detection rate compared with other countries.

Each PHC centre keeps registers (mainly on paper) of the absolute numbers of people diagnosed with diabetes or hypertension and complications. There is a performance management indicator for blood pressure control. As part of the accreditation of health care institutions, indicators for PHC centres include the percentage of patients with arterial hypertension with a last registered blood pressure lower than 140/90 mm Hg. Data from 2015 on the performance of PHC centres indicate that 53% of adult patients with diagnosed arterial hypertension had a blood pressure below 140/95 at the most recent measurement.

Effective primary prevention in high-risk groups

Primary care teams (nurses and doctors) are aware of indications for primary prevention as these are part of the national guidelines. High-risk patients are not systematically identified and targeted through patient registers, however, nor is the extent of coverage of very high-risk patients with primary prophylaxis or appropriate drugs known. It is possible to prescribe multidrug regimens with anti-hypertensive drugs, statins and acetylsalicylic acid; the last-named is prescribed when needed in accordance with the guidelines. It is not possible to calculate the target population or risk factor control for them. The proportion of the general population attending PHC centres varies according to factors including characteristics of the population, limitations to access and the existence of private health facilities. No instruments are being implemented to assess patient adherence.

Effective secondary prevention after AMI or stroke

There is a national network for acute coronary syndrome care patients enrolled in an international quality assurance programme (see Challenge 7). It appeared that more than 75% of patients were receiving key medication after AMI. The proportion of patients with ACS receiving acetylsalicylic acid, beta blockers and statins in coronary care units (CCU) was recorded as 94.8%, 73.6% and 89.6%, respectively, in 2011 (latest available data) *(35)*.

Serbia participated in the EUROASPIRE IV study of 78 centres in 24 countries in Europe in 2013 which found that a large majority of coronary patients do not achieve the guideline standards for secondary prevention and that risk factor control is inadequate despite the high reported use of medications *(36)* (separate data for Serbia not available).

Rapid response and secondary care after AMI and stroke

The organization of services for ACS and stroke is described in more detail under Challenge 7 below. In the WHO Country Capacity Survey, Serbia recorded that coronary bypass, stenting, thrombolytic therapy and acute care and rehabilitation for stroke were generally available, reaching 50% or more of patients in need.

[1] A core element of the primary care reform was the introduction of the chosen doctor scheme, which requires people to register with a primary care physician of their choice. This can either be a general practitioner or occupational medicine doctor for adults, a gynaecologist for women, a paediatrician for children or a dentist. Members of the population choose which doctor they would like to register with for basic medical care, hence the term "chosen".

[2] The IPHS yearbook 2015 *(8)* gives an estimated population of 7 095 383 for 2015, of whom 6 073 375 were aged 15 years and above. Data provided on performance indicators for 2015 showed 5 161 749 adult patients registered with a chosen doctor.

In Belgrade, if a patient calls the emergency telephone number and is suspected of having a myocardial infarction, the emergency medical system activates the catheterization laboratory on call. Although the team did not have access to data for verification, it appears that the tertiary centre, which is one of the largest in Europe, admits around 3000 patients per year, with around 1200 ST-segment elevation myocardial infarction patients per year receiving percutaneous coronary intervention. Serbia has been participating in the Stent for Life scheme initiated by the European Society for Cardiology since 2009. Although the figures were not available, the team understood that the time to treatment has been decreasing: more than 50% of those with AMI apparently receive diagnosis and high-quality care (percutaneous coronary intervention) within six hours of the first symptoms. In Belgrade, there is virtually no thrombolysis because if patients are seen within two hours of symptom onset, a percutaneous coronary intervention is done. The tertiary cardiology centre claims to be one of the best in Europe for interventional cardiology (data not seen). They apparently achieve less than 5% hospital mortality for patients with acute hospital mortality and total mortality within one year is 9–11%. Benchmarking is performed within regional, national and international references but the national ACS registry data are apparently incomplete, with not all centres participating fully or on time.

It is difficult to assess the situation across the country but it seems to be variable. Data from the Serbian ACS Registry *(35,37)* showed that the median delay for ACS patients before admission was 180 minutes for all CCU in both 2007 and 2011; this ranged between 30 (Smederevo) and 500 (Prokuplje) minutes in 2007. In 2011, 68% of ACS patients arrived within six hours, according to the ACS register *(35)*.

In 2011, 46% of patients reached the CCU via ambulance, the median length of stay was 12 days and 9% of ACS patients treated in a CCU had a fatal outcome *(35)*. According to a 2015 report, 8% of patients treated at the CCU of the general hospital in Serbia died and the average length of stay was 6.6 days *(33)*. The most recent data analysed by the ACS Registry for each CCU showed that the units that see fewer patients have the highest mortality rates.

Access to stroke care varies across the country, with advanced care available in the stroke centre in Belgrade but more basic support at regional hospitals. Not all treatment options are possible throughout the country. Rehabilitation is part of the process of care in dedicated facilities. In the Saint Sava Hospital in Belgrade, all stroke patients can access computed tomography scan and magnetic resonance imaging, and angiography is available 24/7. Door-to-needle time is about 45 minutes but less than 25% of patients are within the therapeutic window (for thrombolysis) from onset of first symptoms.

2.2.2. Diabetes

There is a national programme for diabetes and national guidelines were approved in 2002 and 2012. A new diabetes plan was to be adopted in 2017 (with a timespan of five years) and guidelines will be updated in 2018.

The team's assessment of the implementation of individual-level interventions for diabetes is summarized in Table 5.

Effective detection and general follow-up

Under the Law on Health Care of 2005, chosen doctors became the main health care providers in PHC centres, and preventive centres have been introduced to promote preventive activities at PHC level. These elected physicians thus became responsible for managing diabetes in adults. The pre-existing network of diabetes primary care units responsible for following up people with diabetes was closed. There are very good examples of clinical governance and leadership by specialists in the care of diabetic patients, which have resulted in better management of care for these patients at PHC level and optimized clinical pathways.

Table 5. Summary of assessment of individual-level interventions: diabetes

Intervention	Rating	Criteria for rating
Effective detection and general follow-up	**Moderate**	Screening programmes are in place: (i) Finnish Diabetes Risk Score (FINDRISC) tool (target population >45 years, once in three years) with lifestyle intervention in high-risk individuals; and (ii) regular health check-ups (every two years for general population >35 years). No robust data are available on coverage with either programme. Registries may exist in PHC centres.
Patient education on nutrition, physical activity and glucose management	**Moderate**	Approximately 70% are thought to make two to three visits a year. People with diabetes receive general counselling on food and physical activity but not structured/individualized advice. At least 50% are thought to have at least one glycated haemoglobin test a year.
Hypertension management	**Limited**	No data are available on blood pressure control. Angiotensin-converting-enzyme inhibitors (ACEi) are the first-line treatment (no data are available on adherence).
Preventing complications	**Moderate**	No data are available on coverage of screening for complications. It is thought to be 15–20%. Around 70% will have ophthalmology appointments per year. Around 50% will have their feet examined. Few are tested for albuminuria.

Patients can be screened for the presence of diabetes mellitus in two ways: as part of a compulsory heath check-up at PHC units (funded within the national health insurance system) which includes blood pressure and anthropometric measurements and laboratory evaluation of glucose and lipids; or by using an adapted FINDRISC questionnaire (still performed on a voluntary basis) in order to identify people at high risk of developing diabetes. For the latter, following the contract with RHIF, PHC centres have to provide screening for diabetes for all individuals aged over 45 years, with coverage not less than that in the previous year, up to 20% of the targeted population group *(38)*. The national programme consists of a stepwise screening procedure for detecting undiagnosed type 2 diabetes mellitus patients and preventive intervention in high-risk individuals. There is an initial risk assessment using the FINDRISC (Serbian version). This screening tool is systematically applied in individuals aged 45 years and above once every three years, and in individuals aged under 45 years who exhibit one or more risk factors such as obesity, a first-degree relative with diabetes mellitus or gestational diabetes mellitus. Lifestyle advice is offered to all screened individuals who score under 15. Those scoring 15 points or more are considered to be at high risk for diabetes; they are offered an oral glucose tolerance test in order to detect previously undiagnosed diabetes. According to the results of this test, they are classified as normoglycaemic, impaired fasting glucose, impaired glucose tolerance or diabetic. Newly diagnosed diabetic patients are included in a regular system of diabetes care, while all the others who do not have diabetes receive a formal lifestyle intervention. This preventive intervention is applied by using an intensive behaviour approach towards diet and physical activity. It is implemented at individual and group level, with regular check-ups and evaluation of risk factors for both type 2 diabetes mellitus and CVD *(39,40)*.

Screening and lifestyle interventions can be performed by nurses according to the identified pathways. There is no specific training on risk assessment at pre- or postgraduate level but it can be part of the existing general diabetes courses at postgraduate level. Robust data on the coverage of either programme are limited. WHO estimates *(6)* that the prevalence of raised fasting blood glucose (≥7.0 mmol/L or on medication) is 8.6% for both sexes (8.7% men and 8.5% women, with no significant difference between the sexes). Data from the RHIF for 2015 record the number of registered adult patients with diabetes mellitus as 419 000 (that is, 8.1% of the adult population registered with a chosen doctor).

In considering the follow-up of people with diabetes, there are some difficulties in measuring compliance with existing guidelines. People with diabetes are registered at PHC level according to the ICD (see Challenge 13 regarding the national diabetic register). At PHC level, it is possible

to prescribe oral drugs for diabetes, statins, ACEi and other anti-hypertensive medications. Insulin can be recommended at PHC level but it has to be confirmed by the endocrinologist at secondary or tertiary health care level. The chosen doctor writes all the prescriptions. Laboratory tests are performed at PHC level with the exception of for albuminuria. There are local/regional differences in access to laboratory examinations or hospital consultations.

Patient education on nutrition, physical activity and glucose management

Approximately 70% of people diagnosed with diabetes are thought to make two to three visits a year to the PHC centre. People with diabetes receive general counselling on food and physical activity but not structured/individualized advice. Almost half of patients with diabetes are thought to have at least one glycosylated haemoglobin test per year: data from 2015 on PHC performance indicate that 42.3% of patients with diabetes mellitus (ICD-10 E10–E14) were measured at least once a year.

The reinstatement of diabetes primary care units at PHC centres (pilot phase) is part of an effort to improve this situation. Over the past two years, diabetes primary care units have been re-established at 40 PHC centres, staffed by a team of doctors and nurses. The role of these consultation centres is twofold: (i) to provide support for the chosen doctors in diabetes management and prevention of diabetes and its complications; and (ii) to provide continuous medical education for chosen health care workers and health promotion and education for patients. The high-risk population is guaranteed seven group sessions, with individual and group sessions on nutrition for people with diabetes and individual education on insulin. Medical prescriptions have to be filled out by the chosen doctor.

PHC centres are also responsible for home care with mobile teams consisting of doctors and nurses dedicated to vulnerable groups (pregnant women, new mothers, infants, children, elderly people) and specific conditions (diabetes, malignant diseases, neonatal health and infectious diseases). These units are also responsible for primary prevention. They have a limited geographical and time range.

Management of hypertension in diabetes patients

Blood pressure is routinely measured and recorded in paper medical files, but data are not systematically collected data on the control of blood pressure. According to the existing guidelines, ACEi are the first-line treatment for this population.

Prevention of complications

There are no systematically collected data on coverage of screening for diabetic complications. Chosen physicians refer people with diabetes to hospital consultations for screening for complications, but there are asymmetries in access to different hospital specialists for screening and treatment of diabetes complications. The 2015 data available for patients with diabetes who visited PHC centres showed that 36.5% were referred for eye examination and 42.3% had a glycosylated haemoglobin test done. The team was told that around 50% of people with diabetes have their feet examined but saw no verifying data. There is no screening programme for diabetic retinopathy. There are general restrictions in testing for albuminuria. Renal function is assessed through estimation of glomerular filtration rate.

As part of the accreditation of health care institutions, indicators for PHC centres included the percentage of patients with diabetes who had had their eyes (fundus) checked at least once a year. Performance data for this indicator indicate significant regional variations *(33)*.

2.2.3. Cancer prevention and screening

Cancer prevention and screening were assessed as part of a more detailed imPACT mission report.[3]

Table 6. Summary of assessment of individual-level interventions: cancer

Intervention	Rating	Criteria for rating
Hepatitis B immunization for prevention of liver cancer	**Extensive**	All newborns are immunized (>95% coverage), as are groups at risk.
Human papilloma virus vaccination	**Limited**	A pilot project has been carried out and a new immunization programme for boys and girls was to be approved by the end of 2017. Vaccine will be offered free.
Screening of cervical cancer and treatment of precancerous lesions	**Moderate**	Check-ups (without quality control) are carried out in parallel with population-based screening (introduced recently). There are gaps in monitoring and evaluation and coordination for follow-up of positive cases. Treatment is provided free.
Early case-finding for breast cancer and prompt treatment	**Moderate**	There is room for improvement with early diagnosis (awareness, system responsiveness). Screening: there are gaps in monitoring and evaluation and coordination for follow-up of positive cases. Treatment is provided free.
Population-based colorectal screening at age >50 years linked with prompt treatment	**Moderate**	The health system is not well enough prepared for introduction of colorectal screening in all regions and needs to develop human resources and equipment for colonoscopy. There are gaps in monitoring and evaluation and coordination for follow-up of positive cases. Treatment is provided free.

Hepatitis B immunization for prevention of liver cancer

Hepatitis B vaccine is included as part of the national immunization programme for newborns. It is also offered to professional groups at risk. Coverage in newborns is more than 95%.

Human papilloma virus vaccination

A new free human papilloma virus vaccination immunization programme for boys and girls aged 12–15 years was approved as from December 2017. Introduction of the vaccine was piloted in four regions of the country in 2016 and reached 20% coverage.

Cancer screening

Population-based organized screening programmes for breast, cervical and colorectal cancers were started in 2013 and are being introduced incrementally. Plans for development are evidence-based although there is room to improve coordination among providers at each stage of the screening process. Indicators are collected but monitoring and evaluation is not well developed. National coverage figures on the website of the IPHS indicate national coverage of 56% for cervical cancer, 42% for breast cancer and 18% for colorectal cancer in 2016. Follow-up of screen-positive individuals reveals some gaps in all screening programmes (colorectal, breast, cervix) which could be fixed rapidly.[3]

Screening for cervical cancer and treatment of precancerous lesions

Either organized or opportunistic cervical screening with the PAP test is taking place in all regions of the country, and tests and frequency apparently accord with international

[3] Camacho R, Corbex M. Cancer control in Serbia. ImPACT mission follow-up. Report and recommendations (unpublished document, 2017).

recommendations. Women are invited through their chosen gynaecologist or gynaecology nurses. The age range for the eligible population is 25–64 years *(41)*. Gynaecologists take, stain and read the PAP smears themselves. Follow-up of screen-positive women lacked coordination.

There is also a parallel system of annual check-ups. This older policy includes several tests: gynaecological examination, examination with speculum, PAP test and routine colposcopy. Requirements differ according to the screening route. In the case of organized screening programmes, 75% of women from the targeted age group must be screened. Otherwise coverage must be not less than that achieved in the previous year, with gynaecological check-ups planned for 20% of the women who had not been screened before *(38)*. For cervical cancer screening the target is 25%, and for breast cancer screening it is 30%.

Early case-finding for breast cancer and prompt treatment

Information on extension of the disease shows that a relatively large proportion of cancers amenable to early detection are diagnosed early. There is, however, no early diagnosis programme for cancer, neither are there strong educational programmes for professionals and population about the early signs and symptoms of cancer.

Organized mammography screening targets women aged 50–69 years every two years. Women are invited by the gynaecology team (usually nurses). The screening test is two-view mammography. There are many mammography machines operating in the country for breast cancer screening but the number of mammographies per machine seems low.

Population-based colorectal screening at age >50 years linked with prompt treatment

Colorectal screening uses the immunochemical faecal occult blood test as the screening test and targets men and women aged 50–74 years (42). Invitations are issued by the GP by telephone (up to three attempts) followed by a reminder letter. As part of the accreditation of health care institutions, indicators for PHC centres included the percentage of registered patients who received at least one occult blood test a year.

Different requirements are made of PHC centres for screening for colorectal cancer depending on whether they are included in the national programme for organized screening which was introduced in 2013. Only 32 PHC centres are part of the organized screening programme. If a PHC centre is not part of the organized screening programme for colorectal cancer, screening for both sexes in the population group aged 50–74 years must be performed each year for up to 20% of people who were not included in the previous year, with coverage not less than that in the previous year. If the PHC centre is part of the organized screening programme, screening is performed by preventive departments (not by chosen GPs) and covers at least 75% of the target population.

Those with positive screening results are referred to the clinical centre for colonoscopy. National figures indicate that coverage of the target population by screening test reached 18% in 2016. Implementation of colorectal screening is challenging for many regions of the country. The capacity of the health care system to cope with the number of colonoscopies generated is limited and there may be competition between screen-positive patients and symptomatic patients for access to the procedure, with an inevitable impact on the speed of getting into treatment.

3. Health system challenges and opportunities to scale up core interventions and services

This section reviews features of the health system that influence core population interventions to address NCDs. Table 7 gives a summary of the common features. Fifteen of these key challenges are addressed in this report.

Table 7. Common challenges and opportunities for health systems to control NCDs

Political commitment to NCDs	Explicit priority-setting approaches	Interagency cooperation	Population empowerment
Effective model of service delivery	Coordination among providers	Regionalization	Incentive systems
Integration of evidence into practice	Distribution and mix of human resources	Access to quality medicines	Effective management
Adequate information solutions	Managing change	Ensuring access and financial protection	

Source: WHO Regional Office for Europe *(3)*.

Challenge 1. Ensuring political commitment to NCDs

Overall, the country is politically committed to the prevention and control of NCDs and a strategy for this purpose was developed (although it expired in 2015). Many actors are highly motivated, supported by a network of institutes of public health and cooperation with international partners.

The IPHS develops public health guidance, participates in drafting strategies, programmes and legislation and coordinates public health activities that are implemented through a network of 24 institutes of public health. It is responsible for monitoring and surveillance, the development of methodologies and the preparation of reports. It is financed by various sources, including the Ministry of Health, the RHIF and through the provision of services to third parties.

In the Ministry of Health, NCDs are the responsibility of the Sector for Public Health and Programmed Health Care, which has good cooperation with the IPHS and the School of Public Health. In recent years, however, the staffing of this Sector has been reduced from four medical doctors and one lawyer to only three medical doctors, resulting in weaker planning of policies.

NCDs are acknowledged as a major threat to the socioeconomic wellbeing of the population in the 2016 Law on Public Health *(43)*. This law links premature death from or living long-term with

an NCD or related disability to socioeconomic consequences, and stresses that this constitutes a double burden to sustainable social and economic development. Reduced income and early retirement caused by NCDs can lead individuals and households into poverty. At the level of society, pressures arise from increased demands for social care and welfare support, in addition to surging health care costs and the negative impact of absenteeism from school or work on productivity and employee turnover.

Serbia is working on reforms for accession to the EU and the implementation of the Sustainable Development Goals. The Ministry of Health and the Ministry of Work, Employment, Veteran and Social Policy are collaborating on a programme to promote equal access to health services, which especially aims to improve the health status of the Roma, a vulnerable group. Although the Ministry of Health recognizes the importance of poverty reduction and social inclusion for public health, no actual commitment has been reached with the Intersectoral Committee for Poverty Reduction and Social Inclusion to improve the way in which these problems and the burden of NCDs are addressed.

Core population interventions for the prevention and control of NCDs have been adopted but overall progress is slow, mainly due to low implementation of these interventions. For example, despite the adoption of a number of regulations concerning tobacco and alcohol, including taxation and bans on advertising, their overall implementation is not satisfactory, mainly due to inadequate enforcement and control by the competent authorities. Frequent changes in the political environment have been identified as a significant barrier to increased implementation of key NCD control interventions.

The current NCD strategy has expired and no new strategy or action plan is under development. The Ministry of Health would prefer first to have the public health law, strategy and plan in place to serve as an umbrella to oversee other vertical programmes. Several such vertical plans and strategies are in the final stages but will only be sent for adoption in 2017 or in 2018, after the public health strategy and action plan have been approved. The indicators and targets in these vertical plans and strategies in some cases lack coherence with the public health strategy and action plan which are being developed. In addition, the Ministry of Health plans to develop an updated national health plan as an umbrella strategy for the entire health sector.

Challenge 2. Creating explicit processes for setting priorities and limits

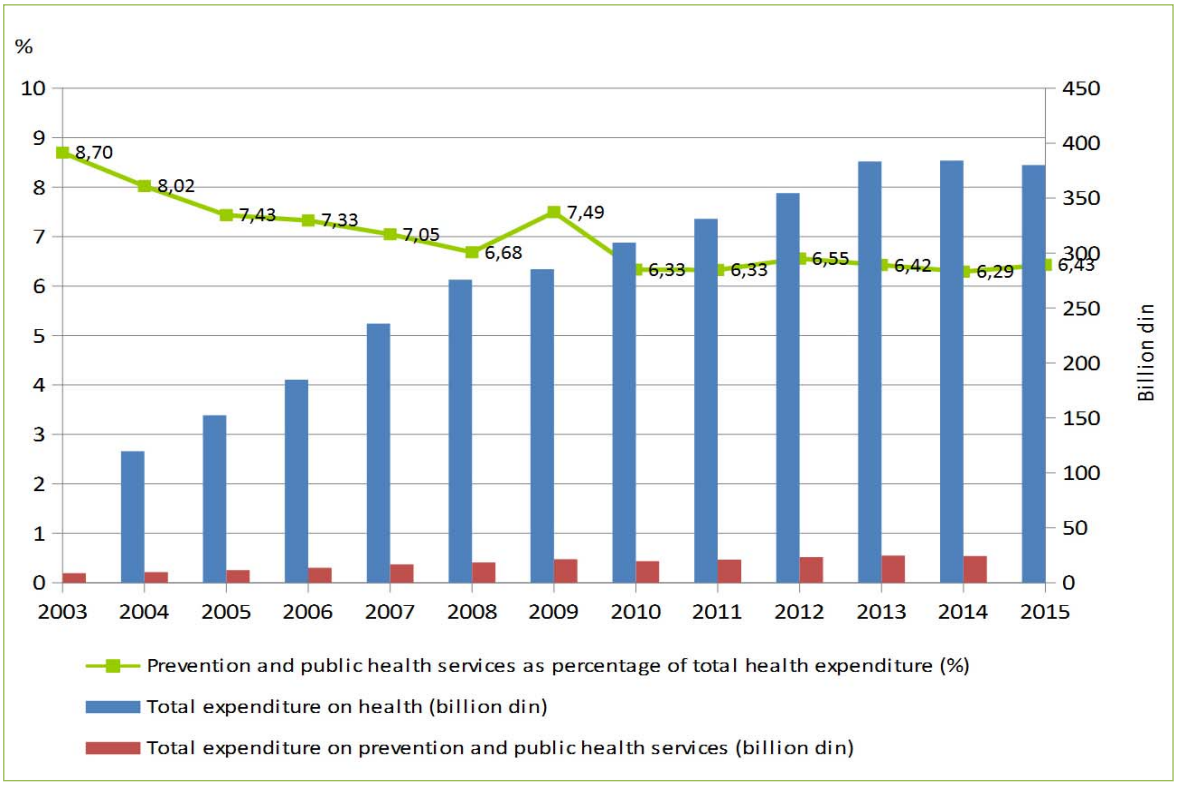
Although NCDs and health promotion appear to receive a fair amount of the health budget, the budget for tackling some of the major risk factors has been constantly reduced in recent years, impairing the implementation of NCD prevention activities.

Total health expenditure increased from almost 100 billion din in 2003 to 380 billion din in 2015. In the same period, the total expenditure on prevention and public health services was increased but at a slower rate than total health expenditure, which led to a decrease in the percentage of prevention and public health services as a share of total health expenditure (Fig. 10).

Priorities in the area of public health are defined by the Sector for Public Health and Programmed Health Care of the Ministry of Health. Programmes are planned and the budgets are managed vertically in the Ministry and implemented by the IPHS and the network of 24 institutes of public health.

Analysis of the expenditure on health from 2012 to 2016 shows a constantly reducing trend in funds for preventive health care since 2004. In the period 2004–2008, an increase was observed

Fig. 10. Prevention and public health budget as % of total health expenditure, 2003–2015



Source: IPHS *(44)*.

in financing for rehabilitation, diagnostic and laboratory care and pharmaceuticals, whereas the finances allocated for both the institutes of public health and preventive and occupational health services were reduced *(45)*.

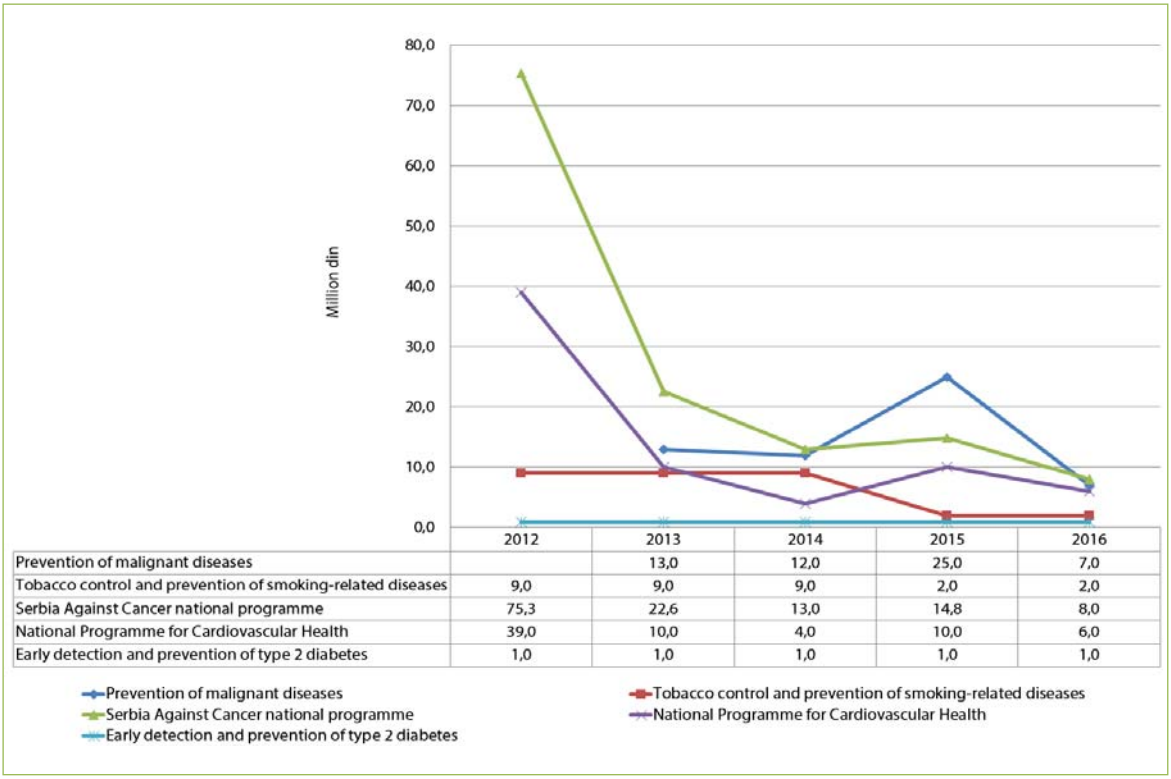
Resources allocated to the network of institutes of public health were reduced from almost 930 million din in 2012 to 844 million din in 2016 *(46)*. More specifically funds for tobacco control and the national programmes for the prevention of cancers and CVDs were reduced, while those for the programme for early detection and prevention of diabetes at PHC level care remained at the same level (Fig. 11).

The formal setting of priorities at the highest level is said to be based on the needs suggested at the regional level, with communicated and transparent criteria and planning for a three-year cycle and one-year projects within the nine public health programmes.[4] The IPHS has the expertise for strategy and programme planning and implementation and its experts are members of committees, as well as of the working groups for the current NCD strategy and action plan and for the new public health strategy and action plan. Frequent changes in the political environment and consequent changes to priorities and funds, however, pose challenges for the sustainable implementation of the programmes. As a result, no evaluation of the expired programme and action plan for NCD is available, which would be essential to inform the development of other policy frameworks such as the new strategy and action plan for public health, whose adoption is pending.

Well-established mechanisms to assess the distribution of NCD risk factors and outcomes in the population would allow the country to make better use of their results, particularly for priority-setting, the development of national health strategies, programmes and plans and the allocation of funds to address the burden of NCDs.

[4] The nine programmes are for: analysis of health status and use of services; information technology systems; quality of health care services; health promotion; communicable diseases; NCDs; the environment; microbiology; emergencies.

Fig. 11. Ministry of Health expenditure on preventive health programmes, 2012–2016



	2012	2013	2014	2015	2016
Prevention of malignant diseases		13,0	12,0	25,0	7,0
Tobacco control and prevention of smoking-related diseases	9,0	9,0	9,0	2,0	2,0
Serbia Against Cancer national programme	75,3	22,6	13,0	14,8	8,0
National Programme for Cardiovascular Health	39,0	10,0	4,0	10,0	6,0
Early detection and prevention of type 2 diabetes	1,0	1,0	1,0	1,0	1,0

Source: adapted from Ministry of Health *(46)*.

Challenge 3. Ensuring interagency cooperation

The 2016 Law on Public Health *(43)* acknowledges the intersectoral nature of public health.

Many stakeholders are engaged and recognize the need for collaboration with partners outside the health sector. However, it is not immediately clear whether the existing relations are good and sufficient for effective cross-sectoral work on NCDs. Formal platforms and mechanisms are missing. Budget restrictions limiting cross-sectoral collaboration make it difficult to obtain funds for activities outside the responsibility of the Ministry of Health, and there is a lack of communication at national level between the Ministry of Health and partner ministries.

The national council of public health (proposed in the draft Law on Public Health, article 16) presents an opportunity for strengthening intersectoral collaboration. The new public health strategy could be a good starting point to ensure more strategic and effective collaboration through clarification of responsibilities and greater accountability.

The Intersectoral Committee for Poverty Reduction and Social Inclusion also offers the opportunity for the health sector to call for a national intersectoral response to NCDs and for coherence of policies that have an impact on sustainable social and economic development. The Standing Conference of Towns and Municipalities in Serbia offers a good platform for intersectoral cooperation at the local level based on its established platforms that support information-sharing and collaboration with local health councils.

Challenge 4. Empowering the population

Although people are well aware of the harmful effects of the major NCD risk factors, risky behaviour is socially acceptable.

The population and civil society do not actively participate in priority-setting and policy-making in health. There is a limited number of patient organizations for specific disease groups such as cancers and diabetes, which in some cases have links with specialist professional associations. A few work in the area of patients' rights independently of providers such as the patients' associations but with little tradition for active advocacy. In this regard, there is no tobacco network to advocate tobacco reduction efforts; the same is true with other forms of risk behaviour.

Challenge 5. Establishing effective models of service delivery

Public health services

At the district (provincial) level the regional institutes of public health provide public health services to the population and, through appropriate departments, monitor and analyse the results of implementation at PHC level of the NCD preventive programmes. The structure and profile of the workforce are organized more around the need to control infectious disease. The capacities for health promotion and education and for public health interventions targeted at the prevention of NCDs are limited (for example, the Valjevo institute of public health has one health promotion specialist among 66 health professionals). Despite limited resources, there are some examples of joint action to promote screening programmes, but there could be better synergies for priority health needs through combined population-based and individual-based interventions.

Since 2005, the municipalities and cities own 158 PHC centres, usually one PHC centre per municipality although Belgrade has 17 municipalities and 16 PHC centres. Representatives of the local government administrations, local politicians and community representatives engage in decisions on health care issues through health councils. Representatives of the institutes of public health are also members of such councils. Still there are too few good examples of local intersectoral public health policies to address NCD-related health needs at the local level. Municipalities contribute to the funding of PHC centres with priority responsibility for maintaining the buildings, purchasing equipment, purchasing vehicles and sometimes paying for additional health professionals.

All institutes of public health are required to provide an annual implementation plan for the nine public health programmes, signed by the Minister of Health. The methodology of planning, including the indicators, is proposed and defined by the Ministry of Health and reports are presented in a standard format. Evaluation of outcomes is lacking and is perceived as a capacity problem. It is carried out by the use of routine indicators, which might not be suitable for in-depth analysis to inform policy-makers with suitable policy briefs.

To implement activities, the IPHS and the network of institutes of public health work closely with other stakeholders in the health sector such as nongovernmental organizations (for example, the Red Cross and student organizations) as well as with other governmental bodies such as the Ministry of Education, the Ministry of Agriculture and the Ministry of Youth and Sports. However, there is a need for even stronger multisectoral collaboration.

PHC

Serbia inherited the health service delivery model of the former Yugoslavia, which had some features of the Semashko model together with a type of Bismarkian compulsory health insurance funding. In 2005, a reform to strengthen the role of PHC saw the separation of PHC from hospitals in most municipalities and the introduction of the chosen doctor scheme.

PHC is only provided by public PHC providers. Despite the increasing network of private health care institutions since 1989, they have limited opportunities to obtain contracts with the RHIF, particularly since the revision of the 2012 health care law. The network of PHC institutions is in a good position to be at the centre of care, with good geographical availability and a relatively good supply of human resources *(8)*.

Patients can choose their medical practitioners from within the municipality in which they live. In some cases, their choice is limited to one PHC centre. The exception is Belgrade where the inhabitants can choose any of 16 PHC centres, irrespective of the municipality in which they live. At a patient's request, the RHIF can give permission for registration at a PHC in a different municipality. In principle, the relationship with the PHC provider is continuous but patients bypass the system. There appears to be an increasing tendency for the population to avoid PHC centres and go directly to the specialists in private practice and/or to hospital admissions departments. The Bežanijska Kosa clinical hospital centre estimated that more than 30% of cases addressed to the admissions department are non-urgent problems which could easily be solved at PHC level. The population-based data on hospitalizations have not been fully analysed, which meant that it was difficult to draw conclusions about the scale of avoidable hospitalizations.

Staffing of PHC centres

There are no requirements for specialization in general practice and only 44% out of 2004 of the chosen doctors (GPs) for adults have three years specialization in general practice. There are few salary incentives to become a GP; moreover, due to a lack of doctors, managers are not interested in sending their doctors for training to gain specializations.

GPs are supported by PHC nurses (one per doctor) who serve the same population. General practice nurses do not have any specialization in general practice/PHC. Their role is to register patients and assist the doctor with paperwork. Usually they do not provide any counselling services for patients with NCDs as they are not properly trained and they usually work in an open reception area. The total number of PHC nurses with a university college education is 329, while 5523 have secondary education.

Organization of care

The working hours in PHC centres are from 07.00 to 19.00 or 20.00, depending on the municipality, and staff work two shifts. GPs provide services for adults in the consulting room from 07.30 until 14.30. The second shift is 13:30 to 20:00. The usual practice is to give appointments to around 20 patients; the number of acute patients without appointment varies from 16 up to 25–30 patients. The minimum norm is for the GP to see 36 patients in six hours. The last consulting room hour (13.30–14.30) may be devoted to paperwork or home visits, although each municipality can organize PHC work slightly differently. The time for a consultation is limited to 10 minutes or less per patient. This limits the GP's opportunities to provide more patient-centred, comprehensive consultations and to include preventive activities such as making an opportunistic assessment of cardiovascular risk and providing brief interventions on risky behaviour with a patient who initially presented with an acute condition.

Home care is organized and carried out by nurses in the separate departments. Two kinds of nurse visit patients at home: community nurses and home care nurses. Community nurses cover districts with around 5000 total inhabitants: for example, Valjevo PHC centre has 15 nurses per 88 000 inhabitants (one per 5800). Among other tasks (such as care for children and pregnant women), community nurses are also responsible for the prevention and management of NCDs in the community. For example, community nurses from the same Valjevo PHC centre made 18 762

home visits, of which 6218 were visits to people aged over 65 years and 2974 involved individual counselling for prevention (1468 of these by telephone). Around 30% of community nurses' time is devoted to group education: for example, 2534 group education sessions took place at the Valjevo PHC centre in 2015 with a total of 17 548 participants. Home care nurses provide services at home for ill patients, following authorization from GPs. In terms of quantity it is a good use of nurses' resources to provide care in the community, but their competences remain an issue (there is no specialization for nurses) and their performance should be better monitored both for the processes and the results of their work.

PHC centres have mobile units which visit the remote areas to bring more accessible services to vulnerable population groups. The populations of remote villages are invited by the nurse at the medical post, and mobile units provide check-ups and screening at least once a year for all the populations in the remote areas, including the Roma population.

An e-platform integrated health information system has been introduced to support referrals from the PHC level to specialists. This, however, creates some challenges, as it is often not possible to get an appointment within one month. If the necessary consultations and/or diagnostic tests are not available within one month, patients have the right to obtain such services from private PHC providers against reimbursement from the RHIF. This rarely happens, however, and the waiting time for an appointment with the GP is usually no longer than one week. Even so, patients apparently complain that waiting times are too long at PHC facilities. This may need improved management and organization of services in health centres and better communication with patients.

NCD prevention

In recent years, there has been a strong national policy to enhance the role of PHC in NCD prevention through early detection of NCDs. The role of PHC in early detection of cardiovascular risk and cancer screening has been described more fully under the section above on Individual services.

Despite PHC centres reporting that they invited people for preventive check-ups for NCDs, not all the populations at risk are being reached. Two out of the three male patients (aged 50–60 years) in intensive care units who were interviewed by the team had not had any contact with their GPs during the previous two years. Neither had they received any invitations for preventive check-ups. The same was reported by women in an educational institution who were interviewed: despite being of the eligible age for cervical cancer screening, none of them had received an invitation for screening.

Challenge 6. Improving coordination across providers

Networks of PHC centres with rural ambulatories and medical points are equally distributed for the whole population. The legal framework defines patients' right to have their GP as first contact for adults and coordinator of overall health care. PHC physicians act as gatekeepers; consultations with specialists in the public health sector are only available on referral. In 2015, there were 26 662 212 visits (last available data from IPHS), of which 35% were first visits. Diseases of the cardiovascular system are the most commonly registered diseases in PHC (18% of all registered cases). Fewer than 20% of all consultations with specialists are first consultations; the remainder are follow-up visits after diagnostic tests. This creates some accessibility problems and an increasing number of cases are being reported of patients with NCDs having to wait more than one month for a consultation with a specialist following referral.

Nevertheless, patients are increasingly going direct to specialists with private practices. Specialists are better paid in private practice, which incentivizes them to reduce their workload in the public sector. This obviously creates some gaps in accessibility to specialists in the public sector for patients referred by GPs.

Notwithstanding the unified patient records that allow for the collection of all health information, fragmentation of services and cooperation between professionals in different departments at the PHC centres remains an issue. There is no system of joint care plans for patients with complex NCD-related health needs that would allow for more comprehensive planning and addressing of these needs through multidisciplinary teams. The unified e-platform for appointments has enabled PHC staff to select specialists for referrals and make appointments with them directly during the patient's consultation with their GP. It should also help to monitor referrals in the future, providing GPs with information about all referrals, including patients' self-referrals. It frequently happens that patients do not deliver letters from specialists to their GP following consultations.

There is a strong culture of multidisciplinary care in cancer medicine. The first tumour boards were held in 1998. All cancer patients go through the tumour board except for a few patients seen only by a surgeon in a general hospital. Delays in reaching a cancer diagnosis following referral by a PHC doctor varies from one institution/region to another. Delivery of treatment following diagnosis varies according to procedure. According to the Institute for Oncology and Radiology, the waiting time for chemotherapy takes less than one month, for surgery it can be around two months while for radiotherapy it can take two to three months.

After an AMI, the patient is followed up initially by the cardiologist in outpatients before being returned to the care of the family doctor. For example, after a percutaneous coronary intervention, a patient is seen two to four weeks later in outpatients then two to three times a year. Treatment is initiated in the outpatients department and then the PHC centre prescribes the drugs. There are good examples of multidisciplinary care. For example, in the hypertension centre in the cardiology centre, the team comprises a cardiologist, endocrinologist, nephrologist, psychologist, ophthalmologist, vascular surgeon and neurologist.

A few good examples of the integration of social workers with PHC in some municipalities were reported but these were limited to child development (for example, in Sremska Mitrovica) or mental health; none specifically addressed NCD-related needs. In general, health services do not link well with social services. This is a clear weakness of the Serbian system according to specialists at the Bel Hospice (private hospice), for example. When patients presenting to PHC are in a difficult situation due to poverty, the home team refers the case by letter to the municipal social service. The PHC home team do not themselves deal with social problems. Social workers are available in some PHC centres but they are recruited to deal with mental health patients, not palliative care patients. Training for social workers is limited as regards palliative care. PHC is not part of the study curriculum for social workers although training courses have been organized. At the national Institute of Oncology there is a small team of social workers whose role is to inform patients about what the state can provide for them in case of need.

Oncologists also mention that there is a strong need for more psychologists. At the Institute for Oncology and Radiology National Comprehensive and Cancer Research Centre, which treats 5500 new cancer patients a year, there are only two psychologists (one for children and one for adults), one physiotherapist and four "defectologists" (a specialty dealing with disabled people). The role of defectologists is to inform patients about the course of their treatment and the side effects they may experience.

There is a clear loss to follow-up for key NCDs, although the rate is not available by different socioeconomic or ethnic groups. Among patients cured of cancer, such loss to follow-up is rare (less than 1%).

Challenge 7. Taking advantage of economies of scale and specialization

There are four university hospitals (clinical centres) which provide tertiary level inpatient and outpatient services. The country is divided into 24 districts plus the city of Belgrade, and every district has at least one general hospital (except Belgrade). Specialists from outpatient departments of university hospitals are assigned to provide consultancy services (secondary level) for municipalities from the catchment area. In 2015, hospital care was provided by 109 inpatient facilities, 40 of which were general hospitals and four were clinical centres.

Before a 10-year project (supported by a European Investment Bank loan) to modernize and reconstruct the four clinical centres in Belgrade, Novi Sad, Niš and Kragujevac started in 2003, the health infrastructure was over-dimensioned, inefficient and expensive, especially as regards hospital care *(47)*. A substantial World Bank Project (which ended in 2012) *(48)* also had restructuring of the health services as one of its components, including support for the development of a national master plan to rationalize health care resources and support investment in the human and physical capital of the health sector.

The cardiovascular programme considers the areas of hypertension, ischaemic heart disease, ACS, heart failure and congenital heart disease. There is no national stroke programme. On the initiative of the cardiologists, a plan for regionalization of services for ACS was developed and approved by the Ministry of Health in 2016. ACS are dealt with by a national network of dedicated facilities with 13 catheterization laboratories and 54 coronary units. There are six centres for ACS in Belgrade. The university hospitals are well-equipped to provide percutaneous coronary intervention and advanced treatment for acute cardiovascular events. Not all general hospitals have adequate capacities to treat an acute cardiovascular event, so the specialized services for treatment of such events are regionalized. General hospitals which are equipped with angiography and fulfil minimum requirements (mainly human resources for percutaneous coronary intervention) are assigned to serve other districts as well. For example, Valjevo hospital receives patients with ACS from several districts. There are no available data on equity of access to percutaneous coronary intervention treatment for citizens from different geographical regions.

The regionalization of services is more developed for ACS than for stroke. Services were reorganized five years ago and stroke units were developed, three in Belgrade and three in the university clinical centres of Novi Sad, Niš and Kragujevac. The Saint Sava hospital in Belgrade is the main centre for stroke. It has 240 beds, 80 doctors, 280 nurses and a 25-bed intensive care unit, and admits 7000 patients per year. Although it operates as a reference centre, it does not have that official status.

Cancer diagnosis and treatment is well organized with a high level of performance. The main oncology centre is the National Institute of Oncology and Radiology of Serbia, although it is not officially designated as such. It is connected to a medical school and important investments have been made in infrastructure, equipment and material in recent years. Nevertheless, there is still some room for improvement. Surgery is performed in tertiary institutions with varying standards, and chemotherapy can be given outside major hospitals and prescribed by unqualified professionals. There are registers at all levels of care (primary, secondary, tertiary) which record the number of cancer patients treated, but information about the disease (stage, test results) and treatment remain limited (see Challenge 13 for more information).

A national cancer control plan was devised in 2009. An updated version has been produced by the plan's working group (the Republican Expert Commission for Oncology) and submitted to

the Ministry of Health at the end of 2016 for approval. Despite this, there is evidence that the tertiary level is dealing with secondary level tasks: for example, many noncancerous patients come to the Institute of Oncology for diagnosis and get surgical treatment there. A similar problem exists at the mammography unit: women try to get mammography screening there because they do not trust mammography at the PHC or secondary levels.

Equitable access to treatment is supported by the fact that most citizens are covered by health insurance and their out-of-pocket expenditure is minimal. On the other hand, there are no transport allowances for patients or assistance with housing for them and their families.

Equity of access to cancer diagnosis and treatment is ensured; contacts and influence do not seem to play a role. There are no private treatment centres for cancer: all cancer patients are treated free in the public sector. Very expensive drugs recently developed for some cancers are not part of national treatment protocols and are not proposed to patients treated in the public sector.

There are no explicit guidelines about when to stop treatment or not to treat. For cancer patients decisions are always taken at the level of the tumour board. There is a national programme for palliative care but it does not answer all the needs. The national palliative care strategy 2008–2015 describes the organization of palliative care provision across all levels of care. Among other things, it lays down that each large municipality (>25 000 inhabitants) should have a home care team, whereas in small municipalities (<25 000 inhabitants) the PHC doctor and nurses are expected to visit patients at home as required. Of the 88 big municipalities at the time of the WHO visit (April 2017), only 56 had home care teams.

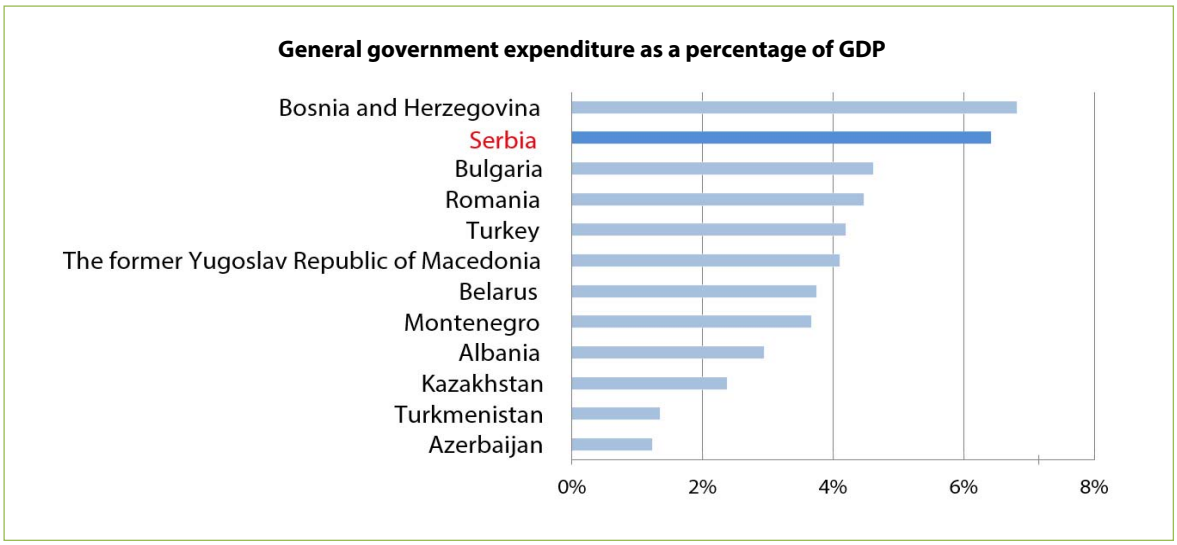
Notwithstanding important improvements in palliative care in recent years (establishment of a National Palliative Care Commission, a national strategy, training, laws and regulations), an understanding of palliative care remains limited among providers and there are not enough palliative care beds for acute intervention. The national palliative care strategy 2008–2015 also states that 300 beds should be dedicated to palliative care in 28 hospitals, but at the time of the WHO visit only 145 beds were dedicated to palliative care in 15 hospitals. The number of palliative care beds varies from one hospital to another but is not closely correlated with need. Many palliative care units in hospitals experience shortages of beds and of nurses. For 10 beds, there is usually one doctor and five nurses (for the three shifts), which is not enough.

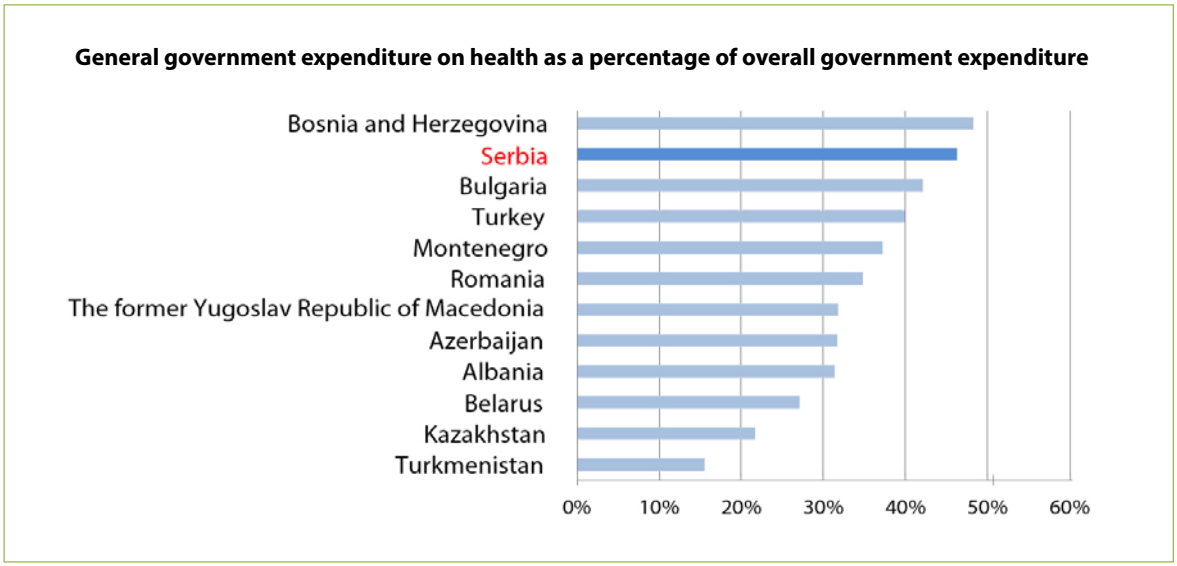
All hospitals provide round-the-clock emergency services. Ambulance patients with acute cardiovascular events are taken to the local general hospital and then, when possible, they are taken after examination to the hospital with percutaneous coronary intervention treatment. Ambulances are usually part of the structure of the PHC centres, apart from in Belgrade, which has a separate ambulance service for PHC. A unified call centre has been introduced recently and is efficiently monitoring the activation and arrival time of ambulance journeys. The ambulance service seems to be functioning very well, in Belgrade at least, with a very short time reported from the call being received to the ambulance leaving, varying from one to 1.23 minutes in different ambulances. Arrival time is around nine minutes in the city of Belgrade.

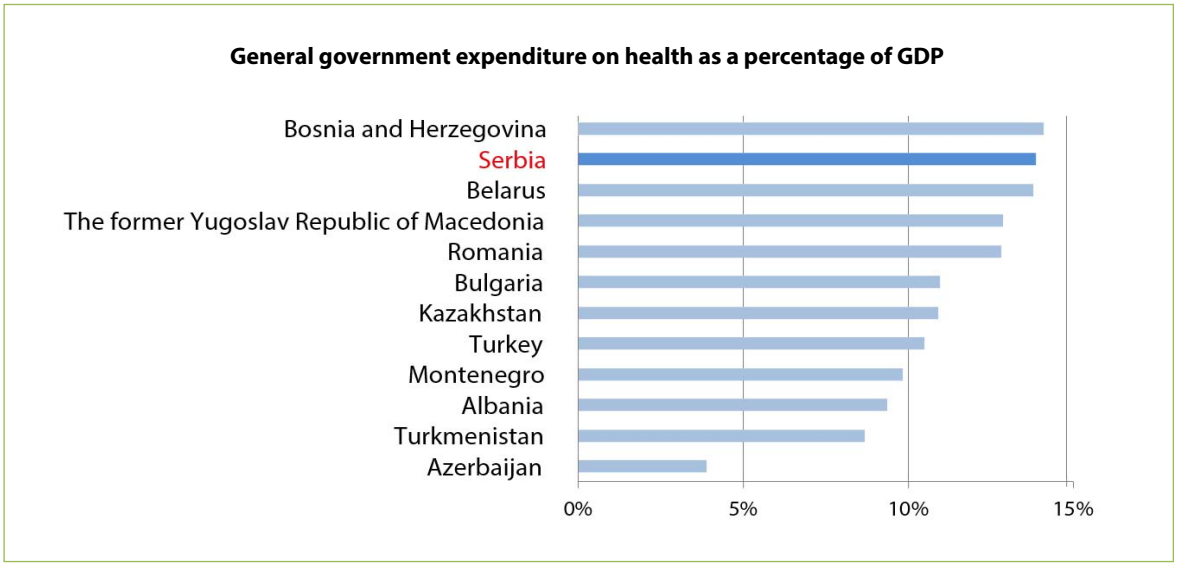
Challenge 8. Creating the right incentive systems

The government's commitment to the health system is high. In 2014, total health spending accounted for about 10% and public expenditure 6.4% of gross domestic product (GDP). The share of government spending allocated to health is high (14%). Compared with other middle-income countries in the Region, Serbia spent almost twice as much per capita on health (Fig. 12). General taxation covers premiums for groups with no or low incomes such as pensioners, children and people with disabilities or unemployed. State or local budgets cover the costs of epidemiological control, medical staff and research as well as capital expenses such as construction and maintenance of facilities and purchase of equipment.

Fig. 12. Government expenditure on health: Serbia compared with selected other countries







Source: WHO *(49)*.

The administrative purchaser-provider split will enable providers' behaviour to be directed towards NCD management.

The RHIF is in charge of providing and managing the compulsory health insurance. Voluntary insurance can be purchased through private insurance companies. The RHIF is financed by payment of health insurance contributions related to income. Contributions from individuals without income or who cannot be insured as family members of persons generating income are paid from the general state budget. The RHIF contracts health care services with health care providers included in the so-called health facilities network plan adopted by the government at the proposal of the Ministry of Health. Health care services that are not assured by these facilities can be contracted with other providers after consultation with the IPHS and approval from the Ministry of Health.

The administrative purchaser-provider split achieved by the development of the RHIF is recognized as an important tool to modulate health care providers' behaviour. At the moment, different payment models to health care providers are being introduced and studied (capitation for PHC providers, diagnostic-related groups for hospitals). In general, they are continuing to follow historical costs. There is a long way to go to maximize this role by introducing more adequate purchasing mechanisms and payment models that could influence the control of NCDs.

The RHIF is developing the implementation of a system of payment according to diagnosis-related groups in hospitals. The Fund is promoting a gradual transition from retrospective payment methods of health services, based on historical costs, to the prospective payment system based on the system of diagnosis-related groups. At present no specific consideration is being given to NCDs.

In PHC, quality indicators and performance-based payments are being introduced for health care providers. Remuneration for the chosen doctors is based on capitation and performance indicators and cannot exceed 8.08%. This includes preventive services for NCDs which account for 30% in the payment formula (50). Professionals do not, however, recognize the incentive as meaningful, but better management of performance and improved NCD clinical outcomes should enable the formula to be improved.

Even though the regional institutes of public health have a role in analysing the PHC and secondary care services' annual plans, this seems to be merely bureaucratic since the RHIF does not take into account their reports. So there is no clear alignment that ensures delivery of core interventions and services and incentive systems across the different levels of care. The competences within the institutes of public health could, however, be useful and enhanced for implementing strategic purchasing strategies related to the response to NCDs.

Challenge 9. Integrating evidence into practice

Clinical guidelines and pathways have been developed through structured processes in the country, but these processes were mainly initiated when there was an impetus from an international externally-funded project. There is no sustainable process for initiating or updating guidelines, nor for reviewing them periodically to check consistency with access to medicines. Patients' associations or representatives do not participate in these processes related to guidelines.

In the WHO Country Capacity Survey, Serbia scored as fully achieved for having evidence-based clinical guidelines in place for management of each of the major NCDs through a primary care approach. Although these guidelines are being utilized in at least 50% of health facilities, they have not been updated since 2013. For example, national diagnosis and treatment guidelines exist for many cancers (including breast, cervix, colorectal, prostate, stomach, thyroid, lung, ovarian) but they were written in 2012–2013 and need to be updated. Clinical guidelines also exist for the

diagnosis and treatment of ischaemic heart disease, hypertension and lipid disorders. The quality of compliance in implementation needs to be better monitored.

In recent years, doctors have been asked to participate in courses accredited by the Health Council to get continuing medical education points for the purpose of licensing or relicensing. Doctors are given a certificate of attendance and may have to do tests at the end of a course but they are not required to write reflective notes or evaluations. They often have to pay a registration fee to attend a course and may ask pharmaceutical companies to support them financially.

Training frequently seems to be provided by professional associations, health and academic institutions. For example, the Institute for Endocrinology in Belgrade is responsible for diabetes care, pre- and postgraduate training (3000 doctors and 1000 nurses were trained in the last three years) and research. All practitioners spend time at the clinical centre in Belgrade to learn percutaneous coronary intervention techniques, and the clinical network remains in close contact. The school of hypertension in the clinical centre runs summer and winter schools as well as continuing medical education-accredited courses. Educational courses may be supported financially by commercial entities such as pharmaceuticals and devices companies.

In terms of accessing the international evidence base, all the physicians met by the team (admittedly a selected group) were fluent in English and apparently well-connected with professional associations. The Cardiology Society of Serbia has been a member of the European Society of Cardiology since 1959, for example, and has endorsed many of the Society's practice guidelines. The Serbian Respiratory Society and Respiratory Society of Serbia are national partners with the European Respiratory Society *(51)*. Doctors and nurses at the endocrinology department are part of international diabetes networks (International Diabetes Federation, Foundation of European Nurses in Diabetes, clinical trials). The Serbian Heart Foundation is a member of the European Heart Foundation *(52)*, and Serbia was on the board (2014–2017) of the Stroke Alliance for Europe *(53)*. Endocrinologists are also part of the National Expert Committee Council (together with GPs and preventive medicine officials). The Clinical Centre of Serbia (cardiology clinic) in Belgrade regularly organizes congresses with international speakers and participation and is well-connected internationally.

Challenge 10. Addressing human resource challenges

Regional institutes of public health are well positioned to contribute to health needs assessments and to enable managers to make master plans, including for human resources, to address health needs better. Their role in human resource planning is, however, limited and somewhat formal: to check, in response to requests from health institutions, whether their needs for staff correspond to the formal requirements. The only initiative reported was the way in which the institutes, working closely with leading endocrinologists from the National Institute of Endocrinology, introduced both motivational counselling services for patients with diabetes and new positions for doctors and nurses, which have been introduced in all 158 PHC centres.

The quantity, distribution and training of human resources significantly affect the ability of the health system to respond effectively to NCDs. In 2005, as part of a health care reform, the Ministry of Health introduced norms for staff equivalents needed per particular number of population served (for PHC centres) and/or number of hospital beds (for inpatient services). Since then, under article 98 of the Law on Health Care, PHC is provided to the public in PHC centres by a chosen doctor who is either a medical doctor or a specialist in general medicine (for adults and sometimes for school-age children), a paediatrician (for children), a gynaecologist (for women) or a dentist.

The complex human resources for health situation in Serbia is regulated through many legislative regulations and programmes relating to other sectors as well as health. Taken together with the fragmentation of data, this leads to an insufficiently clear picture for governance. No centralized information system exists to process data relating to human resources for health. Data relating to human resources for health are collected for different purposes by different institutions, principally the IPHS and chambers of health professionals. The IPHS has data on those working in the network of health institutions in the public sector, while members of chambers of health professionals include those not practising or practising in the private sector. Existing data from different sources on human resources for health in the public sector are not fully aligned.[5] The situation in the private sector is even worse,[6] showing at least a twofold higher figure in chambers' databases than in the database of the IPHS.[7] This also reflects the different values of net monthly salaries in the health sector from data-holders in both the public and private sectors, that is, the Statistical Office of Serbia, chambers of health professionals, the chamber of health institutions in the public sector and association of health institutions in the private sector. Limitations on data for human resources for health are a common challenge in many European countries.

Human resources at PHC level are planned annually on the basis of these formal requirements. The plan, which is submitted through the IPHS to the Ministry of Health, only presents the numbers of medical professionals required to fill empty staff positions. There is no tradition of assessing population health needs or of planning medical resources based on priority health problems and needs in particular areas. Managers of PHC centres lack the autonomy to change the scope of practice of existing medical professionals and/or to expand a multidisciplinary PHC team by introducing new staff positions.

The human resources plans are based on the size of population served and/or the amount of services provided. They do not adequately reflect the population's health needs and decisions for regionalization of specialized services for acute cardiovascular events. Further reorganization of services to concentrate expertise, reduce variability in practice and achieve better clinical outcomes could be problematic if human resource planning and payment models do not support it. Health care professionals need to be better engaged in the development of such plans.

Table 8. All physicians, GPs and nurses per 100 000 inhabitants

Country	All physicians per 100 000	Number of GPs per 100 000	Number of nurses (PP) per 100 000
Serbia	307	71	629
Croatia	314	57	617
Slovenia	277	52	863
Montenegro	234	43	535
Greece	625	43	344
Bosnia and Herzegovina	188	20	558
The former Yugoslav Republic of Macedonia	280	n.a	421
Hungary	332	n.a	658
WHO European Region	**322**	**62**	**740**

Source: WHO Regional Office for Europe *(5)*.

The reported number of GPs is relatively high – 71 per 100 000 population – when compared with neighbouring countries and with other countries in the Region (Table 8). The average number of adults (aged 19 years and older) listed per GP is 1430, which is reasonable for providing

[5] The IPHS database register of the workforce shows that in 2015, 21 613 physicians (generalist medical practitioners, generalist medical practitioners on specialization and specialist medical practitioners) were employed in the network of public health institutions, as against the 20 413 physicians shown in the Republic Statistical Office of Serbia reports in the 2016 Statistical Yearbook *(54)*.

[6] According to the Privatnici document of the National Health Account *(44)*, about 2100 physicians, 2800 nurses, 1600 dentists and 500 pharmacists were employed in the private sector in 2015, while data for 2016 from the chambers give figures of approximately 4000, 5500, 5000 and 6500, respectively.

[7] This is not a difference in definition. Some members of chambers do not practise, while the IPHS covers those in public health institutions.

comprehensive GP services. However, any attempt to improve PHC services by ensuring that PHC physicians have competences more appropriate to PHC work comes up against the requirements for specialization in general practice. Any graduate of the medical university can work in the staff position of GP when he/she has received the licence of medical doctor from the Order of Doctors and has completed three months practice in any health care facility. To receive a licence, a physician needs to have a diploma from the medical university (six years) plus six months internship. Students are not interested in taking a three-year specialization in general practice. Only 44% of GPs have a specialization in general practice, varying from around 50% in central Serbia to only 25% in Vojvodina.

A total of 5852 nurses are working in general practice services for the adult population, most of them graduates of medical schools. Nursing education is also provided by nursing colleges in four universities, and 5.6% of general practice nurses are university graduates. With the exception of counselling services for diabetes patients, nurses in general practice services for adults play a limited role in prevention and management of patients with NCDs. Their competences are not appropriate to the specific needs of PHC practice. There are no options for nurses to specialize in PHC and/or community nursing. The only four specialization options for nurses are physiotherapy, paediatric nursing, radiology and midwifery. The School of Public Health of Belgrade University has developed a master's programme in public health nursing with a curriculum devoted to NCD-related needs (to provide skills for such tasks as risk stratification and patient education) but there are no national policies to motivate nurses to upgrade their competences. The lack of nurses is another challenge and, as a consequence, 30% of staff positions in PHC are not occupied. The lack of human resources for PHC is a particular problem in the remote areas. No national policies and/or support from local municipalities exist to recruit candidates for training from rural areas or ethnic minorities with the aim of them returning to work in the same areas after graduation.

More patient-centred models of care at PHC level are called for to deal with NCD-related health needs and patients' increased health literacy and expectations from the health care system. The role of GPs and PHC nurses in the provision of first contact, person-centred health care and coordination of care has weakened in recent years, and PHC organizational models have not been adjusted to the changing health needs and expectations of patients. This is partly because of limited managerial capacity and the limited managerial and financial autonomy of providers. Accessibility and working hours are also issues. Doctors and nurses have limited motivation to improve their performance, despite evidence about their performance being generated and available at RHIF and accounted through payment mechanisms and/or incentives.

Medical and radiation oncology are recognized specialties with corresponding resident training programmes, although recruitment of residents remains limited. Palliative care is a recognized specialty with a training programme but it does not attract enough students.

The School of Public Health of Belgrade University has a master's in public health programme which provides competences in health promotion, health needs assessment, and the development and implementation of public health policies. Such specialists are sorely needed to adjust the capacities of regional institutes of public health at the province level, so that they can make a better contribution to community interventions and intersectoral collaboration in addressing NCD-related health needs. In general, all the institutes of public health lack medical staff of all profiles, especially those working in prevention.

The health care system in the public sector is losing staff to the private sector and to emigration. It is also difficult for health management to hire new personnel (even to replace retiring or leaving professionals). Bureaucratic and administrative work is felt as an increasing burden and a limiting factor for the availability of health professionals in the care pathways.

Challenge 11. Improving access to quality medicines for NCDs

Patients acquire medicines for NCDs through prescriptions from medical practitioners which are dispensed by pharmacists. All citizens are entitled to a broad package of services, including medicines.

The Ministry of Health is the competent authority for pricing and, together with the Ministry of Trade, it determines the maximum wholesale price of a medicine using international price comparisons. The average price for three reference countries (Croatia, Italy and Slovenia) is taken as the maximum approved price for Serbia, and no medicine can be marketed in Serbia without the price being agreed. The pricing procedure has been criticized in the past for lacking transparency and for the time it takes *(55)*.

The RHIF is the competent authority for reimbursement. It collects contributions which are dedicated to the financing of health care, including medicines on the reimbursement list.

Recommendations for inclusion of new medicines on the reimbursement list are made by the Central Committee for Medicines on the basis of two opinions, from the Republic Expert Committee (pharmacotherapeutics report) and an evaluation from the Committee for Pharmacoeconomics carried out according to comprehensive criteria. It is described as a complex, lengthy but transparent procedure.

The pharmaceutical market almost collapsed in 2012 and the government had to intervene. It was decided that procurement of all pharmaceuticals should be centralized and a central procurement unit was established in the Ministry of Health. The tender price is based on the lowest price offered. Some non-drugs items, such as stents, are also centrally procured.

As part of its aim to achieve candidate status to the EU, Serbia has undertaken major reforms, one of which led to the creation of the Medicines and Medical Devices Agency. Since October 2004, this Agency has served as a competent authority for product assessment and marketing authorization for medicines. The process for entry to the market, the reimbursement framework and safety assurance for medicines are in place and follow EU directives.

The three national relevant manufacturers of medicines are given preference when it comes to listing their medicines on the reimbursement list. In 2014, there were more than 1000 wholesalers in Serbia, making it difficult for regulators to inspect businesses on a regular basis *(55)*.

Counterfeit drugs are not apparently a problem. There is a laboratory available for quality control of medicines, both routine and if allegations arise, and a special inspection unit in the Ministry of Health.

Remuneration for wholesalers and pharmacies is statutorily regulated. In 2014, the wholesale mark-up was 6% on the ex-factory price or import price; the pharmacy mark-up depends on the type of product. A reduced rate of value added tax is also added for medicines, and some customs duties are added for imported medicines *(55)*.

Medicines that are eligible for reimbursement are funded through mandatory health insurance and occasionally through co-payments. Health insurance contributions are transferred from the state budget for vulnerable groups such as unemployed persons or refugees. Patients have to pay for non-reimbursable medicines out-of-pocket. There is a separate budget for medicines for rare diseases.

The reimbursement list is in five parts.

- Medicines on list A can be prescribed by GPs and are dispensed in retail pharmacies. They are 100% reimbursed but a prescription fee of 50 din is charged. Statins are completely reimbursed for hypercholesterolaemia but not otherwise.
- Medicines on list A1 can also be prescribed by GPs and dispensed in retail pharmacies but they require a co-payment ranging between 10% and 90%.

- Medicines on list B are dispensed in outpatient services and in hospitals and are fully reimbursed.
- Medicines on list C (such as cancer drugs) are expensive, require specific prescriptions and are provided in hospitals. They are 100% reimbursed.
- List D contains non-registered medicines which are dispensed via specialized pharmacies and are 100% refunded.

The reimbursement list is an integral part of the Rulebook on Reimbursement and is published in the Official Gazette. The list is regularly updated.

For the last 20 years, medicines on lists A and A1 (see above) have had to be prescribed with a brand name which is shown on the reimbursement list. Central procurement is mainly by brand and not by generic drug.

Prescribing practices have been analysed and show considerable variation between practices and doctors. The top 10 prescribers are invited to discuss the reasons for their practices, but this is not linked to performance monitoring or sanctions. Prescriptions are also analysed to see if they violate certain limits and indicators. Since 2013, prescriptions to a value of under 1000 din are a composite part (20%) of the payment formula for PHC providers, which is made up of a further 30% for preventive services, 40% for accepting registration as a patient's chosen doctor and 10% for efficiency *(50)*.

For diabetes, prescriptions are provided by a patient's GP on the basis of an endocrinologist's report. Access to continuous medication requires chronic patients to obtain a monthly prescription from their GP, even when the initial prescription has been made by another physician. The inconvenience for patients and additional workload for doctors are clear.

In 2013, the International Diabetes Survey of access to medicines and supplies for people with diabetes *(56)* reported that some respondents in Serbia had been having difficulties obtaining their diabetes supplies within the previous two years, which was confirmed by health care professionals. While affordability was a key issue, the majority reported facing problems with stock issues. Blood glucose monitoring devices and insulin were the products most affected. The problems took a few days to a few weeks to resolve and were greater in rural than urban areas. Although insulin, pens and related supplies, syringes and needles are free and diabetes drugs are free or partially covered, people were paying out-of-pocket contributions to the costs of their treatment either to complement public insurance coverage or to overcome shortages and stock issues. Serbia did not participate in the equivalent International Diabetes Federation global survey of 2016.

The RHIF approves blood glucose test strips and glucometers, and determines the number according to the seriousness of the condition. They are free for people with type 1 diabetes (50 test strips per month for adults) and for children and pregnant women (150 test strips per month per person). Otherwise, they are not covered and need to be paid for 100% by the patient.

For cancer medicines, too, it was reported that patients in remote areas sometimes have to wait for the drugs to become available. The central procurement process does not appear to be working as well as it could to assure stocks in remote areas.

In recent years, the laws and regulations on opioids have been revised and good access has been ensured to opioids for palliative care and pain relief. Prescription for opioids can be given for two weeks by any doctor at PHC level. In practice, however, many PHC doctors are afraid to prescribe opioids and often ask specialists for advice, which complicates patients' access to those drugs.

Pharmacy training lasts five years. There are two legal entities for pharmacies: institution and sole trader where the owner must be a pharmacist. Currently no regulations are in place covering the distribution of pharmacies.

In 2014, there were around 3500 pharmacies, 80% of which were privately owned. Publicly owned pharmacies are allowed to dispense reimbursable medicines in accordance with their contract with the RHIF. Private pharmacies can agree with the RHIF to be in the system but public procurement does not apply to them. They invoice according to the central prices.

Over the past decade, the pharmaceutical sector is said to have shifted its focus and now strives to achieve the triple objective of better quality care, better health care outcomes and reduced costs *(57)*. Currently, only five pharmaceutical services are defined as primary level services: dispensing of prescription medication; preventive counselling on the rational and correct use of medicine; advanced pharmacotherapeutic measures and the method of rationally using and prescribing medication; reporting and monitoring of adverse reactions to medicines; and preparation of magistral/galenic[8] drugs. The Pharmaceutical Chamber believes that the number of defined services offered by pharmacists is disproportionate to their level of competence, especially in comparison with other health care professionals such as physicians and dentists. It suggests that there is further potential for expanding the role of pharmacists with regard to chronic diseases, for example by expanding services to include vaccination, health promotion, health education and disease management. This would require a significant investment in pharmaceutical infrastructure and improvement in the competences of pharmacists. The Chamber and its team of pharmacists already conduct activities in relation to counselling for patients, health promotion (for example, through patient leaflets and celebration of specific World Days) and support for patients such as those with heart disease and stroke.

Challenge 12. Managing health systems

The qualifications for health managers are not clearly defined, and most managers are politically appointed. As a result they suffer from a lack of professionalism and autonomy which, in this context, limits their ability to innovate and manage change towards improving NCD-related results and is a source of frustration for all concerned. Evaluations of their work and opportunities for continuing training are limited, which has an impact on the quality, effectiveness and efficiency of health care providers. The lack of strong management competences is particularly noticeable when combined with provider-induced demand (decision rights).

Health care providers' boards of directors include community leaders and health care professionals, which has the potential to promote their engagement in health care delivery. Nonetheless, it is not possible to analyse the full range of this policy and these stakeholders' roles and responsibilities in NCD prevention.

Multiple tools exist for monitoring providers, operating in parallel and providing different (and sometimes inconsistent and contradictory) information according to different institutional recipients. This reduces providers' credibility and the prompt implementation of corrective measures. Moreover, the information collected and used for performance management mainly focuses on the volume of services provided.

The Agency for Accreditation of Health Care Institutions is an example of best practice regarding quality improvement although health institutions are not obliged to be accredited (see Section 4).

Challenge 13. Creating adequate information solutions

Even with a well-established health information system, a major challenge lies in translating data into health policies to address the burden of NCDs effectively.

Serbia has an established system for collecting, analysing and disseminating health data. Data are collected annually on health outcomes and service utilization by the IPHS and the National Statistics Office. The National Health Survey in Serbia 2013 *(12)* provides data on

[8] Galenic formulation deals with the principles of preparing and compounding medicines in order to optimize their absorption. Magistral formulations are those that do not exist commercially but which are prepared for specific patients.

health status, health determinants, the use of health care and health spending, and the health of children and elderly people. The National Health Survey also provides comprehensive data on smoking, alcohol and substance use, and the Global Youth Tobacco Survey 2013 *(13)* specifically focuses on smoking among young people. All data are analysed and disaggregated across socioeconomic groups, including income, place of residence, gender and education level. Data on population health are routinely collected at primary, secondary and tertiary health care institutions through the network of 24 district institutes of public health and are analysed by the IPHS.

Standard reports based on the collected data have been published annually since 1974 in the *Health statistical yearbook of the Republic of Serbia* and are publicly available on the website of the IPHS in open access. These publications present basic data on population, births, morbidity and mortality, environment and health, health care institutions and health care workers, the use of health services and population health indicators. Population births and deaths statistics are provided by the Republic Statistical Office.

The new but as yet unadopted health policy documents (strategy and action plan for public health, strategy and action plan for tobacco control, programme on prevention of the harmful use of alcohol, food and nutrition action plan) are expected to address the scope of the public health problems that were revealed in the surveys. The sources of funding of the proposed strategies are, however, unclear.

One of the challenges in the preparation of strategic documents is insufficient availability of data and their translation into policies. It is essential that reliable data are efficiently and effectively used to scale up interventions for NCD prevention and push the issue higher up the political agenda. There seems to be a need for capacity-building and guidance to carry out evaluations, set priorities according to the needs of the population and available funding, and make internationally comparable calculations.

Population-based surveys

Data on NCD risk factors, which are self-reported and measured (weight, height, blood pressure), are collected via national population-based surveys. Three national health population surveys were conducted in 2000, 2006 and 2013 by the Ministry of Health in cooperation with the IPHS *(12)*. The 2013 survey was harmonized with the European Health Interview Survey and thus aligned with internationally adopted indicators. The surveys provide data on population health, NCD risk factors and health care utilization in different population groups (adults, children and elderly people) *(12)*.

The 2014 national survey on life styles of citizens in Serbia *(14)* provided representative data on the prevalence and patterns of substance use and gambling among the adult population (aged 18–64 years) at the national and regional levels.

The 2013 Country Report on the Global Youth Tobacco Survey *(15)*, conducted by the Office for Smoking Prevention with the support of the Ministry of Health and the Regional Office, provided representative data on the prevalence and patterns of substance use among young people aged 13–15 years.

Diabetes and ACS data, but not stroke data, are registered in the annual health report.

Registries

There are several registries for data on selected NCDs which provide data from primary, secondary and tertiary health care institutions for analysis and publication.

- The ACS registry has been a legal obligation since 1980. It records all cases of ACS in Serbia, including the sociodemographic features of patients, ACS electrocardiographic recording, date of diagnosis, mode of treatment, disease outcome and reporting date, with classifications and codes using international diagnostic criteria *(58)*. However, the inadequacy of data on the registration form, imprecise methodological instructions, limited human resources and lack of information technology support have resulted in subregistration of newly discovered cases of coronary disease. Several laws and by-laws have been passed to improve the data quality of the register since the 1990s. In 2006, the ACS Population Register in Serbia *(59)* was established.
- The Serbian Diabetes Registry comprises data on health care institutions' reporting of diabetes, data on newly diagnosed cases of diabetes, type of diabetes, date of diagnosis, outcome of the disease and the registration date *(60)*.
- The Cancer Registry of Central Serbia is a well-functioning national population-based cancer registry that provides high-quality incidence data. The registry has existed since 1970 and includes data on new cases of cancer, incidence of multiple primary tumours (if any), date of detection of the illness, diagnostic methods, tumour characteristics (primary and secondary localization, histology type, stage), outcome of the disease and on the health institution reporting the malign tumour *(9)*. Stage data are not reported but some information on extension of the disease could be provided to experts. Missing data account for one fifth to one third of cases. No survival data are available at the registry. The hospital registry at the Institute of Oncology has registered information about patients and their treatment since 1990 but has never produced survival statistics. Three years ago a new health information system was introduced (HELIANT) that has disrupted the way the hospital registry works. As HELIANT was primarily designed for PHC a lot of customization has been required which is not yet complete. HELIANT is useful for retrieving information about an individual patient but not for retrieving series and analyses of data.

The registries use different electronic systems to register cases. Annual reports are published by the IPHS; the latest publications contain data from 2016 on ACS and diabetes and from 2014 on malignant diseases.

Electronic data recording and processing

An electronic data recording system at primary health centres is in place but the system (with unified standard software) is not yet fully established nationwide. It creates the opportunity to have joint e-records for patients in place of the current separate patient cards in each PHC department. Even though the patients' records are collected electronically, the reporting is still done in paper form. At present, electronic reporting is done by the IPHS and the RHIF, which have their own data collection systems. The new e-recording software could also support the collection of data on risk factors for NCDs, risk stratification, electronic appointment-making, follow-up and an e-referral system. It will also allow patients to access their own records from 2017. Before, patients could only access their records through the health professionals they were referred to in order to protect the confidentiality of their data.

Challenge 14. Overcoming resistance to change

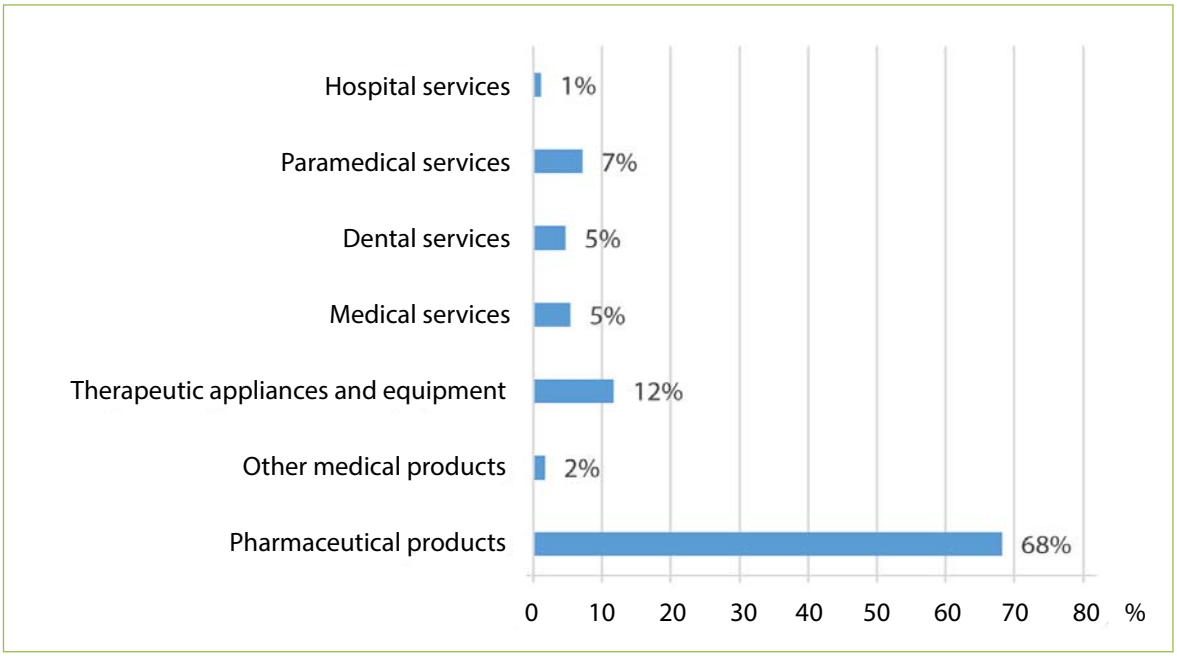
The clinical leadership and commitment of health care professionals are remarkable in an environment where resources are restricted. Some years ago there was a national programme to praise the best providers in the country. The team did not, however, observe a structured recognition and reward programme dedicated to good practices. This can limit their dissemination and the commitment of health professionals.

The need for improvement is recognized by most of the stakeholders even though a majority of them do not feel that they are contributing to the development of solutions. A crucial factor to achieve success in a reform process is the engagement of professionals in that change. In addition, the lack of professionalism among management and their limited autonomy constrains managers' ability to implement change. The strategy for the prevention of NCDs has expired. A planned strategy for public health with a clear action plan and defined indicators could be a good tool to engage other stakeholders in making change happen.

Challenge 15. Ensuring access to care and dealing with the financial burden

As stated above, the share of government spending allocated to health is high, reflecting the commitment towards universal health coverage. Nonetheless, in 2016 40.47% of all health expenditure was accounted for by out-of-pocket payments which can lead to catastrophic health expenditure. The 2015 household budget survey (Fig.13) shows that most such payments are related to pharmaceutical products (68%), followed by therapeutic appliances and equipment (12%) *(25)*. It is, therefore, hard to understand why the medicines that constitute list A (drugs dispensed by community pharmacies) require a medical prescription based on brand names. There is a clear opportunity to reduce waste and increase value by introducing international non-proprietary name prescriptions.

Fig. 13. Monthly average expenditure by individual households on health, Serbia, 2015 (% per household)



Source: Statistical Office of the Republic of Serbia *(25)*.

Patients' financial protection is diminished by informal payments. WHO will be studying this in more detail. Arsenijevic, Pavlova & Groot *(62)* identified three types of out-of-pocket patient payments in the public health care sector in Serbia: official copayments, informal payments and payments for "bought and brought goods". Official copayments do not substitute for the other two types of payment. Payments for "bought and brought goods" are more frequent than informal patient payments. Using the data from the Serbian Living Standard Measures Study carried out in 2007 (the most recent such study to be carried out in the country), the

authors concluded that payments for "bought and brought goods" take the highest share of the total annual household budget. The most recent data available from the annual household budget survey (2016) indicate that 4.3% of a household's individual consumption is for health, of which 2.9% is for medicines *(63)*.

The diagnoses responsible for the highest number of hospitalizations are NCD-related, the leading cause being lung cancer (Table 9). Primary and secondary prevention strategies should be carefully reanalysed for their impact on hospitalization rates.

Table 9. The top 10 causes of hospitalization, Serbia, 2015

ICD-10 code	Diagnosis	Number of hospitalizations
C34	Malignant neoplasm of bronchus and lung	22 230
C50	Malignant neoplasm of breast	19 996
E10	Type 1 diabetes mellitus	19 643
I20	Angina pectoris	19 296
I10	Essential (primary) hypertension	17 471
J44	Other chronic obstructive pulmonary disease	15 869
K40	Hernia inguinalis	15 794
I21	Acute myocardial infarction	14 694
H25	Age-related cataract	14 645
I63	Cerebral infarction	13 910

Source: IPHS *(64)*.

4. Innovations and good practices

The team found several examples of good practice in the health care system.

- The development of the ACS network demonstrates that a strategically organized process can be implemented. The full process consists of the planning of human and financial resources (and training), infrastructures, an information technology and communication network, and evaluation and quality processes. Clinical outcomes are comparable with the best international results.
- A pilot project covering diabetes facilities at PHC centres has started with needs assessments at different levels of care, with the involvement of the multidisciplinary team at all levels of conception and implementation of the programme. Clinical outcomes results are awaited.
- Accreditation of health care institutions is improving quality, safety and the patient experience. The Agency for Accreditation of Health Care Institutions was established in October 2008 to carry out the technical, regulatory and development accreditation activities of health providers. Since July 2009, it has been implementing the accreditation process by setting standards, training external auditors and assessing the quality of health care. Until 2012, the Agency worked closely with the Ministry of Health and the Institute of Public Health of Serbia (IPHS) in collecting data on the performance of health care institutions, and made ratings of institutions with awards for the winners.
- Salt content has dropped in daily school meals. A small-scale study in 2013 investigated the salt content of ready-to-eat foods and daily meals served in kindergartens, student canteens and enterprise/institutional cafeterias in Novi Sad, the second-largest city *(65)*. The researchers found that the average salt content had risen from 1.8 g in 2005 to 8.1 g in 2007 in kindergarten meals, from 8.1 g in 2005 to 13.1 g in 2007 in student canteens, and from 3.8 g in 2005 to 5.1 g in 2007 in workplace cafeterias *(66)*. In the years that followed, the Institute of Public Health of Vojvodina received support from the local government and the Provincial Secretariat for Health Care, Social Policy and Demography to set up a monitoring programme on salt content in served meals in kindergartens, school canteens, boarding schools and student cafeterias, which has resulted in a significant drop in the average annual salt content in daily school meals *(65)*.
- A Standing Conference of Towns and Municipalities in Serbia was established in 2004 to advocate the interests of local authorities. It also serves as a key point in information-sharing and capacity-building, offering a platform for the development of capacities and intersectoral cooperation. The Conference works with the health sector through local health councils to enhance access to services, improve quality of life and advance NCD-related issues. Through such joint work, decentralized and inclusive cooperation can harness the potential of local and regional partnerships and enhance health, economic and development opportunities.

5. Policy recommendations

5.1 Strengthen coordination and governance

Sectors are segmented in the public administration despite some examples of intersectoral cooperation between government agencies. The proposed national council of public health (article 16 of the Public Health Law) will present an opportunity to strengthen intersectoral planning and action towards more effective NCD-related preventive action. Experience at local level is encouraging and exchange of experiences should be supported and facilitated. In this regard, the Standing Conference of Towns and Municipalities in Serbia clearly offers a good platform for intersectoral cooperation, building on established platforms that support information-sharing and collaboration with local health councils.

The team recommends that:

- the setting up of the national council for public health as per article 16 of the Public Health Law should be accelerated;
- advocacy should be undertaken for NCDs to remain a standing item on the agenda of the Intersectoral Committee for Poverty Reduction and Social Inclusion;
- intersectoral cooperation at the local level should be supported by building on the mechanisms for information-sharing and collaboration established by the Standing Conference of Towns and Municipalities.

5.2 Establish a coherent framework of mandates, strategies and action plans for NCD

Many NCD-related draft strategic documents (public health strategy and action plan and vertical programmes) are in the process of being adopted. There is, however, a lack of coherence in the targets and indicators and missed opportunities to formulate specific, measurable, attainable, realistic and timely objectives. The expired strategy should be evaluated to identify some of the weaknesses in the plans, including for governance and monitoring and evaluation.

The team recommends that:

- the expired NCD plan should be evaluated and an assessment made of the coherence of and gaps in the many NCD-related draft strategic documents that are currently in process of adoption (the public health strategy and action plan and vertical programmes);
- the new public health strategy for 2017–2025 should be adopted, including targets, indicators, timelines and budgets aligned with European and global mandates;
- a clear accountability framework should be established for NCDs describing the tasks, responsibilities and reporting lines between the partners to avoid duplication of tasks.

5.3 Accelerate efforts to control tobacco, alcohol, nutrition and other lifestyle risk factors

The greatest opportunity to improve the outcomes from NCDs lies in scaling up population interventions to reduce the prevalence of smoking and alcohol abuse and to promote healthier lifestyles. Assessment of the coverage by core interventions for tobacco and alcohol control reveals that there is substantial scope to do this.

The team recommends that:

- priorities should be set based on criteria such as cost-effectiveness, feasibility of implementation (technical, political, cultural, financial and legal), what is already being successfully implemented, what responds to the situation analysis, and what is linked to the national vision, goals and targets;
- options should be explored to accelerate the implementation of:
    - cost-effective measures and stronger legislation for smoke-free environments (to include the hospitality sector and workplaces);
    - warnings of dangers of tobacco and smoke (warning labels to cover 65% of front and back as per the EU directive *(20)*);
    - scaled up enforcement of tobacco advertising, promotion and sponsorship;
    - regular increases in tobacco taxes, taking into consideration inflation and the increase in the purchasing power of the population;
    - a ban on advertising to prevent alcohol use (to include products with an alcohol percentage of less than 20% as per the Law on Advertising under the Ministry of Trade);
    - special taxes on alcohol products attractive to young people, better enforcement of the minimum purchase age regulation and a lower allowed blood alcohol level for drivers of 0.1 g/L;
    - nutritional standards and school meals for all children in primary schools, potentially provided by school kitchens;
    - a reduction in salt intake and salt content in foods (following the good example implemented in Novi Sad).

5.4 Increase health literacy in the population and support self-management by patients

Smoking and drinking are still considered part of culture and tradition. The low health literacy of the population is reflected in their poor awareness of potential risks such as smoking, alcohol consumption, unhealthy diets and physical inactivity. The role of civil society is expanding and can be an important partner to advance health literacy.

The team recommends that:

- effective policies should be developed to increase health literacy in the general population and contribute to a higher value placed on individuals' health, better compliance with the laws, adoption of healthy behaviour and a healthy lifestyle and creation of socially supportive healthy environments;
- programmes should be initiated in schools as major settings for improving health literacy;
- although patient education and counselling for diabetes in PHC is promising, structured curricula for patient education are needed with better training of doctors and nurses and potentially involving patients or patients' associations.

5.5 Strengthen human resources for the prevention of NCDs

Human resource planning needs to be better aligned with the population's health needs. Staff working in public health need to strengthen their competences in intersectoral work, health impact assessment and economic evaluation. Health care professionals should be more closely involved in the current human resource plans to reflect health care needs and the regionalization of services. The education strategy for medical (and other health care) professionals should be

developed so that they can be educated/trained to make a better contribution to NCD prevention in the community. More outcome-based performance of medical professionals is needed. The present engagement of the community and health care professionals in management is good but managers need a greater degree of professionalism.

The team recommends that:

- capacity should be built to address the intersectoral nature of NCD in public health and PHC;
- the Ministry of Health and Ministry of Education should work closely with academic institutions and health care providers with the aim of educating and/or (re)training medical professionals in PHC centres and regional institutes of public health to enable them to make a better contribution to NCD prevention in the community, including the following measures:
  - incentives should be introduced for doctors specializing in general practice;
  - PHC nurses must be specialized in PHC/community nursing and play a more advanced role in NCD risk assessment and health education and motivational counselling for patients with NCDs and with individuals at risk for NCDs;
  - the profile of the workforce in regional institutes of public health should be better balanced towards NCD-related needs including, for example, more specialists in health promotion and health education (such as graduates of social medicine and/or public health programmes);
- palliative care education should be improved among all health professionals and the training strengthened for those giving home care and palliative care in hospitals;
- management should be professionalized.

5.6 Orientate health financing to improve support for NCD prevention

There is a relatively high level of financial commitment in health care but better value could be obtained with the resources invested. The budget for preventive health programmes has been constantly reduced in recent years, impairing the implementation of NCD prevention activities. The administrative purchaser : provider split is an opportunity to improve the autonomy of the provider and to implement payment models more aligned with NCD control. Clinical leadership and commitment is in place and there is an opportunity to further recognize and reward good practice. While a variable component of the salary is dependent on performance, it is not meaningful and could be aligned more closely with NCD clinical outcomes. Policy-makers should pay more attention to increasing financial protection for patients by reducing waste in the pharmaceutical area and combating fraud and corruption.

The team recommends that:

- the balance between prevention and treatment should be redressed and sources of financing identified for an accelerated response to NCDs and related risk factors;
- waste should be reduced and value increased by introducing international nonproprietary name prescriptions and clarifying the rules for copayments according to health and social needs;
- payment mechanisms should be aligned with NCD management: for example, the performance of health care institutions in the areas of NCD prevention and management should be monitored better and aligned with payment methods and incentives;
- the payment formula for PHC workers should be revised and consideration given to introducing meaningful incentives for the management of NCDs;
- hospital payment models should be analysed so as to reflect the need for a more integrated care pathway.

5.7 Use health information and performance monitoring systems to improve outcomes

Good links between public health and primary care services exist but need better synergies through bringing together population and individual perspectives. The development of a common and comprehensive performance measurement strategy that considers clinical outcomes would increase responsiveness and potentially improve the performance of the system. Monitoring services based on volume should go further by monitoring and benchmarking performance and clinical outcomes. The current monitoring systems are a significant burden on health care professionals. The implementation of electronic health records affords further opportunities for an incremental evolution in the monitoring process, moving to an automated benchmarking performance and clinical outcomes process.

The team recommends that:

- the information available at national level from health insurance, national statistics and the RHIF should be brought together to support situation analyses and strategic planning;
- the implementation of electronic health records should be exploited to support prevention and medical decisions by integrating chronic disease modules and business intelligence tools to give feedback;
- a single performance management strategy should be developed, taking into account relevant and feasible NCD outcome indicators;
- stage of cancer should be registered at diagnosis and survival analyses developed to monitor and evaluate investment in screening and treatment;
- a critical appraisal of data should be incorporated to support future recommendations and policies;
- result-based indicators for the performance of health care institutions should be defined and used for monitoring performance and/or benchmarking PHC institutions;
- a continuing surveillance system for risk factors and their determinants should be established to assess the effectiveness of population interventions and to improve accountability for the implementation of NCD interventions.

5.8 Develop a more effective model of service delivery, improve coordination between providers and strengthen evidence-based practice

PHC teams of chosen doctors (functioning as GPs, paediatricians and gynaecologists) and nurses have good potential to be in the centre of care, but their scope of services and practice should be revised to reduce the current fragmentation. Management of diabetes is on track but the issue now is to develop a more coordinated and patient-centred approach which could also be used for other NCDs. The ACS network is well-organized (at its best in the capital) but stroke care needs to catch up. The stratification of the population for cardiovascular risk and a more targeted approach to identification and management of cardiovascular risks is needed. The skills and practice for lifestyles counselling and diabetic risk assessment and care could also be used to benefit cardiovascular risk.

The team recommends that:

- GPs and PHC nurses should have a stronger role in the provision of first contact, person-centred and coordinated care for patients with NCDs by:
    - ensuring that they can enhance their competences through a specialization in general practice/PHC;

    - task-sharing among nurses with proper competences and supporting organizational arrangements to enable them to provide counselling services for patients with NCDs;
- PHC practice should be better organized and clinical pathways more clearly defined to enable a more efficient, effective and patient-centred approach with, for example, better managed and faster patient transitions within PHC;
- evidence-based guidelines should be kept up to date and compliance monitored better;
- electronic health records should be used to unify paper records from different PHC departments, support risk stratification and follow-up and gain a better understanding of the health needs and priorities of the PHC population;
- there should be more communication and linkages between the home care nurses and the GPs in the interests of NCD prevention and management;
- good practices in NCD management should be identified and promoted and experience shared, for example, between diabetes and CVD risk management, and between ACS and stroke networks and care;
- physicians' workloads should be reduced by using alternative methods of renewing prescriptions for the continuous medication of patients with chronic conditions;
- duplication and the potential waste of resources within screening should be reduced by, for example, ceasing to offer opportunistic screening for cervical cancer (annual check-up) where the population-based programme is being implemented;
- coordination and communication should be improved among service providers as regards screening (from invitation to final treatment).

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Annex 1. Data sources and methods

The principal source of data on demographic and health-related indicators for this report was the European Health for All database.[1] Most of the data were for 1980–1990 to 2009–2010. The indicators selected for analysis were based on expert recommendations and practical considerations of the available evidence.

Estimates and projections from data reported annually in the 53 Member States of the WHO European Region were used. The following country subgroups defined in the European Health for All database were applied to distinguish regional trends:

- EU-15: the 15 Member States in the EU at 1 May 2004: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom;
- EU-12: the 12 Member States that joined the EU in May 2004 or in January 2007: Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia;
- the Commonwealth of Independent States until 2006: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, the Republic of Moldova, the Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

The countries in the Region that are not in these groups are: Albania, Andorra, Bosnia and Herzegovina, Croatia, Iceland, Israel, Monaco, Montenegro, Norway, San Marino, Serbia, Switzerland, the former Yugoslav Republic of Macedonia and Turkey.

[1] European Health for All database [online database]. Copenhagen: WHO Regional Office for Europe; 2018 (http://www.euro.who.int/en/data-and-evidence/databases/european-health-for-all-database-hfa-db, accessed 10 January 2018).

Annex 2. Criteria for scoring tobacco-, alcohol- and nutrition-related interventions

Table 2.1. Tobacco control: summary of core service coverage

Coverage	Limited	Moderate	Extensive
Range of antismoking interventions (WHO Framework Convention on Tobacco Control)	Prevalence among adults >30%	Prevalence among adults 18–20%	Prevalence among adults <18%
Raising tobacco taxes	Tax is <25% of the retail price	Tax is 25–75% of the retail price	Tax is >75% of the retail price
Smoke-free environments	100% smoke-free environment enforced only in schools and hospitals	100% smoke-free environment enforced in hospitals, schools, universities, public transport and workplaces	100% smoke-free environment enforced in all public places, including hospitality sector
Warnings on the dangers of tobacco and smoking	Warning labels required on tobacco products (size not specified)	Warning labels required on all tobacco products covering ≥30% (front and back)	Warning labels required to cover >50% (front and back), with graphics (standardized packaging)
Bans on advertising, promotion and sponsorship	No bans on national television, radio or in print	Bans on direct and indirect advertising and promotion	Ban on all advertisements and promotion, including at points of sale, with effective enforcement
Quit-lines and nicotine replacement therapy[a]	No quit-lines; government-funded cessation services, with nicotine replacement therapy allowed if paid in full by the individual	Quit-lines; government-funded cessation services available (possibly with payment by the individual); nicotine replacement therapy available if paid in full by the individual	Free quit-line, with cessation services and nicotine replacement therapy available and affordable (covered at least partially)

[a] Additional criteria not included in the Global action plan for the prevention and control of noncommunicable diseases 2013–2020.
Source for Tables 2.1–2.3: WHO Regional Office for Europe.[1]

[1] Better noncommunicable disease outcomes: challenges and opportunities for health systems. Assessment guide. Copenhagen: WHO Regional Office for Europe; 2014 (http://www.euro.who.int/data/assets/pdf_file/0005/247649/HSS-NCDs_Guide_WEB_Version_20-11.pdf, accessed 8 January 2018).

Table 2.2. Interventions to prevent harmful use of alcohol: summary of core service coverage

Coverage	Limited	Moderate	Extensive
Raising taxes on alcohol	Alcohol taxes follow price index	Alcohol taxes follow price index, with special taxes on products attractive to young people	Alcohol taxes follow price index and are related to alcohol content, including special taxes on products attractive to young people
Restrictions or bans on advertising and promotion	Regulatory framework regulates the content and volume of alcohol marketing	Regulatory framework regulates the content and volume of alcohol marketing, including direct and indirect marketing and sponsorship	Full ban on alcohol marketing of any kind
Restrictions on retail availability of alcohol	Regulatory framework exists on serving alcohol in government and educational institutions	Regulatory framework exists on serving alcohol in government institutions, and serving alcohol is banned in educational institutions	All governmental and educational institutions must be alcohol-free
Regulation and enforcement of minimum purchase age[a]	Minimum age for purchasing all alcohol products is 18 years	Minimum age for purchasing all alcohol products is 18 years, and effective enforcement measures are in place	Minimum age for purchasing all alcohol products is 18 years, effective enforcement measures are in place with loss of licence for illegally selling alcohol to people aged <18 years
Permitted blood alcohol content for driving	Maximum of 0.5 g/L	Maximum of 0.5 g/L for learner drivers and 0 g/L for professional drivers	Maximum of 0.2 g/L for learner drivers and 0 g/L for professional drivers
Multisector policy development[a]	Multisector national strategy on alcohol policy	Multisector national strategy and a coordinating council on alcohol policy	Multisector national strategy, a coordinating council on alcohol policy and an adequately resourced nongovernmental sector, free of potential conflict of interest with public health

[a] Additional criteria not included in the Global action plan for the prevention and control of noncommunicable diseases 2013–2020.

Table 2.3. Diet and nutrition: summary of core service coverage

Coverage	Limited	Moderate	Extensive
Interventions to improve diet and physical activity	Prevalence of overweight and obesity in children and adults (pre-obesity and obesity) is ≥30%	Prevalence of overweight and obesity in children and adults (pre-obesity and obesity) is 20–30%	Prevalence of overweight and obesity in children and adults (pre-obesity and obesity) is <20%
Reducing salt intake and salt content of foods	≤10% reduction of salt intake has been registered since the mid-2000s	Salt intake has been reduced by ≥10% since the mid-2000s	Salt intake has been reduced by >10% since the mid-2000s
Virtual elimination of trans fatty acids from the diet	No evidence that trans fats have been significantly reduced in the diet	Trans-fats have been reduced in some food categories and in certain industries but not overall	Trans fats are virtually eliminated from the food chain through government legislation and/or self-regulation
Reducing free sugar[a] intake[b]	Reduction of the intake of free sugars is mentioned in policy documents, but no action has been taken	Reduction of the intake of free sugars by 5% is mentioned in policy documents and partially achieved in certain food categories	Reduction of the intake of free sugars by 5% is monitored, with a focus on sugar-sweetened beverages
Increasing intake of fruit and vegetables[b]	The aim to increase consumption in fruit and vegetables is mentioned, but no monitoring data have been collected	The aim to increase consumption of fruit and vegetables is in line with the recommendations of WHO and the Food and Agriculture Organization of ≥400 g/day, and some initiatives exist to this effect	The aim to increase consumption of fruit and vegetables is in line with the recommendations of WHO and the Food and Agriculture Organization of ≥400 g/day, with population initiatives in place and incentives to increase availability, affordability and accessibility
Reducing marketing pressure on children to consume food and non-alcoholic beverages[b]	Marketing of foods and beverages to children is noted as a problem, but no specific action has been translated into government-led initiatives	WHO's recommendations on marketing have been acknowledged and steps have been taken for self-regulation to reduce marketing pressure on children	WHO's recommendations on marketing and a framework for implementation are followed consistently, including a mechanism for monitoring
Promoting awareness about diet and activity	No workforce has been developed for nutrition and physical activity, and nutrition and physical activity are not priorities in PHC	Some workforce has been developed for nutrition and physical activity; nutrition and physical activity are considered priorities in PHC	Workforce has been developed for nutrition and physical activity, and nutrition and physical activity are priorities in PHC

[a] Free sugars are monosaccharides (such as glucose, fructose) and disaccharides (such as sucrose).
[b] Additional criteria not included in the Global action plan for the prevention and control of noncommunicable diseases 2013–2020.

Annex 3. Criteria for scoring coverage of individual services for CVD and diabetes

NCD	Limited	Moderate	Extensive
CVD and diabetes			
Risk stratification in PHC	10-year CVD risk documented in fewer than 30% of records of patients aged >40 years with at least one main CVD risk factor. Specific risk factors not routinely documented.	10-year CVD risk documented in 30–60% of records of patients aged >40 years with at least one main CVD risk factor. Incomplete risk factor documentation or not using systematic method.	10-year CVD risk routinely documented in more than 60% of records of patients aged >40 years with at least one main CVD risk factor. Systematic method of calculation with routine documentation of specific risk factors.
Effective detection and management of hypertension	Fewer than 30% of estimated cases with high blood pressure identified in PHC, evidence-based generic antihypertensive drugs infrequently prescribed, no efforts made to address patient adherence.	30–60% of estimated cases with high blood pressure identified in PHC, evidence-based antihypertensive drugs often (25–75%) prescribed, some efforts made to increase patient adherence but not systematic.	More than 60% of estimated cases with high blood pressure identified in PHC, evidence-based generic antihypertensive drugs routinely (>75%) prescribed; government-funded systematic efforts made to increase adherence.
Effective primary prevention in high-risk groups	Prescribers unaware of indications for primary prophylaxis. Under 10% of patients with very high (>30%) 10-year CVD risk identified and prescribed multidrug regimens (antihypertensive, acetylsalicylic acid and statin) for primary prophylaxis. Acetylsalicylic acid prescribed indiscriminately to all hypertensive patients.	Prescribers aware of indications for primary prevention with multidrug regimen. Low coverage (10–25%) of very high-risk patients with primary prophylaxis or appropriate drug regimens prescribed but very low patient adherence. Acetylsalicylic acid prescribed indiscriminately to all hypertensive patients.	Routine prescription of multidrug regimens, including statins, for patients at very high CVD risk. Coverage of at-risk patients exceeds 25%. Evidence of good long-term patient adherence. Acetylsalicylic acid not prescribed to hypertensive patients with low or medium CVD risk.
Effective secondary prevention after AMI including acetylsalicylic acid	Fewer than 25% of patients after AMI receive acetylsalicylic acid, beta-blockers and statins.	25–75% of patients after AMI receive acetylsalicylic acid, beta-blockers and statins.	More than 75% of patients after AMI receive acetylsalicylic acid, beta-blockers and statins.
Rapid response and secondary care after AMI and stroke[a]	Fewer than 25% of those with AMI or stroke receive diagnosis and care within six hours of first symptoms.	25–50% of those with AMI or stroke receive diagnosis and care within six hours of first symptoms.	More than 50% of those with AMI or stroke receive diagnosis and care within six hours of first symptoms.

	Limited	Moderate	Extensive
Diabetes			
Effective detection and general follow-up[a]	Fewer than 75% of PHC practices establish and maintain a register of all patients aged ≥17 years with diabetes. <25% detection/registration rate, based on estimated prevalence of type 2 diabetes in adult population. Not using evidence-based, systematic method to select asymptomatic patients for screening.	25–75% of PHC practices establish and maintain a register of all patients aged ≥17 years with diabetes. 25–50% detection/registration rate, based on estimated prevalence of type 2 diabetes in adult population. Using evidence-based, systematic method to select asymptomatic patients for screening, but limited coverage.	More than 75% of PHC practices establish and maintain a register of all patients aged ≥17 years with diabetes. More than 50% detection/registration rate based on estimated prevalence of type 2 diabetes in adult population. Using evidence-based, systematic method to select asymptomatic patients for screening with high coverage.
Patient education on nutrition and physical activity and glucose management	Fewer than 25% of those diagnosed with type 2 diabetes made at least three PHC visits in past year. Fewer than 25% of registered people with diabetes receive organized dietary counselling. PHC gives no counselling about physical activity. Fewer than 25% of registered people with diabetes had glycosylated haemoglobin measurement in past 12 months.	25–75% of those diagnosed with type 2 diabetes made at least three PHC visits in past year. 25–75% of registered people with diabetes receive organized dietary counselling. PHC routinely offers counselling on physical activity. 25–75% of registered people with diabetes had glycosylated haemoglobin measurement in past 12 months.	More than 75% of those diagnosed with type 2 diabetes made at least three PHC visits in past year. More than 75% of registered people with diabetes receive organized dietary counselling. PHC routinely offers counselling and options for physical activity through partnerships. More than 75% of registered people with diabetes had glycosylated haemoglobin measurement in past 12 months.
Hypertension management among diabetes patients	Fewer than 25% of registered people with diabetes with hypertension have achieved a blood pressure <140/90 mmHg; ACE inhibitors not routinely prescribed as first-line antihypertensive.	25–75% of registered people with diabetes had foot and eye examinations (fundoscopy) and urine protein test in past 12 months.	More than 75% of registered people with diabetes with hypertension have achieved a blood pressure <140/90 mmHg; ACE inhibitors routinely prescribed as first-line antihypertensive.
Preventing complications	Fewer than 25% of registered people with diabetes had foot and eye examinations (fundoscopy) and urine protein test in past 12 months.	25–75% of registered people with diabetes had a foot examination , eye examination (fundoscopy) and urine protein test in past 12 months.	More than 75% of registered people with diabetes had foot and eye examinations (fundoscopy) and urine protein test in past 12 months.

[a] Indicates criteria additional to those mentioned in the Global action plan for the prevention and control of noncommunicable diseases 2013–2020 (Geneva: World Health Organization; 2013).

Annex 4. List of participants

November 2016

Dr Vesna Knjeginjić, Assistant Minister, Ministry of Health
Dr Zoran Mihailović, Assistant Minister, Ministry of Health
Dr Zoran Panajotović, Assistant Minister, Ministry of Health
Professor Vesna Bjegović Mikanović, Director, School of Medicine, University of Belgrade
Professor Nebojša Lalić, Dean, School of Medicine, University of Belgrade
Dr Janko Janković, School of Medicine, University of Belgrade
Dr Svetlana Janković, Deputy Director, Head, Centre for Health Promotion, Institute of Public Health, City of Belgrade
Dr Nevenka Pavlović, Deputy Director, Institute of Public Health, City of Belgrade
Ms Jasmina Tanasić, Standing Conference of Towns and Municipalities
Professor Dragan Micić, President, Ministry of Health NCD Commission
Professor Tatjana Pekmezović, Member, Ministry of Health NCD Commission
Dr Snezana Ukropina, Member, Ministry of Health NCD Commission
Dr Arsen Ristić, Member, Ministry of Health NCD Commission
Dr Violeta Vučinić, Member, Ministry of Health NCD Commission
Dr Slobodan Antić, Member, Ministry of Health NCD Commission
Dr Slavica Radjen, Member, Ministry of Health NCD Commission
Dr Tanja Jozić, NCD focal point
Dr Ivana Rakočević, Institute of Public Health, Batut
Dr Snezana Pantić Aksentijević, Ministry of Health
Dr Jelena Gudelj, Head, Centre for Health Promotion, Institute of Public Health, Batut
Dr Biljana Kilibarda, Head, Tobacco Office, Institute of Public Health, Batut
Dr Milena Vasić, National Technical Focal Point on Health Systems
Dr Mirjana Šulović, National Technical Focal Point on Equity
Dr Srmena Krstev, National Technical Focal Point on Tobacco
Dr Sreten Vićentić, National Technical Focal Point on Alcohol
Prof. Dušan Mitić, Faculty of Sport and Physical Education
Dr Sergej Ostojić, Focal Point on Physical Activity
Dr Dragana Balanović, Director, PHC Zvezdara
Dr Dragoljub Stanisavljević, Deputy Director, PHC Zvezdara
Dr Bogdanka Čabak, PHC Zvezdara
Dr Vesna Filipović, Head, Gynaecology Department, PHC Zvezdara
Dr Jelena Stojanović, Head, General Practice Department, PHC Zvezdara
Dr Branko Jovović, PHC Zvezdara
Dr Gordana Stanojević, Head, Statistics Department, PHC Zvezdara
Ms Snjezana Lončar, Chief Nurse, PHC Zvezdara
Dr Milijana Popović, Director, Institute of Public Health, Sabac
Dr Olivera Stojanović, Head, Health Promotion Department, Institute of Public Health, Sabac
Dr Branka Gajić, Head, Statistics Department, Institute of Public Health, Sabac
Ms Katarina Dubljanin, City Architect, Member, Local Health Council, Sabac City
Ms Bojana Mladenović, President, Local Health Council, Sabac City, Head, Social Department
Dr Branislav Vujković, Director, PHC Sabac
Dr Dejan Pavlović, Deputy Director, PHC Sabac
Dr Nebojša Janković, Head, General Practice Department, PHC Sabac
Dr Miroslav Milješić, Head, Preventive Centre, PHC Sabac
Dr Snežana Gavrilović, Head, Paediatrics Department, PHC Sabac
Dr Branko Miljuš, Head, Gynaecology Department, PHC Sabac
Dr Sladjana Kaorin Miletić, Head, Statistical Department, PHC Sabac
Dr Zoran Gojković, Provincial Health Secretariat, Vojvodina

Professor Erzebet Ač-Nikolić, Deputy Director, Institute of Public Health, Vojvodina
Dr Olja Nićiforović, Head, Centre for Health Promotion, Institute of Public Health, Vojvodina
Dr Milka Popović, Head, Centre for Hygiene, Institute of Public Health, Vojvodina
Dr Mila Uverić, City Secretariat for Health, Novi Sad
Dr Zoltan Horvat, City Secretariat for Health, Novi Sad
Dr Ljerka Popov, Deputy Director, PHC Novi Sad
Dr Nina Smiljanić, Sector for Quality Improvement, PHC Vojvodina
Ms Sladjana Šobajić, Serbian Nutrition Society (nongovernmental organization)
Mr Predrag Božić, Society for Sport and Sport Medicine (nongovernmental organization)
Mr Velizar Djerić, Association Sport for All (nongovernmental organization)
Mr Damjan Damjanović, Association of Patients' Organizations of Serbia
Ms Stela Prgomelja, Association of Patients' Organizations of Serbia
Ms Bojana Marković, Association Blue Circle (patients with diabetes)
Ms Jasmina Lukić, Budimo Zajedno (patients with breast cancer) (nongovernmental organization)
Dr Ana Jovićević, Serbian Association for the Fight against Cancer
Dr Dragana Jovic, Institute of Public Health of Serbia

April 2017

Dr Meho Mahmutović, State Secretary
Ms Sladjana Djukić, Assistant Minister for Health Insurance
Dr Vesna Knjeginjić, Assitant Minister for Public Health and Programmatic Health Care
Dr Snežana Pantić Aksentijević, Sector for Public health and Programmatic Health Care
Ms Biljana Čukanović, Special Adviser
Ms Nevena Šović, Sector for International Cooperation and EU Integration
Professor Dragan Micić, President, Ministry of Health NCD Commission and Health Council of Serbia
Professor Neboša Lalić, Dean, School of Medicine and President, Ministry of Health Commission for Diabetes
Professor Vesna Bjegović Mikanović, School of Medicine, University of Belgrade
Professor Snežana Bošnjak, Member, Ministry of Health Commission for Palliative Care
Dr Tanja Jozić, NCD focal point
Professor Aleksandra Jotić, Member, Commission for Diabetes, Ministry of Health
Professor Radan Dzodić, President, Commission for Oncology, Institute for Oncology and Radiology, Ministry of Health
Dr Verica Lazić, Acting Director, RHIF
Dr Dragana Jovićević Antić, RHIF
Dr Slavica Blagić Derikonjić, RHIF
Ms Vesna Vuković, RHIF
Ms Vera Paripović, RHIF
Mr Marko Mitrović, RHIF
Dr Milan Dinić, Director, Medical Doctors Chamber
Mrs Radmila Ugrica, Director, Medical Nurses Chamber
Mrs Snežana Lakčević, Social Statistics Department, Statistical Office
Dr Verica Jovanović, Acting Director, Institute of Public Health of Serbia
Dr Daria Kisić, Assistant Director, Institute of Public Health of Serbia
Dr Jelena Gudelj, Institute of Public Health of Serbia
Dr Milena Vasić, Institute of Public Health of Serbia
Dr Biljana Kilibarda, Institute of Public Health of Serbia
Dr Nataša Mickovski, Institute of Public Health of Serbia
Dragan Miljuš, Institute of Public Health of Serbia
Dr Snežana Živkovic Perišić, Institute of Public Health of Serbia
Dr Maja Krstić, Institute of Public Health of Serbia

Dr Danijela Dukić, Institute of Public Health of Serbia
Dr Bojana Milošević, Institute of Public Health of Serbia
Dr Dušica Banković Lazarević, Institute of Public Health of Serbia
Dr Dragana Jovic, Institute of Public Health of Serbia
Dr Nevenka Pavlović, Institute of Public Health, City of Belgrade
Professor Ivan Marković, Institute for Oncology and Radiology of Serbia
Professor Vesna Plešinac Karapandzić, Institute for Oncology and Radiology of Serbia
Professor Zorica Milošević, Institute for Oncology and Radiology of Serbia
Dr Milan Nadrljanski, Institute for Oncology and Radiology of Serbia
Dr Davor Radosavljević, Institute for Oncology and Radiology of Serbia
Dr Snežana Šušnjar, Institute for Oncology and Radiology of Serbia
Dr Lejla Paripović, Institute for Oncology and Radiology of Serbia
Dr Zorka Milovanović, Institute for Oncology and Radiology of Serbia
Dr Zoran Kozomara, Institute for Oncology and Radiology of Serbia
Dr Ana Jovićević, Institute for Oncology and Radiology of Serbia
Ms Mirjana Gavrilović, Institute for Oncology and Radiology of Serbia
Professor Goran Stanković, Cardiovascular Clinic, Clinical Centre of Serbia
Professor Vesna Stojanov, Cardiovascular Clinic, Clinical Centre of Serbia
Ms Tanja Kojadinović, Cardiovascular Clinic, Clinical Centre of Serbia
Dr Bozica Novaković, Director, PHC Novi Beograd
Dr Ljiljana Jandrić, PHC Novi Beograd
Dr Dragica Spasić, PHC Novi Beograd
Dr Vlada Sretenović, PHC Novi Beograd
Professor Dejana Vuković, School of Medicine, University of Belgrade
Professor Aleksandra Jović Vraneš, School of Medicine, University of Belgrade
Professor Zorica Terzić, School of Medicine, University of Belgrade
Ms Marija Mitić, Agency for Accreditation of Health Care Institutions of Serbia
Mr. Pavle Zelić, Medicines and Medical Devices Agency of Serbia
Mr. Vladan Savić, Medicines and Medical Devices Agency of Serbia
Dr Marija Zdravković, Director, General Hospital Bezanijska Kosa
Dr Borislav Tošković, Assistant Director, General Hospital Bezanijska Kosa
Professor Moma Babić, General Hospital Bezanijska Kosa
Professor Nikola Milinić, General Hospital Bezanijska Kosa
Professor Dejan Nikolić, General Hospital Bezanijska Kosa
Dr Jelica Bjekić, General Hospital Bezanijska Kosa
Dr Zoran Andrić, General Hospital Bezanijska Kosa
Dr Dejan Jović, General Hospital Bezanijska Kosa
Dr Nevenka Zarić, Assistant Director, Hospital for Cerebrovascular Diseases "Sveti Sava"
Mrs Jelena Tolić, Head Nurse, Hospital for Cerebrovascular Diseases "Sveti Sava"
Professor Nela Djonović, Institute of Public Health, Kragujevac
Professor Sanja Kocić, Institute of Public Health, Kragujevac
Dr Gordana Djordjević, Institute of Public Health, Kragujevac
Dr Snežana Radosavljević, Institute of Public Health, Kragujevac
Ms Jelica Djorović, Institute of Public Health, Kragujevac
Dr Vasilije Antić, Director, PHC Kragujevac
Dr Slavica Ločcar, PHC Kragujevac
Dr Nataša Nikelić, PHC Kragujevac
Dr Vidosava Žuveljić, PHC Kragujevac
Ms Nataša Milojević, PHC Kragujevac
Ms Danijela Petrović, PHC Kragujevac
Professor Aleksandar Djukić, Clinical Centre Kragujevac
Professor Vladimir Miloradović, Clinical Centre Kragujevac
Ms Vesna Kazaković, Clinical Centre Kragujevac

Ms Vesna Nikolić, Clinical Centre Kragujevac
Ms Ivana Vasić, Clinical Centre Kragujevac
Ms Jelena Matović, Clinical Centre Kragujevac
Dr Marija Gavrilović, Director, Institute of Public Health, Valjevo
Dr Mirjana Petrović, Institute of Public Health, Valjevo
Dr Zaven der Hazarjan, Director, PHC Valjevo
Dr Violeta Vasić, PHC Valjevo
Dr Branka Antić, PHC Valjevo
Dr Slavica Uskoković, PHC Valjevo
Dr Milan Mirković, PHC Valjevo
Mrs Vladimir Dimitrijević, PHC Valjevo
Ms Vesna Pavlović, PHC Valjevo
Dr Zoran Milosavljević, Assistant Director, General Hospital Valjevo
Dr Katarina Pantelić, General Hospital Valjevo
Dr Danijela Pavlović, General Hospital Valjevo
Dr Jovan Balinovac, General Hospital Valjevo
Dr Darko Cenić, General Hospital Valjevo
Dr Jelena Perović Tomić, General Hospital Valjevo
Dr Aleksandra Milutinović, General Hospital Valjevo
Ms Jasmina Lukić, Europa Donna Serbia (nongovernmental organization).
Mr Mijodrag Bogićević, Acting Director, Belhospice, Centre for Palliative Care (nongovernmental organization)
Dr Nataša Milicević, Belhospice, Centre for Palliative Care (nongovernmental organization)
Dr Leonida Djukanović, Belhospice, Centre for Palliative Care (nongovernmental organization)

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World Health Organization
Regional Office for Europe
UN City, Marmorvej 51, DK-2100 Copenhagen Ø, Denmark
Tel.: +45 45 33 70 00 Fax: +45 45 33 70 01 E-mail: contact@euro.who.int
Web site: www.euro.who.int