

Better noncommunicable disease outcomes: challenges and opportunities for health systems

Country assessment CROATIA

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Better non-communicable disease
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**Croatia country assessment:
focus on cardiovascular
diseases and diabetes**

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Abstract

In Croatia, noncommunicable diseases (NCDs) account for 93% of all deaths. They affect mainly the population of working age, with an 18% probability of premature mortality from four leading NCDs. This has significant socioeconomic consequences on the development of the country, indicating that immediate action must be taken to strengthen the capacity of the health system to respond. Much progress has been made, with political commitment to health reform; however, NCDs were targeted only recently. The assessment reported here, conducted by the WHO Regional Office for Europe in collaboration with the Ministry of Health, will form the basis for integrated approaches to addressing the burden of cardiovascular diseases and diabetes in Croatia. The authors analysed the current capacity of the health system to prevent and control these NCDs and identified major health system challenges; the document also reports good practice in using information technology for integrating patient information. On the basis of the assessment, recommendations are made for further policies and action.

Keywords

CHRONIC DISEASE
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Acronyms and abbreviations

AMI	acute myocardial infarction
CVD	cardiovascular disease
FAO	Food and Agriculture Organization of the United Nations
GP	general practitioner
HIF	Health Insurance Fund
IT	information technology
NCD	noncommunicable disease
NIPH	National Institute of Public Health
PHC	primary health care



1. Introduction and rationale

In Croatia, noncommunicable diseases (NCDs) account for 93% of all deaths, mainly among the population of working age; the probability of premature mortality from the four leading NCDs is 18% (1). This has significant socioeconomic consequences for the development of the country and indicates that immediate action is required to strengthen the capacity of the health system to respond. Although significant progress has been made in health reform in Croatia, with increased political commitment, NCDs were targeted policy only recently. The assessment reported here was conducted as part of collaboration between the WHO Regional Office for Europe and the Ministry of Health of Croatia to develop an integrated approach to reducing the burdens of cardiovascular diseases (CVD) and diabetes mellitus in Croatia.

The assessment is one of a series of country assessments on health system achievements and challenges in NCD control. It is based on the Health Systems Strengthening operational approach of the WHO Regional Office for Europe and on a conceptual framework for country assessments prepared by the Division of Health Systems and Public Health and the Division of Noncommunicable Diseases and Promoting Health through the Life-course. By the time of this publication assessments were conducted in following countries: Armenia, Belarus, Croatia, Estonia, Hungary, Kyrgyzstan, Portugal, the Republic of Moldova, Tajikistan, The former Yugoslav Republic of Macedonia and Turkey.

The aim of this assessment was to make pragmatic, contextualized, actionable policy recommendations for national health system strengthening, in order to support and accelerate gains in improving NCD outcomes. The report and the policy recommendations are designed for use in deciding national policy on health system strengthening and provide background information for work in the field of NCDs. This country assessment therefore formed the basis for the drafting of the integrated national NCD Action Plan (2). Furthermore, as part of a regional project, the assessment will be available on the regional platform for sharing knowledge and experience on common health system challenges and good practices for addressing them.

The assessment was conducted by a multidisciplinary team of regional experts and the WHO Regional Office for Europe. It was based on a structured guide (3) and was tailored to the specifics of Croatian health system. In preparation for the mission, the experts reviewed background literature and policy documents and then either collected and/or analysed data. The multidisciplinary mission, conducted on 1–5 December 2014, was launched with a roundtable discussion involving key actors in the health system to identify the available resources, data, people and institutions for the mission. Then, targeted bilateral meetings were held with health agencies, institutions and non-profit organizations, and the assessment team visited Dubrava Teaching Hospital in Zagreb, family group practices in Breznica and Karlovac and the county government and general hospital in Karlovac, where they conducted interviews. Representatives of national bodies and agencies, including the National Institute of Public Health (NIPH) and the Health Insurance Fund (HIF), were also interviewed. Intensive follow-up was continued after the mission, including a 4-day visit in September 2015. This assessment reflects the views of the experts who participated in both missions.

The structure of the report is as follows: section 2 provides an overview of the trends in the main NCD health outcomes, section 3 provides an assessment of the coverage of core population interventions and individual services for NCDs in Croatia, section 4 discusses the health system achievements and barriers for provision of core NCD interventions and services, section 5 describes selected innovations and best practices, and section 6 concludes with policy recommendations.

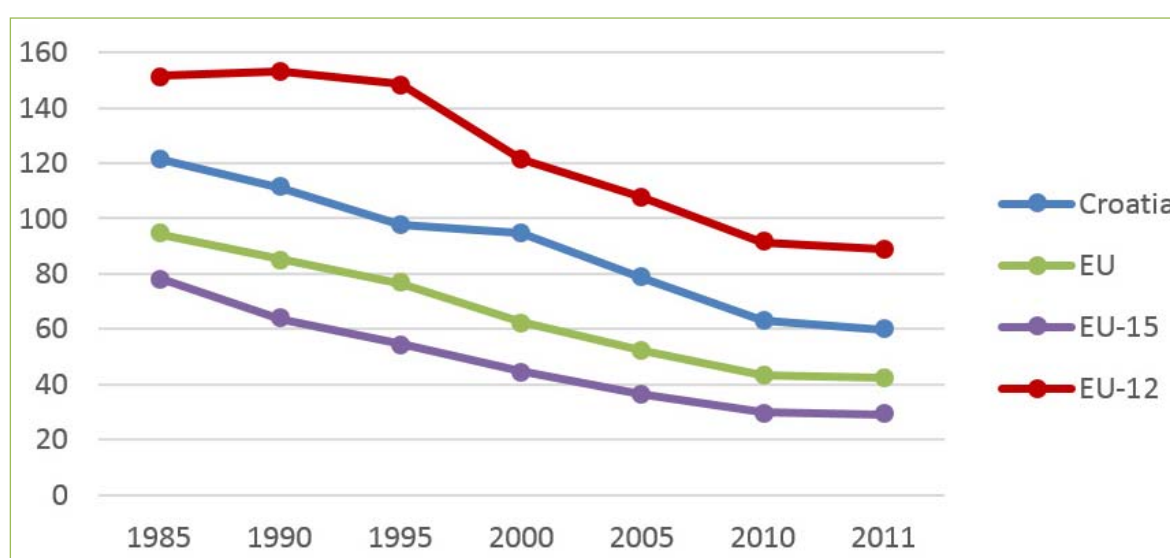


2. Noncommunicable disease outcomes

In view of the current pattern of demographic transition, the burden of NCDs in Croatia is likely to increase. Life expectancy at birth has been increasing continuously since 1980, reaching an average of 77 years for both sexes in 2012 (74 years for men and 80 years for women). According to the European Union survey of statistics on income and living conditions in 2010 (4), healthy life expectancy at birth was lower in Croatia (57.4 for men and 60.4 for women) than the average in the European Union-27¹ (61.8 for men and 62.6 for women) (5). During the past few decades, the population of Croatia has aged, as in other countries in the WHO European Region, and the proportion of the population aged > 65 years increased from 10.6% in 1985 to 18% in 2012 (6). As the prevalence and number of NCDs increase with age, the capacity of the health system to prevent and control these diseases must also increase. The proportion of the total population of Croatia with chronic illnesses or long-term health problems is 38%, which is higher than the European Union-27 average of 31.4%.

WHO estimates that NCDs account for 93% of all deaths in Croatia (1). Despite the decreasing trend in the standardized death rate from diseases of the circulatory system (Fig. 1), it is much higher than the European Union-15² and European Union averages.

Fig. 1. Standardized death rates from diseases of the circulatory system, population aged 0–64 years, 1985–2011



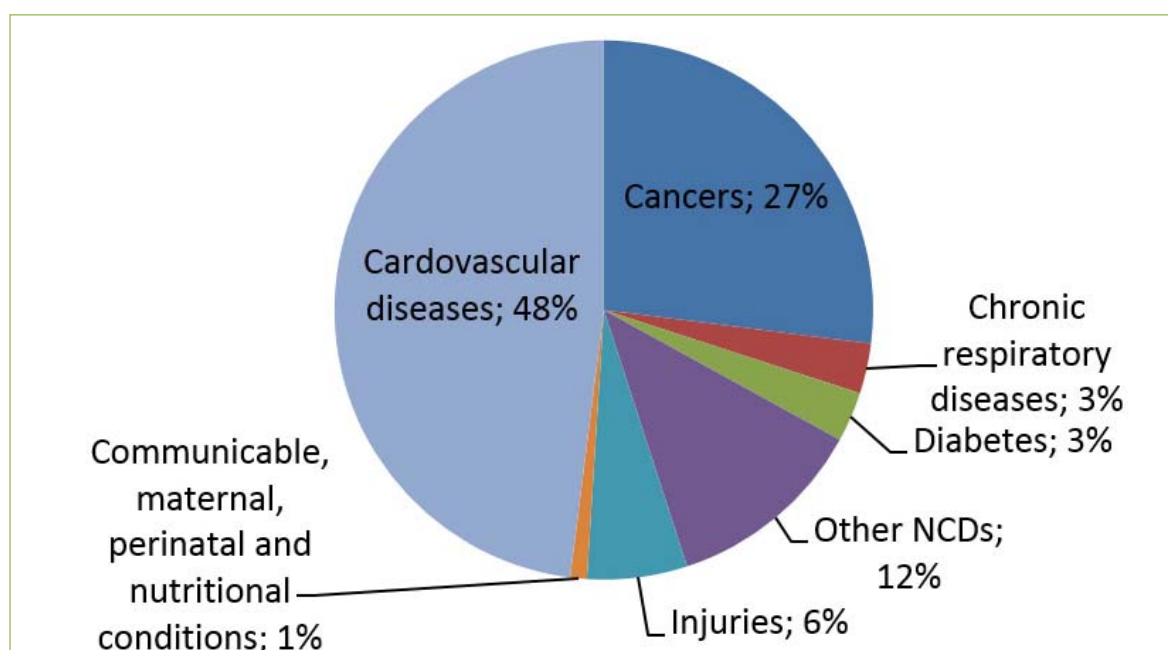
Source: (6)

According to WHO estimates, CVDs account for 48% of all deaths in Croatia (Fig. 2). In the breakdown of mortality from CVDs (Fig. 3), the most prevalent diagnostic subgroups are ischaemic heart disease (21.3%) and cerebrovascular disease (14.4%) (7).

¹ **European Union-27:** Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom

² **European Union-15:** the 15 Member States of the European Union before 1 May 2004 (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and the United Kingdom); **European Union-12:** the 12 Member States that joined the European Union in May 2004 or January 2007 (Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia)

Fig. 2. Proportional mortality (percentages of total deaths), all ages, both sexes, 2014



Source: (1)

The second most prevalent cause of death is cancer, accounting for 27% (Fig. 2). The most common cancer in males was of the trachea, bronchi and lungs (19%), while breast cancer was the most common type in women (22%) (7).

Table 1. Deaths from cardiovascular diseases, by diagnostic group, 2013

Diagnostic group (ICD-10 code)	No.	Percentage	Rate per 100 000
Ischaemic heart disease (I20–I25)	10 772	44.5	251.4
Cerebrovascular disease (I60–I69)	7 243	29.9	169.1
Other forms of heart disease (I30–I52)	2 635	10.9	61.5
Diseases of arteries, arterioles and capillaries (I70–I79)	1 311	5.4	30.6
Hypertensive diseases (I10–I15)	1 947	8.0	45.4
Pulmonary heart disease and diseases of pulmonary circulation (I26–I28)	126	0.5	2.9
Diseases of veins, lymphatic vessels and lymph nodes not elsewhere classified (I80–I89)	76	0.3	1.8
Chronic rheumatic heart disease (I05–I09)	122	0.5	2.8
Total (I00–I99)	24 232	100.0	569.4

Source: Presentation during the assessment mission by the Central Bureau of Statistics and the National Institute of Public Health. Cardiovascular deaths by diagnostic groups in Croatia in 2013. ICD-10, International Classification of Diseases and Causes of Death, revision 10. Geneva: WHO.

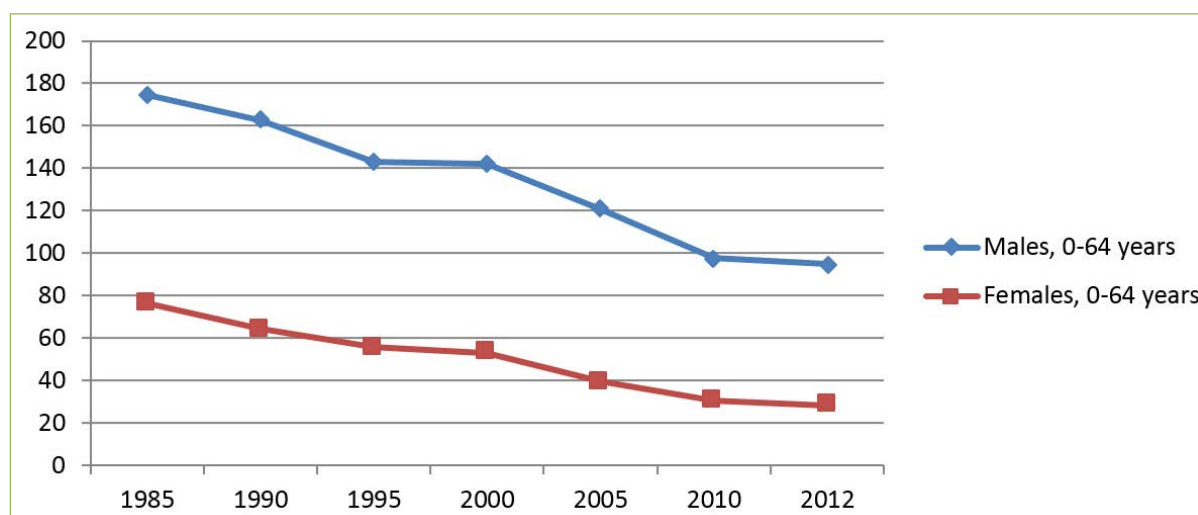
In 2013, diabetes became the eighth leading cause of death in Croatia, accounting for 2.5% of all deaths.³ National reports indicate that the prevalence of diabetes is 6.2%, which is higher than

³ Presentation made during the assessment mission by the Central Bureau of Statistics and the National Institute of Public Health. Cardiovascular deaths by diagnostic groups in Croatia in 2013.

the regional (3.6%) and European Union (4.9%) averages. Recognizing that the rapidly increasing number of citizens with diabetes is having a major impact on costs for the health system, in 2007 the Ministry of Health, the Government adopted the National Programme for Care of Persons with Diabetes 2007–2012 (7), which was recently renewed by adoption of the National Diabetes Programme 2015–2020 (8).

Age- and gender-related analysis of the causes of death showed that men are at higher risk of dying from CVDs than women in all age groups (9). Fig. 3 shows that progress has been made in bridging the gender gap in mortality from circulatory diseases over the past 28 years, due possibly to general improvement in the quality of life, the growing effectiveness of preventive activities (especially reducing alcohol consumption and smoking in the male population) as well advancement in treatment methods. Nevertheless, mortality from CVDs among men is still four times higher than among women. While men die earlier from CVDs, international evidence suggests that women with these diseases live longer, although with a lower quality of life. The Croatian Adult Health Cohort Study in 2008 (10) revealed a socioeconomic gradient, with a positive correlation between socioeconomic status and indicators of stress, poor health and unhealthy behaviour. The study also found a difference in the health status of people living on the eastern coast, which was particularly affected by the war in 1991–1995, and those in other parts of Croatia.

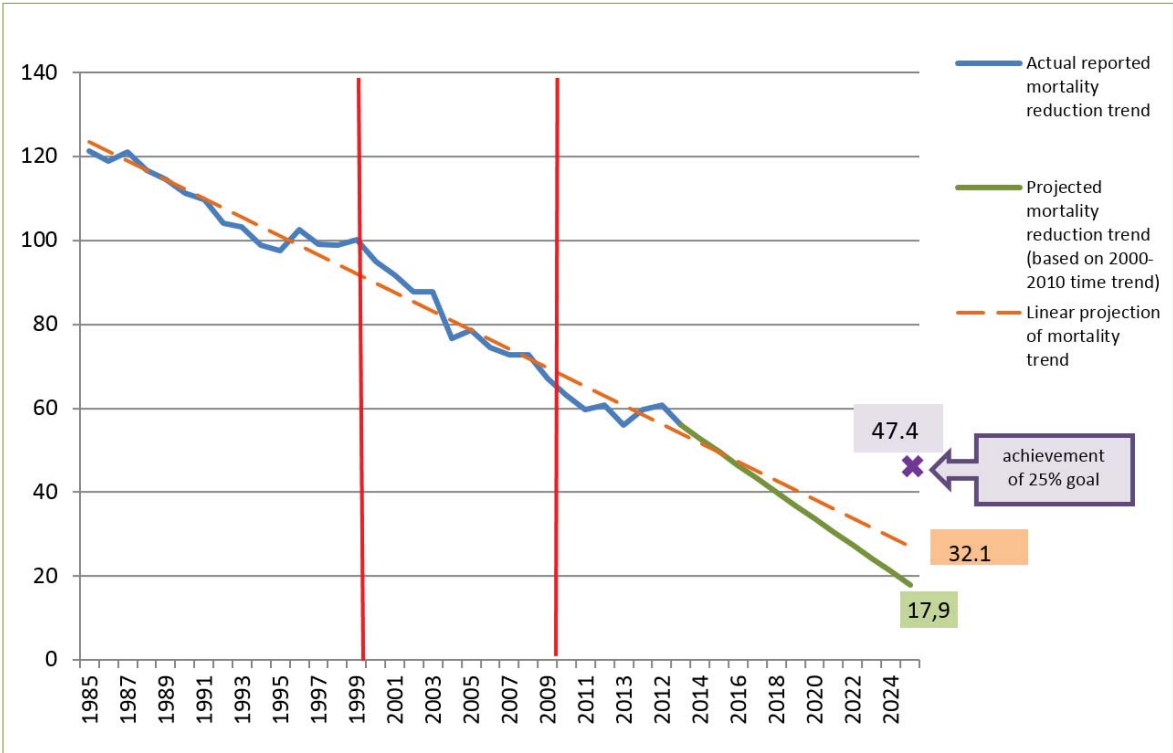
Fig. 3. Standardized death rates from diseases of the circulatory system per 100 000 population



Source: (6)

The goal of the *Global Action Plan on Prevention and Control Noncommunicable diseases 2013–2025* (11), to decrease the risk for premature mortality by 25%, will require strengthening of the Croatian health system response to NCDs. **Analysis of the mortality trends reported for the period 1985–2013 and linear and time-trend projections up to 2025 show that Croatia is on track to achieving the global NCD goal if the current pace of mortality reduction is sustained** (Fig. 4). Nevertheless, the effects of important sociodemographic and epidemiological factors, such as the ageing population and the current prevalence of behavioural and biological risk factors, cannot be underestimated and could result in a notable increase in the burden of NCDs in coming years. Thus, this comprehensive assessment of the capacity of the Croatian health system for prevention and control of NCDs and its recommendations are highly relevant.

Fig. 4. Standardized death rate per 100 000 population aged 0–64 years from diseases of the circulatory system, 1985–2013, linear and time trend projections to 2025



Source: European health-for-all database and calculations by the authors



3. Coverage of core population interventions and individual services

Core services are evidence-based, high-impact, cost-effective, affordable, feasible activities in a variety of health systems, comprising **population-based interventions** and **individual services**.

Population-based interventions consist of a multipronged approach to reducing smoking, preventing harmful use of alcohol and improving diets and physical activity. According to WHO, up to 80% of cases of heart diseases, strokes and type 2 diabetes and over a third of cancers could be prevented by eliminating this group of shared risk factors.

Individual services focus on the early detection and continuous management of risk factors and disease and timely referral to subsequent levels of care. A standard set of core individual services, closely linked to activities recommended in the Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013–2020 (11), is reviewed in each country assessment. After careful collection of background information, the assessment team decided to focus on CVDs and diabetes outcomes and the coverage of the respective interventions. Health system capacity in cancer control was assessed during a mission by the International Atomic Energy Agency just before the WHO mission (October 2014) (12).

Each intervention and service was evaluated by the assessment team on a three-point scale: limited, moderate or extensive. The scoring criteria, prepared by WHO, are listed in Annexes 1 and 2. Table 2 shows the core services identified for this study according to the country assessment guide (3).

Table 2. Core population-based interventions and individual services to improve the outcomes of noncommunicable diseases

Population-based interventions	Individual services
<ul style="list-style-type: none"> • Anti-smoking interventions (Framework Convention on Tobacco Control) <ul style="list-style-type: none"> – Raising tobacco taxes – Smoke-free environments – Warnings on the dangers of tobacco and smoking – Bans on advertising, promotion and sponsorship – Quit-lines and nicotine replacement therapy* 	<ul style="list-style-type: none"> • CVD and diabetes <ul style="list-style-type: none"> – Risk stratification in primary health care (PHC) – Effective detection and management of hypertension – Effective primary prevention in high risk groups – Effective secondary prevention after acute myocardial infarction (AMI), including aspirin therapy – Rapid response and hospital for patients AMI and stroke*
<ul style="list-style-type: none"> • Interventions to prevent harmful alcohol use <ul style="list-style-type: none"> – Raising taxes on alcohol – Restrictions or bans on advertising and promotion – Restrictions on retail availability of alcohol – Regulated minimum purchase age, with enforcement* – Tolerated blood alcohol level for driving* 	<ul style="list-style-type: none"> • Diabetes <ul style="list-style-type: none"> – Effective detection and general follow-up* – Patient education on nutrition, physical activity and blood glucose management – Hypertension management – Screening for and management of complications
<ul style="list-style-type: none"> • Interventions to improve diet and physical activity <ul style="list-style-type: none"> – Reducing salt intake and salt content of foods – Virtually eliminating trans fatty acids from the diet – Reducing free sugar intake* – Increasing intake of fruit and vegetables* – Reducing marketing pressure on children to consume food and non-alcoholic beverages* – Promoting awareness about diet and activity 	

Source: Adapted from reference (11)

* Additional interventions and services for a more comprehensive assessment

The coverage of core services was scored according to the following assessment criteria:

- **extensive:** extensive commitment, demonstrated by the design and implementation of strategies, programmes and interventions in line with international best practices, emerging results on health behaviour change and outcomes;
- **moderate:** strategies, programmes and interventions that reflect commitment to the subject, but either the design does not conform with international best practice or implementation is incomplete; little health behaviour change recorded as a result; and
- **limited:** limited activities and commitment to bring notable change; initiatives remain unimplemented, with no evidence of population behaviour change for key risk factors.

3.1 Population-based interventions

Croatia could improve the prevention and outcomes of NCDs by scaling-up the extent and coverage of core population interventions.

The trend in tobacco smoking is decreasing, but 35% of the adult population are still smokers (13). Alcohol remains a significant public health issue, with an estimated annual consumption per capita of 12.2 L of pure alcohol (14). Nearly one in four adults is obese (15). The current population exposure to shared risk factors for NCDs therefore allows to make projections on significant growth in the prevalence of NCDs in the coming decade. The proportion of direct public expenditure on preventive programmes is about 1.5% of total health expenditure, which is lower than the average of 2.68% in the European Union. This remains a major concern.

The degree of implementation of population-based interventions for tobacco control, alcohol consumption, diet and physical activity was assessed and is shown in the form of a “score-card” in Table 3.

Table 3. Score-card for population-based interventions

Policy option	Score
Anti-smoking interventions	
Raise tobacco taxes	Moderate. Tobacco taxes constitute 71% of the retail price, of which 51% is excise tax and 20% is value-added tax.
Provide smoke-free environments	Moderate. There are laws with regard to smoke-free environments. Hospitals, schools, public transport and workplaces are smoke free, but the hospitality sector allows smoking.
Issue warnings on the dangers of tobacco and smoking	Moderate. Health warnings cover 35% of the front and back of cigarette packages, but there are no pictorial displays.
Ban tobacco advertising, promotion and sponsorship	Moderate. Bans on all tobacco advertising, promotion and sponsorship exist but are moderately enforced.
Provide quit-lines and nicotine replacement therapy*	Limited. Some health clinics provide smoking cessation support, but there is no national quit-line. Nicotine replacement therapy is recommended by the Ministry of Health but is not subsidized and requires full out-of-pocket expenditure. ^a

^a During review of the report, the authors were informed that, from October 2015, the Ministry of Health has established a call centre (quit-lines) and drawn up specific protocols for smoking cessation, which were recently implemented.

Policy option	Score
Interventions to prevent harmful alcohol use	
Raise taxes on alcohol	Limited. Alcohol taxes follow the consumer price index, but there are no taxes to make alcohol products less attractive to young people. Wine is not taxed.
Restrict or ban alcohol advertising and promotion	Moderate. There is a ban on alcohol advertisements and sponsorship; however, indirect marketing remains a challenge.
Restrict availability of alcohol in the retail sector	Extensive. There is a ban on retail sales of alcohol in Government and educational institutions
Enact and enforce minimum purchase age regulation	Moderate. The minimum age limit for purchase of alcohol products is 18 years, which is effectively enforced.
Implement a blood alcohol limit for driving	Moderate. The maximum blood alcohol concentration when driving a vehicle is set at 0.5 g/L, and there is zero tolerance for novice and professional drivers.
Interventions to improve diet and physical activity	
Reduce salt intake and the salt content of foods	Limited. Salt intake in Croatia is not monitored, and no data are available to compare changes in intake over the past 10 years. A national salt reduction programme has been in place since 2014.
Replace trans fats with unsaturated fats	Limited. There is no regulatory framework for the elimination of trans fats and no evidence of their reduction in the population diet.
Reduce free sugar intake*	Limited. There is no monitoring framework for population sugar intake, and no action has been taken to control it.
Increase consumption of fruit and vegetables*	Limited. The aim of increasing consumption of fruits and vegetables is mentioned in some policy documents, but no action has been taken.
Reduce marketing pressure of food and non-alcoholic beverages to children*	Limited. Marketing of foods and beverages to children is recognized as a major problem but has not been translated into specific action in Government-led initiatives.
Promote awareness about diet and physical activity	Limited. Some training has been given in counselling on nutrition and physical activity in primary care; this must be scaled up nationally.

* Interventions additional to those in the Global action plan (11)

3.1.1 Tobacco

Croatia has made significant progress in tobacco control legislation in the past few decades; however, enforcement of the regulations could be improved. According to the latest report submitted to the Secretariat of the Framework Convention on Tobacco Control, 35% of the adult Croatian population smokes daily (13). The Global Youth Tobacco Survey 2011 reported that 27.2% of children aged 13–15 years smoked cigarettes (16).

Among measures to reduce tobacco use, Croatia adopted an act on the use of tobacco products in 1999, mainly concerning tobacco production. The country ratified the Framework Convention in 2008 and adopted several antismoking regulations and population-based interventions (17). The interventions include: smoking bans in all indoor public areas and public transport; a ban on direct advertising, promotion and sponsorship; health warnings on packaging of tobacco products; and a ban on direct and indirect marketing of cigarettes (18). These regulations have led to significant progress in the field of tobacco control; for example, the tax on tobacco now constitutes 71% of the retail price, of which 51% is excise tax (18).

After joining the European Union in 2013, Croatia introduced changes to its act on the use of tobacco products in order to harmonize it with European Union regulations on the manufacture, packaging and sale of tobacco products. In accordance with the WHO report on the global

tobacco epidemic (18), 35% of cigarette packaging is covered with health warnings in the national language; however, there are currently no pictorial warnings.

Comprehensive, multisectoral national strategies and programmes have been undertaken to strengthen tobacco control in Croatia. The national multisectoral commission to control tobacco use has established a coordinating mechanism for tobacco control in order to harmonize activities across sectors. In 2013, the Government adopted an action plan to strengthen tobacco control, and new regulations on the display and visibility of tobacco products were introduced in July 2013 (19), with a ban on smoking in public places, including health care facilities and Government and educational sites, and fines for non-compliance. Although the range of tobacco policies is thus extensive, the assessment team considered that their enforcement should be strengthened.

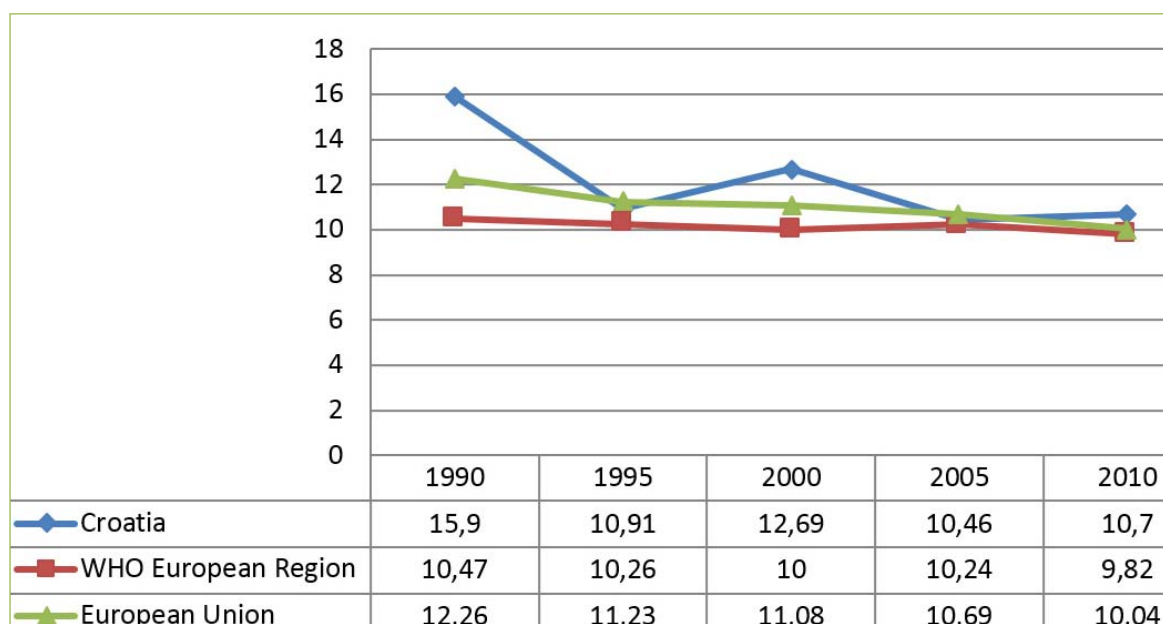
In April 2013, a tobacco control unit was established in the department of mental health and addiction prevention in the health promotion division of the NIPH. The unit conducts various smoking prevention activities, in collaboration with professional societies and in schools, workplaces and communities. For example, individual counselling and cessation treatment services have been established in local public health institutes. Pharmaceutical products and nicotine replacement therapy are legally available for the treatment of tobacco dependence, although their cost is not subsidized. Furthermore, in October 2015, the Ministry of Health established a call centre for smoking cessation (quit-lines) and specific protocols for smoking cessation.

3.1.2 Alcohol

Moderate progress has been made in interventions to reduce the harmful use of alcohol in Croatia. More opportunities exist for addressing alcohol abuse among young people.

According to the European health-for-all database, the consumption of alcohol in Croatia in 2010 was 10.7 L pure alcohol per inhabitant ((Fig. 5), which is slightly higher than the European Union average of 10.4 L (6).

Fig. 5. Trends in alcohol consumption (L pure alcohol) among people aged ≥ 15 years



Source: (6)

According to the *Global status report on alcohol and health* (14), in 2010, 45% of the alcoholic beverages consumed was wine, 40% was beer, and 15% was spirits. The high prevalence of wine consumption can be explained by the prevalence of the Mediterranean diet and the absence of an excise tax applied to wine .

The results of the Croatian adult health study and follow-up in 2008 show that the prevalence of heavy alcohol consumption among men in Croatia has fallen significantly, from 12.3% in 2003 to 5.3% in 2008, whereas the prevalence among women increased from 0.7% to 5.6% (20).

Despite a regulated minimum age of 18 years for both on- and off-premises sales of alcoholic beverages and regulations for alcohol advertising and sponsorship, the results of the European School Survey on Alcohol and Other Medicines (21) show an increasing trend of heavy episodic drinking among young people.

According to the latest *Global status report on alcohol and health* (14), the national maximum legal blood alcohol concentration when driving a vehicle is 0.05%, with zero tolerance towards novice and professional drivers. The Ministry of the Interior in Croatia has reported a decrease in the number of accidents caused by drunk-driving over the past few years, with a parallel decrease in the number of deaths in such accidents.

A national strategy for prevention of the harmful use of alcohol and alcohol-related disorders was adopted in 2010. A multisectoral committee was established by the Ministry of Health to implement the strategy, consisting of representatives of the ministries of Social Policies and Youth, Interior Affairs, Science, Education and Sport, Justice, Agriculture, Economy, Finance, Labour and the Pension System, as well as the NIPH, the Institute for Health Protection and Safety at Work, the Sisters of Mercy (Sestre Milosrdnice) University Hospital, the National Centre for Alcohol Disorders, the Society for Alcoholism and Other Addictions under the Croatian Medical Association, and the Association of Clubs for Treated Alcoholics. The action plan for implementation of the strategy has not yet been finalized (14).

3.1.3 Diet and physical activity

Diet and physical activity strategies are the weakest of the core population interventions in Croatia. Regulations are required on salt, trans fats and sugar in processed foods, the marketing of food to children and better promotion of physical activity in the population.

The Croatian Adult Health Study conducted in 2003 showed that > 60% of men and 50% of women were overweight and 20.1% of men and 20.6% of women were obese (10). A follow-up study in 2008 reported an increasing trend in the prevalence of obesity, with 25.3% of men and 34.1% of women being obese (10, 20). According to the latest data from the Regional Office for Europe, there are more overweight men than women (64.1 % and 51.9%, respectively); the proportion of men and women who were obese have decreased since 2008 and were 24.4% and 23.9%, respectively (15). The results of the Health Behaviour in School-aged Children study (22) indicated that, among 11-year-olds, 21% of boys and 15% of girls were overweight in 2010. To address these issues, a multisectoral action plan for the prevention of overweight and obesity was implemented, but it has unfortunately not been renewed.

In 2003, the Croatian Adult Health Study found that 15.9% of the adult population had poor dietary habits (23). Data from the Health Behaviour in School-aged Children study show that only 59% of boys and 54% of girls had breakfast on weekdays – a habit that predisposes to unhealthy eating and excess body mass (24). According to a study by the Regional Office in 2009 (25), the average salt intake of the adult Croatian population was 13–16 g per person per day, which is much higher than the 5 g/day recommended by WHO and the Food and Agriculture Organization of the United Nations (FAO). As a result, 44.7% of the population has elevated blood pressure (1). The literature (15) suggests that food reformulation strategies are in place in Croatia to reduce the salt content of processed foods such as bread. To further reduce the consumption of salt, a strategic plan is being prepared for 2015–2019. In 2009, the average daily consumption of fruit and vegetables was 558 g per capita (15) – slightly below the WHO/FAO recommended 600 g/day. No data were available on the saturated fat content of foods, and there are no reported strategies on elimination of trans fats.

The Croatian adult health study in 2003 (23) showed that 30.5% of Croatians aged \geq 18 years were physically inactive, with similar prevalence in men (28.9%) and women (31.9%) (26). A follow-up study showed a concerning trend, with a higher prevalence of physical inactivity in 2008 than in

2003 (36.7% of men and 38.1% of women) (27). The levels of physical inactivity among children and young people are also alarming: according to the Health Behaviour in School-aged Children survey results for 2010, Croatian boys and girls aged 11 years were physically active on only 4.6 days and 3.8 days per week, respectively (24).

To address increasing exposure to unhealthy diets and low physical activity, a national “healthy living” programme was launched in 2014, including health education, promotion of healthy nutrition and occupational health. In the framework of this programme, a network of centres for health promotion, including counselling for healthy diets and physical activity, have been established. The programme also supports consumers in making healthy choices by working with industry to label foods comprehensively.

3.2 Individual services

Croatia has made significant progress in the use of risk-stratification tools in primary care and in the management of acute CVDs; however, it should improve the continuity and coordination of care between health facilities and optimize models of care for patients with chronic disease. The assessment of individual services in Croatia focused primarily on risk stratification, early detection and management of CVDs and diabetes. The assessment is summarized in the score-card in Table 4.

Table 4. Score-card for individual cardiovascular disease services

Policy option	Score
Risk stratification in PHC	Moderate. The introduction of “preventive e-panels” in PHC has improved risk stratification in target populations; however it has not yet been applied systematically.
Effective detection and management of hypertension	Moderate to limited. While detection of hypertension in PHC is satisfactory (prevalence of detected cases, 20–25%), management remains a challenge because of lack of continuity of care and poor adherence to treatment.
Effective primary prevention in high-risk groups	Moderate. Aspirin and statins are available for the management of patients at high risk for CVDs and are subsidized; however, adherence to treatment is poor.
Rapid response and secondary care after AMI and stroke*	Moderate. There is good geographical round-the-clock access to various diagnostic and revascularization procedures for AMI, with good health outcomes; secondary care and rehabilitation for stroke patients could be improved.
Effective secondary prevention after AMI, including aspirin	Moderate. Effective secondary prevention is provided routinely in health facilities; however, the continuity of care after acute events and transition to PHC face challenges, with high loss to follow-up.

*Interventions additional to the global action plan (11)

In the Adult Health Cohort Study conducted in 2008 (10) some reported national activities for primary prevention of CVDs and diabetes were actions to address behavioural and biomedical determinants; however, most activities local (monosectoral) interventions for a single disease and lacked a modern, integrated approach to shared risk factors. During the past few decades, the rates of detection of hypertension and diabetes in primary care were low; however, risk stratification in PHC has improved since April 2013, when the new payment model and “preventive e-panels” were introduced. Preventive e-panels are innovative tools for collecting information about risk factors from people receiving services and for monitoring changes in their behaviour. General practitioners (GPs) use score-cards to assess patients’ risks for NCDs and

receive incentives for filling in the e-panels with data on body mass index, blood pressure, blood glucose and smoking and drinking habits. They also use the score-cards to calculate the 10-year CVD risk. Some practices report that $\leq 90\%$ of the population has received preventive check-ups with recording of common NCD risk factors. The initiative is still new, and its final outcomes are still to be reported and assessed.

The assessment team concluded that access to therapy based on risk stratification is moderate. Most medicines for hypertension and diabetes are paid for in the State benefits package, with the exception of a few very expensive last-generation medicines. Interviews conducted during the assessment showed that GPs are well informed about prescribing aspirin and statins for patients in high-risk groups, although the provision of behavioural counselling for this category of patients could be improved. Some practices reported difficulty in involving nurses in risk stratification and behavioural counselling.

Rapid response and coverage with secondary care after AMI is comprehensive. There are well-developed services for patients with AMI, which guarantee good geographical access to revascularization in primary percutaneous coronary intervention centres round the clock. The average time between an AMI and hospitalization is 30 min. During the assessment mission, one health provider said that approximately 70% of patients with AMI receive percutaneous coronary intervention and that approximately 60% of patients with stroke are hospitalized immediately in facilities where angiographic services are available round the clock. An international survey in 2009 (28) reported that 70% of all patients hospitalized for ST-elevated AMI were treated by primary percutaneous coronary intervention and 15% by thrombolysis; in 15% of cases, no reperfusion was performed. Cardiologists and GPs reported that patients comply well with treatment after an acute event like AMI, consisting of subsidized beta-blockers and statins; however, the continuity of care remains a significant problem, especially in the transition period between hospital and primary care centres, when loss to follow-up can occur. Specialists reported that the health outcomes of stroke patients are poorer than those of AMI patients, indicating that rapid response, secondary care and rehabilitation services for stroke patients could be improved.



4. Health system challenges and opportunities to strengthen core NCD interventions and services

In many countries, it is difficult to strengthen the core NCD interventions and services described in the previous sections, despite overwhelming evidence of their cost-effectiveness and impact on population health. A number of countries, however, are reporting inspiring experiences, which could be adapted for use in other countries. This section reviews the health system challenges that could undermine delivery of core interventions and services and prevent progress towards the targets of the global monitoring framework and also describes opportunities for scaling up selected interventions and services.

Fig. 6 lists 15 health system features that can pose challenges or present opportunities for improved delivery of core NCD interventions and services. Further guidance on these health system challenges and opportunities is given in the background paper (29).

Fig. 6. Fifteen health system challenges and opportunities to improve the outcomes of noncommunicable diseases

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

Source: (29)

Challenge 1. Political commitment to prevention and control of noncommunicable diseases

Recent reforms and national strategies clearly indicate political commitment to the prevention and control of NCDs in Croatia. The integrated national NCD action plan will provide a solid basis for further activities in this area.

The National Health Strategy 2012–2020 recognizes the growing burden of NCDs and its impact on the socioeconomic development of the country (30). The Strategy has served as an impetus for new commitments to strengthen the role of primary care in the health system in general and for the prevention, early detection and control of NCDs in particular. International evidence-based interventions and WHO-recommended tools (e.g. 31) will be used in scaling-up reform.

A number of separate strategies address risk factors and specific NCDs. Croatia has the following strategies for addressing issues associated with NCDs.

- Action Plan for Strengthening Tobacco Control 2013–2016
- National Strategy for Prevention of Harmful Use of Alcohol and Alcohol-related Disorders 2011–2016

- National Diabetes Programme 2015–2020
- National Healthy Living Programme 2014
- Strategy for the Development of Palliative Care 2014–2016

During the follow-up mission in September 2015, the NIPH confirmed adoption of the National Diabetes Programme and the start of its implementation. The major focus of the Programme is to improve early detection of diabetes, provide adequate services for secondary prevention of complications and monitor gestational diabetes. The specific goal of the Programme is to improve detection of diabetes and the quality of care at PHC level.

Despite the existence of the strategies listed above, an integrated, multisectoral national strategy is required as a guide for mutual accountability among all stakeholders (11). At the time of the initial assessment, the National NCD Strategy 2016–2020 was being prepared; the follow-up mission was informed that the Strategy would be submitted to the Government for comments in November 2015. The recently established unit on NCDs at the Ministry of Health is expected to implement the Strategy and continue work on the other strategies.

Challenge 2: Explicit priority-setting

Although health sector expenditure is a priority on the national agenda, financial resources should be reallocated to primary care and public health services.

The health sector is a priority in Croatia, where total health expenditure is higher than in other central and south-eastern European countries, comprising 6.8% of gross domestic product (Fig. 7). The proportion of public expenditure on health is 80–90%, making it one of the most generous health systems in the WHO European Region.

Fig. 7. Total health expenditure as percentage of gross domestic product, 1995–2012



Source: (6)

The National Health Strategy 2012–2020 (30) adopted in 2012 clearly defines key strategic development directions:

- Improve connectivity and continuity in health care.
- Standardize and improve the quality of health care.
- Improve the efficiency and effectiveness of the health care system.

- Increase the accessibility of health care.
- Improve health indicators.

In order to attain these strategic goals, eight priorities for action were set (Fig. 8). During the analysis of disease causes during preparation of the National Strategy, the prevention and control of NCDs were identified as some of the main means of improving population health and health outcomes.

During the assessment, it became obvious that the major obstacle to priority-setting in the National Strategy is inadequate budget allocations for primary care and population-based interventions. For instance, during the period 2007–2012, the share of the budget for PHC decreased from 15.8% to 13.1%, while other service expenses were increased (9). The proportion of total health expenditure for funding the activity of the NIPH is 0.68%.

Fig. 8. Priorities for action in the National Health Strategy 2012–2020

Health infrastructure	Health information and e-health	Maintaining the financial stability of health care	Cooperation with other sectors and society in general
Strengthening managerial capacity	Fostering quality of care	Health promotion and disease prevention	Strengthening and better use of human resources for health

Source: Ministry of Health, 2012

Challenge 3: Interagency cooperation

The Croatian Government is increasingly engaged in mobilizing multisectoral action. The importance of intersectoral cooperation in health is emphasized in the National Health Strategy, which includes “cooperation with other sectors and the society in general” as one of its priorities (30).

Many line ministries consider NCDs to be the business only of the Ministry of Health, although there are good experiences of partnership between ministries on specific issues. For example, the Ministry of Environment and Nature Protection is cooperating with the Ministry of Health and other ministries in implementing the Environmental Protection Act and preparing a strategy for sustainable development for Croatia (9). Multisectoral committees on alcohol and tobacco have been set up including ministries such as those of Social Politics and Youth, the Interior, Science, Education and Sport, Justice, Agriculture, the Economy, Finance, Labour and Pension System and the NIPH and the Institute for Health Protection and Safety at Work. Cooperation with the education system has been central in health promotion activities in schools and kindergartens. Civil society organizations are also contributing to the development of the health sector in Croatia and are important stakeholders in intersectoral collaboration; many have become partners in initiatives to protect patients’ rights, health promotion and disease prevention. Although a wide range of professional and nongovernmental associations are active in NCD control, they often lack synergy and cooperation. During the follow-up mission, NIPH representatives proposed that a survey be conducted to map local initiatives in health promotion and create a national or subnational coordination mechanism. Various interviews indicated that other national strategies (such as the National Programme for Occupational Health and Safety 2009–2013 and the National Mental Health Strategy 2011–2016) would also benefit from intersectoral cooperation with ministries, governmental agencies and nongovernmental organizations.

Regional and local government units are important partners in intersectoral collaboration for NCDs, as they are well positioned to act as catalysts for cooperation among e.g. educational institutions, civil society organizations and the media). There is a well-developed initiative of healthy cities and counties in Croatia, which had a long tradition of intersectoral action. Counties and county public health institutes have opportunities for intensifying intersectoral action in accordance with local needs and resources; county health councils will play a crucial role.

Despite these initiatives, the work of various sectors in addressing the problem of NCDs would be strengthened in an integrated multisectoral strategy. The present strategy was in preparation during the mission; now, a robust intersectoral mechanism is required for its implementation to achieve the engagement, policy coherence and joint accountability of different sectors. International evidence shows that effective, equitable prevention and control of NCDs requires action throughout government in order to address the underlying social determinants.

Challenge 4: Population empowerment

The National Health Strategy 2012–2020 defines health promotion through population empowerment as one of its priorities. It envisions systematic, coordinated activities in engaging the public and patients in health promotion and making a concerted effort to empower patients in managing their health, for example by ensuring resources and access to health information (strategic objective 1.3). Coordinated patient empowerment strategies that go beyond local initiatives are required.

Population empowerment (“bottom-up” approaches) is critical for effective NCD prevention and control, so that patients can play a role in managing their own condition (11). Therefore, strategies and policies for addressing NCDs must include policies that support population empowerment. The first Croatian Association for Patients’ Rights was founded in 1999, and many other nongovernmental organizations have the protection of patient rights on their working agendas. In addition, patients are represented on county and Ministry of Health commissions for the protection of patients’ rights, as part of the governing board of the HIF and county health councils. They participate actively in public debates, although their formal legal influence is limited.

Patient education materials (e.g. leaflets and posters) are prepared by the NIPH with input from patient and professional associations. These are distributed to community health centres, family group practices and patients visiting their GPs.

Behavioural counselling of patients is paternalistic, owing to absence of training and competence in patient-centred communication. There are no clear guidelines for the roles of nurses, physicians and family members in patient education or in training in self-management of NCDs. Schools that provide patient education for specific diseases are usually linked to specialized hospital departments and are therefore not accessible to everyone. Interviewed GPs said that they educated patients during visits if time permitted. Interviews with doctors and nurses confirmed that they had not received specific training in patient-centred communication or behaviour change communication, although they recognized the importance of patient education and welcomed reforms to support it. During a site visit to one family group practice, it was reported that an additional nurse would soon be available for patient education for every three physicians in the practice.

Community awareness programmes, such as on hypertension, are usually funded by the HIF. A “healthy ageing” programme for the elderly in remote areas is funded by this body, with a limited number of peer education programmes. During the site visits to Karlovac County, informants reported on implementation of local community health promotion programmes and information campaigns on disease prevention and patient rights and entitlements. They reported, however, that there is no synergy or coordination among these programmes and that their effect is therefore usually limited.

The Ministry of Health, the HIF, the NIPH and hospitals each has its own website or hot-lines, which provide some basic information on diseases in a patient-friendly format, information on waiting times and the availability of services in facilities. Such information should improve the quality of care and patient experience, especially after introduction of e-waiting lists and e-prescription in 2012–2013. The online system does not yet provide comparative information on providers, but modern information, communication and mobile technologies can further empower patients, especially those with chronic diseases, and support self-management of their conditions.

Challenge 5: Effective models of services delivery

The orientation of the Croatian health system towards primary care has been a distinctive feature for many years. Each insured citizen is registered with a GP (adults) or a paediatrician (children) but can choose their provider freely.

Primary care services are provided in three types of setting: individual private practices (80% of all providers), groups practices (often comprising GPs, paediatricians, gynaecologists and sometimes dentists) and PHC centres (*domovi zdravlja*) that provide extended services such as specialized care and often have small laboratories (9). PHC centres are owned by local governments. Family medicine has a long-standing tradition in the Croatian health system: the training programme in general and family medicine at the Andrija Stampar School of Public Health has been running since 1961. In accordance with a European Union recommendation to harmonize the standard of care provision, Croatia has introduced a retraining programme for GPs, with the goal of complete retraining of all GPs by 2015 (32). Each HIF-contracted GP is expected to register at least 600–1275 and not more than 2125 assigned population. The low number of assigned population is designed to encourage GPs to provide higher-quality care; a lower capitation rate is applied for numbers higher than the recommended number in order to avoid larger catchment areas (33). The average number of registered patients per GP is 1700, with the exception of GPs in remote areas who have more. The family group practice that was visited in Breznica consisted of three GPs, who had 1300, 1500 and 1800 patients each. The GPs reported that they see approximately 30 patients a day, mostly as drop-in visits, and they spent about 30 min a day in telephone consultations. The group practice in Breznica has an internal arrangement whereby GPs see each other's patients for emergencies during out-of-service hours. On weekends, patients are expected to contact emergency services.

Every GP works with a nurse, who conducts triaging of patients, facilitates phone consultations and accompanies the GP during home visits. A small percentage of patients are seen by the nurse, such as for routine wound care or non-acute blood pressure measurement. Polyvalent community- or patronage nurses also work with the population in catchment areas of around 3000–5000 people. Their services complement those of GPs, gynaecologists and paediatricians, especially in maternal and child health. Representatives of the Croatian Chamber of Nurses reported that additional training for nurses and development of competence in the area of NCDs would increase the coverage of preventive services.

The National Health Strategy 2012–2020 emphasizes the importance of strengthening PHC in the prevention of NCDs and calls attention to the decreasing proportion of preventive services in primary care facilities. The objective of the PHC payment model introduced in April 2013 is to improve provision of preventive services and increase the quality of care. "Preventive e-panels" and "chronic disease panels" are recent innovations for early detection and control of NCDs in primary care settings. Preventive e-panels are used to collect information about risk factors from the population and to monitor changes over time. GPs fill in patient score-cards to assess their risks for NCDs, with information on exposure to risk factors, weight, body mass index, waist:hip ratio, blood pressure and blood glucose levels registered chronologically in individual patient profiles. The software allows stratification of CVD risks from the values entered. Chronic disease panels have been designed for the three major NCDs – hypertension, chronic obstructive pulmonary disease and diabetes – and follow disease dynamics over time (see also Challenge 13). Financing reform has linked some incentives for GPs to completion of e-panels, which facilitated their rapid uptake (see also Challenge 8). Some practices visited during the assessment reported that up to 90% of their population was registered in e-panels.

Despite significant achievements in the identification, registration and follow-up of patients at risk for NCDs, the assessment mission found that primary care workers lacked competence to provide evidence-based services. The traditional diagnosis-oriented approach predominates in primary care practices, and the current incentive system supports the development of biomedical competence (e.g. ability to perform ultrasound examination) rather than the "soft skills" of patient-centred communication and behavioural counselling. The situation is complicated by the absence of national guidelines on integrated management of NCDs. Clinical guidelines on the

management of common cardiovascular conditions are based on international clinical evidence and were prepared by cardiologists, without consultation with other health care professionals or patient organizations, and are often not adapted to the local context.

Acute care services for conditions like AMI and stroke are provided in a network of county hospitals in which revascularization services are widely available. The department of emergency medicine in visited Karlovac Hospital uses the Australian–Asian triaging system for classifying patients according to their needs. The first category of patients, who include those with AMI or stroke, are treated immediately in a triage room equipped with electrocardiography and other equipment (Fig. 9). Within the Croatian National Health Strategy, hospitals are currently being reformed to reduce the number of beds with a parallel increase in the number of ambulatory services. The emergency department of visited Karlovac Hospital also has outpatient beds for stabilization of patients with, for example, hypertension, who do not require hospitalization.

Fig. 9. Emergency department in Karlovac Hospital

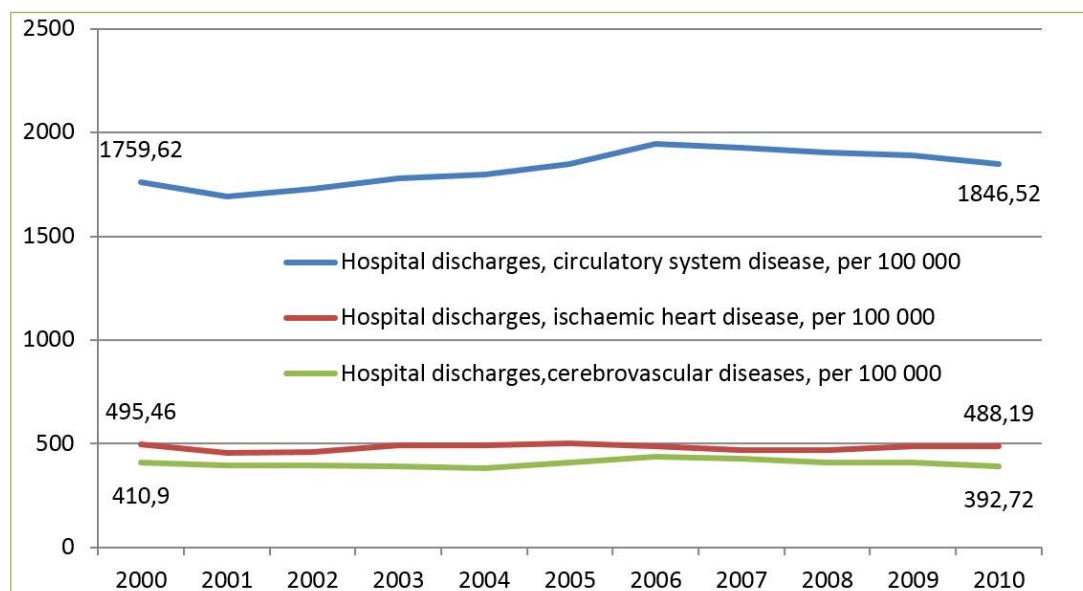


Challenge 6: Coordination among providers

Croatia has a comprehensive service delivery model for patients with acute CVD; however, there are significant barriers to the continuity of care between PHC level and hospitals for patients with chronic diseases and to integration of community health services into the overall continuum of care.

Primary care has a gatekeeping function and serves as a hub for general coordination of care and further referral to specialists. Specialized consultations comprised 23% of all ambulatory consultations in 2012. The HIF reported that most specialist visits are referred from PHC, with occasional self-referrals. The rate of hospitalization of patients with CVDs has been increasing (Fig. 10), indicating both the increasing prevalence of CVDs and the poor capacity of primary care to treat conditions in ambulatory care.

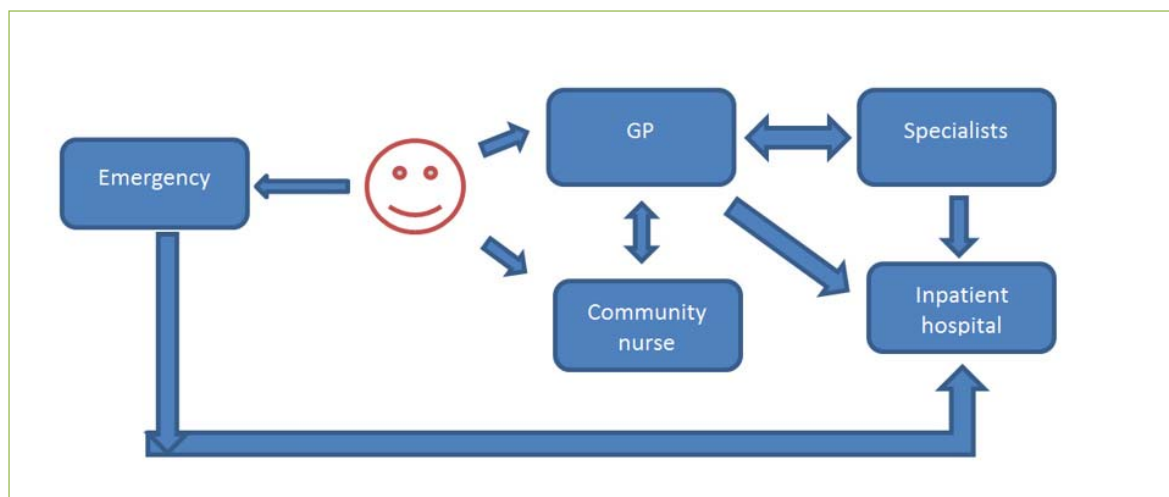
Fig. 10. Hospitalization rates for cardiovascular diseases, per 100 000 population, 2000–2010



Source: (6)

While the HIF reported high rates of PHC-referred hospitalizations and specialist consultations, some patients bypass the primary care level by going directly to emergency departments or specialists in outpatient clinics (Fig. 11). This leads to episodic care with little or no continuity or coordination among providers; furthermore, the services delivered are curative, with little focus on health promotion or preventive services. The position of PHC as the coordinator of care for patients with NCDs should be strengthened.

Fig. 11. Standard patient pathway to health services



Source: (9)

During the interviews, health providers stated that mechanisms to optimize teamwork and coordination are underused. Nurses could be positioned as coordinators of care or case managers for patients with NCDs; however, in the current model of health service delivery, nurses play a very limited role in patient care, often only providing administrative support to physicians. There is a reported lack of communication between patronage nurses who visit chronically ill patients at home and GPs, resulting in uncoordinated provision of care (9). Some routine tasks in PHC facilities should be delegated from GPs to nurses, which would lighten the workload of physicians. Representatives of the Chamber of Nurses emphasized that delegation of tasks should be complemented and reinforced by appropriate training and legal regulation of their scope of practice. A promising development is the scheduled initiation of multi-professional training courses for teams working in family group practices, outpatient clinics and hospitals.

The lack of coordination between PHC and public health services has resulted in the establishment of separate health promotion units in regional health centres for preventive work in communities. Ideally, patronage health nurses, who are the professionals closest to the population on the continuum of care, should fulfil this function, in close collaboration with PHC and regional branches of the NIPH.

For acute cardiovascular events, regional hospitals provide 24-h diagnostic (angiography) and invasive services (percutaneous coronary intervention). While hospitals report significant improvement in the provision of care and health outcomes after acute events (AMI, stroke), follow-up of patients after acute events and their transition to PHC level remains a problem. Discharge records are usually given to patients, who are expected to transfer them to their GP; this often leads to loss to follow-up of patients and discontinuation of treatment. Some GPs have raised concern about the absence of clear national guidelines on the provision of PHC to patients after AMI or stroke.

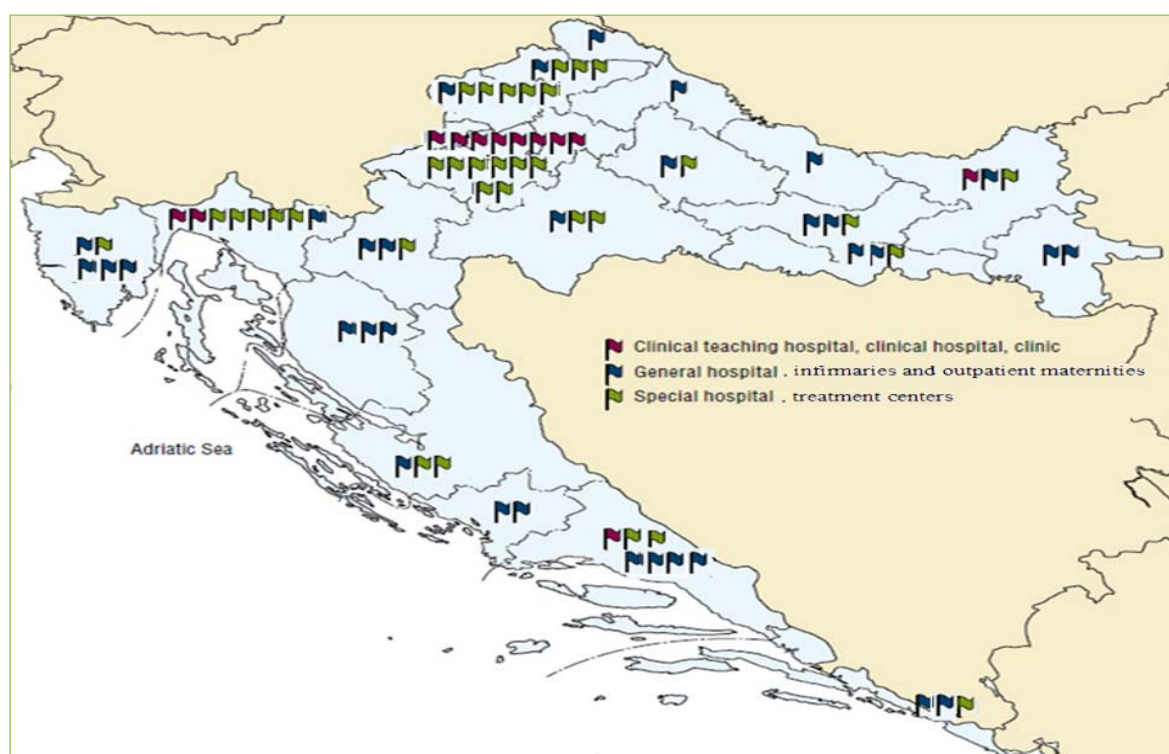
Personnel in visited Karlovac Hospital described a new initiative for collaboration with PHC practices in the same county. The initiative includes a new communication strategy, collaboration in health promotion and preventive campaigns and "on-call GPs". The communication strategy

involves coordination meetings among PHC and hospital doctors in the same county in order to synchronize activities and discuss ideas. The initiative of “on-call GPs” is designed to ensure closer coordination among GPs and hospital services by placing GPs in hospital admission. There is some resistance from GPs; however, patient satisfaction with the services has increased, and waiting times have been shortened. The initiative must now be assessed over time; furthermore, it represents a project in a single county. Generally speaking, the current model of care must adopt strategies to allow better transition of patients and patient information between levels of care.

Challenge 7: Regionalization, economies of scale and specialization

Croatia is divided into 21 administrative and territorial units, and the organization of health care follows the same structure. Public health services are provided by the NIPH network at national level and by 21 county public health institutes. In 2012, there were 79 clinics, hospital centres, general hospitals, specialized hospitals, inpatient facilities, PHC centres and a hospice, unequally distributed throughout the country (Fig. 12). Most hospitals are owned by local governments (7). Since implementation of the “healthy counties” initiative in 2002, local authorities have been given more autonomy in administrative and financial management of health facilities.

Fig. 12. Geographical distribution of hospitals in the country



Source: (9)

Until recently, Croatia had no explicit policy or plan for formal regionalization of care for patients with CVD and no clearly defined patient pathways. The significant overlap in services provided by primary, secondary and tertiary levels of care led to duplication of diagnostic testing and confusion among service users. Recent reforms have reinforced the gatekeeping function of PHC physicians by obligatory patient referrals to specialist services; however, enforcement of this regulation in urban areas is inconsistent.

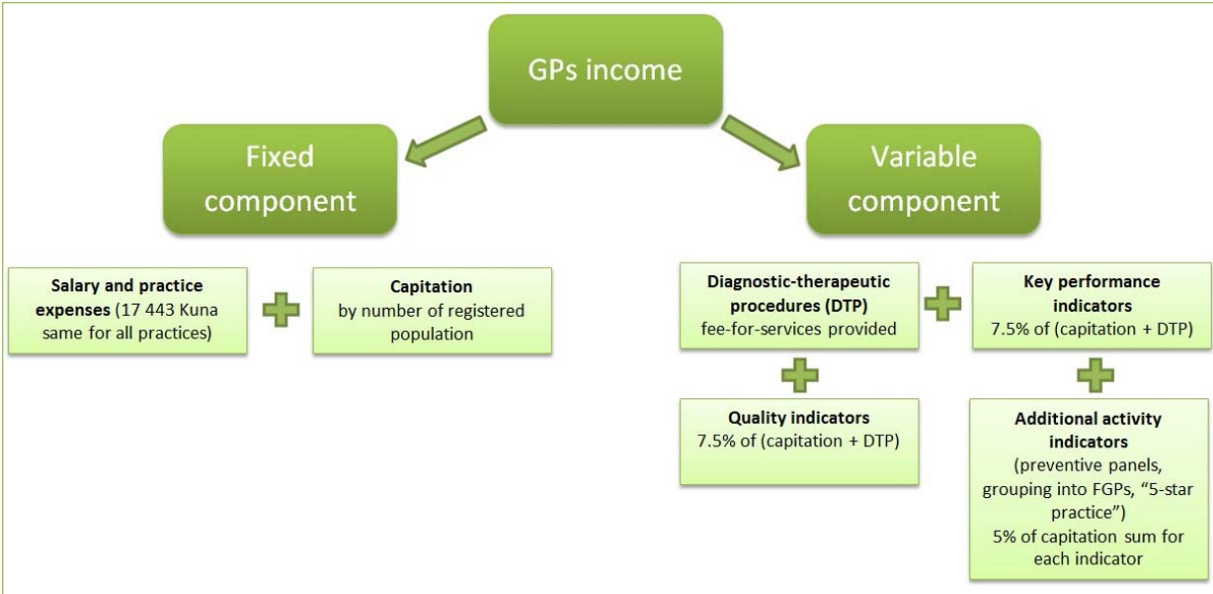
By Ministerial order 71/12, a network of emergency medicine facilities has been established, with 22 county departments (34). Emergency care is provided by two types of mobile team: type 1 teams comprise a medical doctor specialized in emergency medicine and at least one nurse–medical technician, while type 2 emergency teams include a nurse with specialized training in emergency medicine and a nurse–medical technician. Type 2 teams were introduced because of a significant shortage of doctors in rural areas. There are 595 type 1 teams throughout the country and 229 type 2 teams. Emergency services are also provided by medical units in health centres, hospitals and family physicians on standby for geographically remote, sparsely populated areas (34).

In terms of economies of scale at PHC level, physicians in family group practices are usually bound by an internal contract for use of common facilities and equipment. Thus, grouping in a family practice permits sharing of operational costs and the purchase of equipment that would not be affordable for a single GP. The HIF provides incentives for grouping into family practices (see Challenge 8). Hospitals usually cover populations of 120 000–200 000 people and serve as a hub for outpatient specialist consultations. The hospital in Karlovac visited during assessment mission has state-of-the-art equipment for revascularization surgery and early diagnosis of breast cancer, including magnetic resonance imaging and computerized tomography. During the follow-up mission, stakeholders reported on implementation of a European Union-funded project for renewing equipment at all levels of care.

Challenge 8: Incentive systems

New mixed-payment mechanisms for primary and secondary levels of care were introduced recently to improve performance and the quality of care. The new GP contracting model marks an important shift from a capitation-based model (almost 90% of the total PHC budget) to a blended model for incentivizing GPs to participate actively in patient care (9). Capitation currently accounts for about one fourth of the total income of a GP, complemented by fixed payment to cover the capital costs of the practice and salaries. More than half of GPs’ income now comes from other type of sources, including fees for preventive services, diagnostic–therapeutic procedures, performance indicators and quality indicators, mainly for NCDs (Fig. 13). The new contracting model depends on use of information technology (IT), which has simplified performance-based reimbursement for services (see also Challenge 13).

Fig. 13. Breakdown of the new primary health care payment model



Source: Presentation during the assessment mission by the Croatian Health Insurance Fund. Key health system issues in Croatia.

Data on performance indicators, such as specialist and hospital referral rates, are collected and compared with the national average in 2013. If they are kept within those rates they are incentivized according to the formula shown in Fig.12. Quality indicators are reimbursed on the basis of working with chronic patients (chronic disease panels) and attending peer-to-peer provider groups. Participation in monthly provider-to-provider peer group conferences is not only incentivized, but also earns the GP two extra credits as part of continuous medical education. The HIF representative said that an important aspect of peer groups is that credits for continuous medical education can be earned without participation in events sponsored by the pharmaceutical industry.

Other incentivized services include the number of preventive panels filled per month, participation in family group practices and so-called “five-star practices”. In the system of “five-star practices”, GP activity is monitored by e-referral and e-appointment systems for specialist consultations, phone consultations, patient group counselling and specimen collection for laboratories. Each of these additional activities is monitored and incentivized up to 5% of the total capitation sum if desired goals are met. Incentives are calculated and paid every month to each GP individually.

A preliminary analysis shows that the blended payment mechanism has improved the efficiency of PHC and decreased unjustified specialist and hospital referrals. The shift towards the new contracting model is voluntary and at early stages of the reform left some GPs out of the incentive scheme; however, during the follow-up mission, the HIF reported that approximately 97% of all GPs have shifted to the new payment mechanism.

The share of a GP’s salary based on successful completion of various performance indicators appears to be higher in Croatia than in other countries. While the scheme has a positive impact on patient care, dependence on a high proportion of income coming from selected indicators might lead to targeting activities to improving incentivized indicators and abandonment of non-incentivized areas of care. Therefore, it is crucial that there be continuous monitoring of use of this system and adjustment if necessary. Innovative e-solutions provide a solid tool for collecting high-quality data on indicators for management of NCD outcomes.

The “five-star rating system” is a non-financial incentive that has improved preventive activities and efficiency of care among patients with CVD and diabetes. As adherence to this system is usually displayed in the waiting-rooms of family group and private practices, GPs are incentivized to earn and retain this rating for the prestige and status of their practice. The NIPH has announced a similar initiative for “diabetes-friendly GPs”, indicating adherence to certain treatment techniques and counselling services for reducing complications.

The current hospital payment and contracting system has been subject to less extreme reform than PHC payment, mainly because of State Treasury requirements (9). Although hospitals use case-based invoicing, fee- for- service in outpatient care and diagnostic-related groups for inpatient care allocations to hospitals are not linked to their performance but are based on historical budget allocations. Concern was expressed about the cost-effectiveness and sustainability of this budgetary arrangement. During the follow-up mission in September 2015, the HIF reported that the mechanism for financing hospital care had changed from simple case-based invoicing to estimated budget limits for each hospital. Budget limits are calculated on the basis of the budget for the previous year, the size of the population of the catchment area, waiting time, the number of specialists and the number of manipulations per patient. Although the full impact of the reform has not been analysed yet, preliminary data shows that it has led to more equitable distribution of financial resources among hospitals. Furthermore, the HIF has introduced a payment schedule whereby monthly budget allocations are transferred in two portions: 80% at the beginning of the month and 20% according to the achievement of indicators of certain activities at the end of the month, which creates quasi-market competition among providers. Additionally, 5% of a hospital’s budget is reimbursed according to monitored indicators of mortality, use of reserve antibiotics, number of procedures per bed, average length of stay and other factors.

Interviews provided anecdotal evidence that NCD-related conditions account for a relatively high proportion of hospital outpatient services and up to 70% of all emergency service visits. For example, patients with diabetes visit specialists two or three times a year, at a higher cost than GP visits. The interviews indicated an increasing shift to use of PHC facilities for routine management of NCDs; payment methods at PHC and hospital levels should therefore be revised for better allocation of resources and patient transition between levels of care.

Challenge 9: Integration of evidence into practice

In Croatia, the main tools for improving and standardizing the quality of health care are clinical guidelines, algorithms and protocols. These include directives or recommendations on prevention, diagnostics and the treatment of specific conditions or diseases based on the best available scientific evidence.

Clinical guidelines and protocols for NCDs are prepared and issued by the Croatian Medical Association and the Croatian Nurses Association. Other professional chambers and institutions, organizations, groups and individuals can participate in consultations and approval of guidelines and protocols, but this is not common practice. Clinical guidelines represent nationally adapted best evidence on treatment of a disease and are the basis for clinical protocols (specifying the volume of care at different levels) and clinical algorithms.

Application of clinical guidelines, algorithms and protocols is monitored by the Agency for Quality and Accreditation in Health Care and Social Welfare and is a prerequisite for voluntary accreditation of health facilities. Health facilities must harmonize and align their performance with the accreditation standards, including adherence to clinical guidelines and protocols developed by the accreditation agency (9). The Agency encourages and systematically awards health facilities that seek accreditation. Additionally, the HIF monitors the execution by health facilities of their contractual obligations, which are both financial and medical, such as the scope of services provided and adherence to clinical guidelines and protocols (9).

Acute care algorithms and criteria for grouping patients are displayed on emergency room walls for easy reference. Interviews during the assessment mission indicated that existing clinical guidelines and protocols for prevention and control of NCDs are usually not adapted to capacity at PHC level. International recommendations state that clinical guidelines and protocols should address prevention and control of disease at all levels of care and should include guidelines for self-care. The new National Diabetes Programme has prioritized alignment of all existing guidelines for diabetes care and will issue unified national guidelines. The draft action plan for the prevention and control of NCDs 2015-2020 represents an opportunity for introducing evidence-based guidelines for use at all levels of care and a new model for integrated management of NCDs (2). It is envisioned that this component of the action plan will be the responsibility of the HIF and the NIPH, to be implemented by the end of 2016.

Challenge 10: Distribution and mix of human resources

The current distribution of human resources indicates weak capacity in human resource planning (35). The Ministry of Health has recognized the challenge and the overall shortage of human resources and has made it a priority in the National Health Strategy 2012–2020 (30).

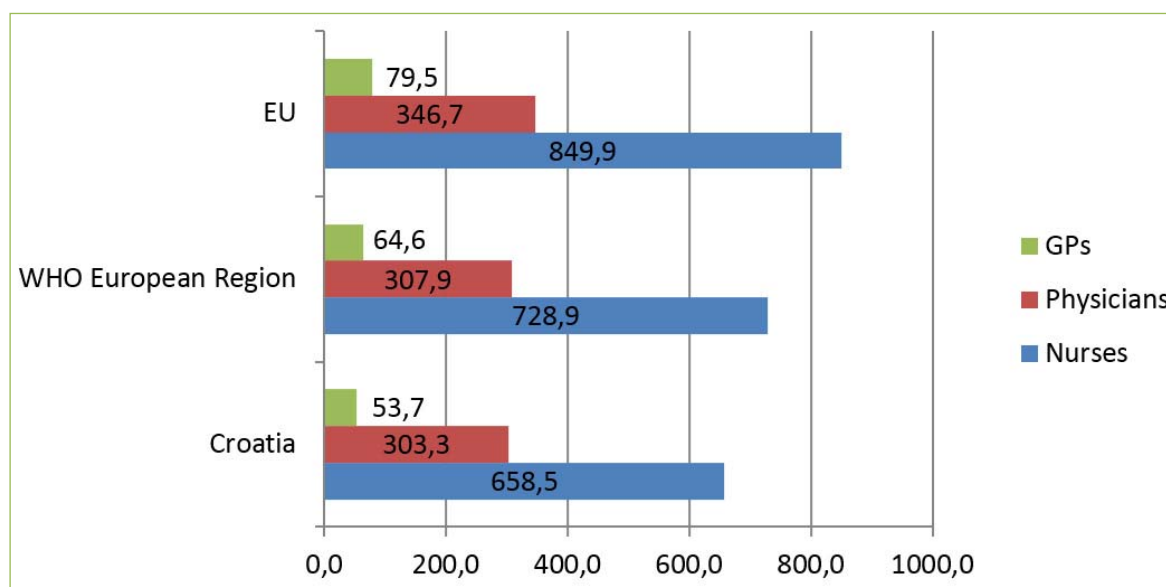
Information on health care resources in Croatia is collected by a network of health registries. The Registry of Health Professionals, maintained by the NIPH, collects basic information on the health care work-force, including age, sex, place of work, services provided, entry or departure from service and any change of position or professional level, and also basic information on health institutions (whether they are owned by the State, counties or privately) (9). Every public and private health care institution is obliged to submit information on all the health workers it employs, and the information is analysed and published annually by the NIPH in health service yearbooks,

which are used for health work-force planning. Human resource planning is still rather limited, however, because of a persistent shortage of medical doctors and an oversupply of other health professionals (36). The Ministry of Health prepares a national plan for specializations and sub-specializations each year, and the Ministry of Science, Education and Sport defines the number of training places in medical educational programmes. While this system achieves short-term goals, annual health work-force planning is not a sustainable approach to training and retraining of medical professionals.

The number of physicians per 100 000 population increased from 212 in 1991 to 283 in 2011 (6); however, the number of GPs – a significant resource for the prevention and control of NCDs – is lower than the regional and European Union averages, with 51 GPs per 100 000 inhabitants (Fig. 14). In 2014, a total of 2462 GP teams was required for population coverage, whereas there were 2336 HIF-contracted GPs, including 743 family group practices in 49 health centres. There is also a shortage of specialists for NCDs, such as cardiologists.⁴

Interviewed GPs and HIF representatives noted that the salaries of GPs and the prestige of the profession have increased with the introduction of the new PHC payment model and non-financial incentives (see Challenge 8). GPs and nurses recognized their important role in the prevention and management of NCDs and noted that community health nurses (“patronage nurses”) represent a huge but underused resource for addressing the burden of NCDs. Their workload is territorially defined to cover 2000–5000 people in designated areas, with some differences according to age and population density. They are trained to conduct comprehensive assessments of the health needs of patients and families, are responsible for preparing care plans, which are approved by GPs, and provide care at home for patients with NCDs. Both GPs and nurses, however, lack the competence for early identification of risk factors and NCDs, and interviews with home care nurses indicated that they had not received any training in patient counselling or risk stratification.

Fig. 14. Distribution of the health work-force in Croatia, the WHO European Region and the European Union per 100 000 population, 2013



Source: (6)

Croatia has a well-organized network of medical schools and faculties, with 1202 medical study programmes in 40 cities in the country (9). The education of nurses is uneven because of the absence of professional training standards and regulations, which leads to significant variation in the knowledge and skills of nurses and insufficient competence to perform everyday work. While medical education for physicians is more closely regulated and follows internationally recognized standards, it is unclear whether the current burden of NCDs is reflected in medical

⁴ Presentation during the assessment mission by the Croatian National Institute of Public Health. Strategic Plan of Public Health Development: Report for 2013 and upcoming activities

training curricula. Continuous medical education is required for obligatory relicensing of both physicians and nurses, whereby a certain number of credit points is obtained within 6 years (120 points for physicians, 90 for nurses). No time is allocated for continuous professional development, however, and it is difficult to find time for short training courses, which could be combined with everyday professional tasks and workload. In the interviews, concern was raised about the ethics of continuous professional development events, most of which are organized and sponsored by pharmaceutical companies.

The distribution of medical professionals in the country is still uneven, and there are shortages in some remote areas due to both internal and external migration (36). Some health care administrators stressed, however, that the situation has been improving since a special State budget allocation of 20 million euros to support medical professionals in setting up practices in remote areas. An additional set of incentives is given to GPs working in such areas, which contributes up to 30% of their income.

Because of persistent challenges in planning, organizing and retaining human resources to respond adequately to the growing burden of NCDs, the Ministry of Health has made strengthening and better use of human resources one of the priorities of the National Health Strategy 2012–2020. In response to the recommendations of the Strategy, the Ministry prepared an Action Plan for Human Resources in Health 2015–2020, which was adopted in May 2015 (35).

Challenge 11: Access to high-quality medicines

Croatia has harmonized national and European Union regulations with regard to the price formation of medicines and their inclusion in the basic (A) and additional (B) lists of medicines to be covered by the HIF, ensuring good access to medicines for NCD control.

Expenditure for prescription drugs in Croatia is high, comprising up to 27% of total health expenditure in 2013 (60% more than in 2012). NCD-related prescriptions tend to account for the majority of the financial burden, the five most expensive drugs in 2013 being for NCDs (37). Use of generic prescriptions is low (< 10%), indicating that the current reimbursement and pricing system should be revised to respond to the increasing burden of NCDs. Decisions on the pricing and reimbursement of drugs and medical devices are made by the HIF, but their purchase is administered by the Agency for Medicinal Products and Medical Devices (HALMED), which is also responsible for the quality of medicines; however, only drugs that are not approved by the European Medicines Agency are tested.

Medications on the A list are fully covered by the HIF, while 15% co-payment is required for drugs on the B list. These lists comprise all first-line medications for conditions such as hypertension, hepatitis B and C, diabetes and hypercholesterolaemia. All first-line medications for NCDs are on the A list, and none are sold over the counter. There are no rules regarding the prescription of generic compounds or how physicians should fill in prescription forms; however, lists of generic medicines are included on both lists. During the assessment, most physicians reported that prescribing brand-name medicines was common practice, and a recommendation to prescribe generic drugs had been introduced only recently. The HIF representative explained that physicians must indicate an alternative to their recommended medicine on each prescription form but that it is not necessarily a generic drug.

A discrepancy was noted between the medicines described in clinical guidelines and protocols and their availability in the country. International guidelines should be better adapted to national circumstances, and medicines recommended in clinical guidelines and protocols should be included in the procurement process. A general list of medications for which there have been shortages is publicly available on the website of the Agency for Medicinal Products and Medical Devices. Representatives of the health authorities did not report of any interruptions in the supply of medications on the A or B list for key NCDs in either urban or rural settings.

Before 2015, medicines could be prescribed to outpatients only by a GP. Hence, patients had to obtain a written recommendation on treatment from a specialist and take the prescription to their GP. The Ministry of Health recognized this as a procedural barrier and changed the

prescribing system in 2015. Developments in IT now permit use of e-prescriptions with the personal identifiers of a patient. Recommendations by specialists will be entered into patients' digital records, which can be seen by the GP. It is not clear, however, whether the GP will also receive an alert for immediate patient follow-up.

The National Health Strategy 2012–2020 addresses the challenges described above in several priority areas, such as rational use of medicines, comprehensive use of e-prescription and instituting a pharmacovigilance system.

Challenge 12: Effective management

Despite several good examples of the development of managerial capacity, there are significant shortcomings in the management of health facilities, which requires comprehensive reform.

Croatia has had decentralized health system management since 1980 (9). After the period of transition in the 1990s, opportunities arose to improve decision-making and resource allocation; however, these opportunities were missed. In 2001, reforms transferred the responsibility and decision-making power to local and regional governments, increasing the managerial autonomy of regions; however, most county administrations lacked the technical competence and managerial capacity to govern the health care institutions that had been transferred to their ownership (9). Moreover, although most health centres and general and specialized hospitals were county-owned, they were largely autonomous and uncoordinated. This had negative consequences for both the quality and continuity of care, with lack of efficiency in service provision, including overlaps and fragmentation, lack of unified procurement and deficiencies in system-wide human resource planning and management. Health care financing and resource allocation were still concentrated at national level and thus not responsive to local needs, resulting in growing regional health disparities (9).

The main goal of decentralization was to democratize decision-making, ensure further training to meet public needs and thus result in a more efficient, rational public sector that would stimulate the economic and overall progress of the region. Decentralization does not, however, consist of a mere transfer of funds but rather a shift in regional obligations for optimal performance of the functions for which the funds are transferred (4). In order to support county authorities during decentralization of health and social care, a programme on "Leadership and governance for health" was launched in 2001. The training programme was successful in building solid capacity among managers of health facilities; however, it was not continued, and the demand for properly trained health care managers persists. For example, in 2013, the State Audit Office revealed managerial inefficiency in a number of health facilities, such as outdated information for medication procurement, complex, opaque methods for calculating salaries and frequent staff turnover (10).

As managerial capacity is crucial for the provision of high-quality health services and allocative efficiency within facilities, the Government recognizes that more resources should be invested in this area. As a first step, the National Health Strategy 2012–2020 differentiates between administrative–financial and clinical managers and recommends the establishment of special units for data analysis and planning in health facilities and strengthening the managerial autonomy of community health centres.

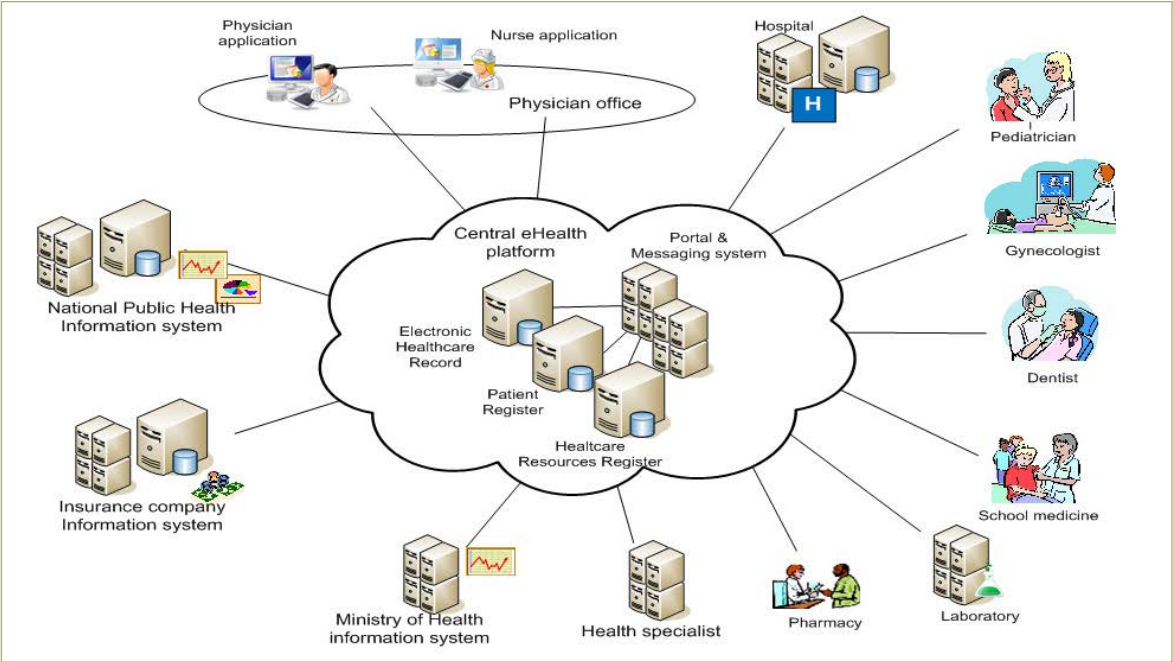
Challenge 13: Adequate information systems

The Ministry of Health recognizes the importance of high-quality information for planning, monitoring and delivering care while minimizing the burden of data collection by using comprehensive, passive methods. The interoperability and integration of existing information systems remains a significant challenge for new developments in this area. Furthermore, it is important to strengthen the security of patient data and use of the evidence for policy-making in the framework of the National Health Strategy 2012–2020.

The health information system in Croatia has two dimensions: (i) a centralized e-health system and (ii) data on health services for internal and public use available at the Ministry of Health, the NIPH and the HIF. These information systems have not yet been integrated, but there is clear commitment and leadership by the Ministry of Health and the HIF. Although data can be accessed by the public, patients and service providers, they are spread among several information platforms and thus do not provide exhaustive information. A centralized health information system, administered by the HIF, was introduced in primary care in the early 2000s and later scaled-up throughout the country. The primary goal of the information systems is to support the work of the HIF and other public agencies; furthermore, they allow timely transfer of diagnostic test results to primary care physicians. This is recognized internationally as best practice, as the systems provide high-quality information at the point of decision-making for individual patients in PHC. Concern has been raised, however, about the confidentiality of patient data and levels of access to data.

As the centralized information system was initiated relatively recently, the planned integration of the information platforms of different hospitals and PHC facilities is yet to be achieved (Fig. 15). Significant progress has been made in e-prescribing, with reported complete national coverage since 2011. The system of e-referrals and e-results has been functioning well at PHC level since 2011 and the system of e-waiting lists since 2012. The system of e-ordering, introduced in 2012, now receives 25% of all orders. The HIF has reported that a system of e-discharge letters from hospitals to PHC, e-results and referral for consultation without a patient was introduced in 2015. Nationally developed software and “smart cards” serve as keys to the system, allowing rapid uptake of these innovations by users. The HIF reports that 70 000 smart cards have been issued to employees of the health sector, allowing access to information from any point in the system. Currently, the HIF is piloting use of electronic health records.

Fig. 15. Information system linkages



Source: HIF (2014)

Health information is collected and processed on a number of platforms, including national and special registries. National registries collect data on public health priorities, such as the prevalence and incidence of specific diseases or diagnoses that are considered to have a major impact on the health of the population. They also enable continuous surveillance of certain conditions and treatment and the health status of specific population groups. Many of these registries, particularly the national registries, are maintained by the NIPH, with other health information resources, for collecting, analysing and providing regular reports. The current health information resources comprise: a cancer registry (data from cancer screening programmes), a registry of

vulnerable groups (e.g. people with disabilities), data on population groups (e.g. children, the elderly), annual hospital discharge data and coded information on diagnosis or treatment. There are also a few specific registries such as for diabetes and mental health. Some of these registries are notified by mandatory reporting from health providers under the Official Statistics Act of 2003 (amended in 2009 and 2012). For example, the diabetes registry is a comprehensive database supported by legislation that requires reporting of information related to diabetes by all primary care physicians and specialists to the Medical Faculty of the University of Zagreb. The NIPH oversees a network of 21 public health institutes at county level. Some local registries are maintained by local authorities, such as the Zagreb City Acute Myocardial Infarction and Acute Coronary Syndrome registries. The Public Health Mortality Database, also administered by the NIPH, collects information on the primary, secondary and tertiary causes of death, and information derived from this database is published annually. The database is reported to be 100% complete, as reporting is mandatory under Croatian legislation. Nevertheless, concern was raised during the assessment about the timeliness and completeness of data collected for some registries.

The NIPH uses the data collected to generate evidence and inform policy-makers. It recently adopted a new common platform for sharing information among agencies, applying the principles of good information governance. As the Croatian health system collects and comprehensively monitors only a few outcome measures (8), the full potential of the system is not used. Those interviewed commented that the new information panels for PHC could improve data collection on NCDs such as CVD, diabetes and chronic obstructive pulmonary disease, and their shared risk factors. The data could also be used to link quality indicators to provider reimbursement.

Challenge 14: Managing change

The Croatian Government is open to changes in its health system, as demonstrated by the series of health reforms introduced over the past few decades. The system initially underwent radical reform, from a fragmented, decentralized health system to a centralized system with strong values of universality and solidarity (9). The National Health Strategy 2012–2020 endorses a shift from prevalence-based reform to improving population health outcomes in priority areas. The greatest barrier to these changes is weak system for monitoring and evaluating of reforms.

The Croatian Government has shown a clear commitment to reforming the health system, in a series of health reforms starting in the 1990s. The National Health Care Act approved in 1993 (replaced by the new Act in 2008) established the National Health Council as the main advisory body to the Ministry of Health. The long-term planning tool of the Ministry is the National Health Strategy, which is an umbrella document covering the context, vision and priorities in health care for the next planning period (9). New reform proposals usually originate in the Ministry and are then discussed by relevant stakeholders and in public debates before being sent for Government and Parliamentary approval. After amendment and acceptance of the reform, the Ministry of Health appoints the main executive agencies. Policies are usually evaluated by ad hoc working groups or national agencies. Evaluation procedures and reporting mechanisms remain weak.

In the early 2000s, the health system shifted its focus from reducing the prevalence of specific diseases to achieving better health outcomes. During the period of intensive reforms, the Government moved from fragmented insurance schemes to consolidating them under one public entity – the HIF – and ensuring universal health coverage for the population. Because of various financial and structural problems, such as an imbalance between revenue and expenditure, excess infrastructure and low efficiency, the Government introduced a further set of health reforms, including limiting benefits, increasing cost-sharing, reducing the payroll contribution rate and reorganizing and rationalizing health care delivery (9). Unfortunately, these changes were not successful, as the HIF experienced budget deficits during the period 2002–2008. The next round of reforms was introduced as the National Health Strategy for 2006–2011. The focus of these reforms was financial stabilization of the health system including measures such as diversification of public revenue collection mechanisms by the introduction of mandatory and complementary

health insurance contributions, increasing co-payments, changing the mechanisms for health care provision (e.g. emergency care) and payment for primary and hospital care and modifying pharmaceutical pricing and reimbursement. The results of this round of reforms remain controversial, as no formal evaluation has been conducted. The National Health Strategy for 2012–2020, approved in 2012, defines five key strategic directions and eight priority areas for action (see Challenge 2). The reforms planned for the period 2014–2016 will be directed mainly to ensuring cost-effectiveness in the hospital sector (9, 30).

During the assessment interviews, concern was raised about the dissonance between policy and reform formulation and implementation, due to little or no participation by stakeholders and the public, considered to be due to insufficient consultations with health care providers and with service users in drafting reform policies. This is a persistent barrier to implementation of change in Croatia and should be addressed as a priority in further policy reforms. Nevertheless, successfully introduced changes at both PHC and hospital levels (e.g. in Breznica and Karlovac) set important precedents for bottom-up approaches to health service delivery in Croatia.

Challenge 15: Access to care and financial protection

The health insurance system in Croatia provides universal population coverage of services for the prevention and control of NCDs; however, the accessibility of services for vulnerable populations should be improved (9).

Public expenditure as a proportion of total health expenditure is higher in Croatia (82% in 2012) than in many other countries in the WHO European Region. The Government allocates a large fraction of its budget to the health sector, which comprised 17.6% in 2013 (9). Most State health funds (about 90%) are allocated to the HIF to purchase services and pharmaceuticals included in the catalogue of benefits under mandatory health insurance. The population benefit package is not, however, clearly defined, apart from the list of medicines (see Challenge 11). The Ministry of Health prepares the plan and programme of health care measures, including a catalogue of health services and pharmaceuticals that should be provided to the population under the insurance scheme to achieve the objectives of the national health programme. The catalogue consists of services and pharmaceuticals for the prevention, early detection and control of infectious and chronic diseases, including CVDs, malignant diseases and diabetes. HIF regulations define the beneficiaries eligible for the basic benefit package under the mandatory health insurance scheme. For example, some population groups (e.g. children) are exempt from co-payment, but all other population groups add 20% co-payment to their insurance cost. Cost-sharing is capped at 2000 Croatian kunas (approximately €264) per episode of illness (9).

Voluntary health insurance is also available in the country, with two types of additional insurance: supplementary insurance, which covers user charges in the mandatory health insurance scheme; and additional insurance covering higher standards of care. Omissions in the design of the benefits package mean, however, that it does not provide proper financial protection for deprived socioeconomic groups in remote geographical locations such as the islands off the Adriatic coast (9). In 2011, 5.1% of Croatian respondents to the European Union survey of statistics on income and living conditions (4) reported an unmet need for medical care, because of factors such as cost, distance or a long waiting list; the average among respondents in the other countries was 3.4%. The reported unmet need showed a socio-economic gradient, being higher in more deprived population groups, with 10.3% unmet health care needs in the lowest income quintile and 1.5% in the highest.

At the beginning of 2015, the status of the HIF changed from an agency under the jurisdiction of the State Treasury to an autonomous agency. The main expected impact of this reform is separation of the health budget from other budgetary items and therefore better cash flow management. Preliminary analysis by the HIF of changes in financial flow show financially more stable health facilities and better quality of care. In comparison with 2014, investment has increased by 10% for PHC, 17% for hospitals, 35% for pharmaceuticals and 30% for outpatient care in rural areas.

5. Innovations and good practice

This section describes evidence of the impact of innovations and good practice on core NCD services and outcomes. An especially good practice is use of **preventive and chronic disease panels in PHC**.

A growing need was identified for an integrated information technology (IT) solution for PHC to support the work of GPs and family group practices and also for use by the HIF for reimbursements. With initial investment from the HIF, a state-of-the-art IT solution has been scaled up nationwide, currently covering approximately 95% of all PHC providers in Croatia.

The idea of recording anthropometric and risk factor data for each patient visiting a PHC provider originated in a family group practice in Breznica. Patient data were kept in Microsoft Excel tables and updated during patient visits. Thus, each patient record could be easily navigated during the visit, the dynamics of exposure to risk factors and of disease could be followed in chronological order, and missing data could be flagged and added. The innovation was recognized by the HIF as a good practice, and a national IT company has developed special e-panel software (Fig. 16).

Fig. 16. Example of the patient panel system outlook

The screenshot displays a patient panel system interface with the following sections:

- Mjerenja** (Measurements) and **Laboratorijski nalazi** (Laboratory findings) tabs.
- Dosadašnja stanja** (Previous conditions) list on the left, showing dates from 24.09.2013 to 13.08.2013.
- Panel: HIPERTENZIJA** (Hypertension panel) with fields for MKB-10 (24.09.2013) and Napomena (Notes).
- TEŽINA, VISINA, OPSEG STRUKA, BOKOVA** (Weight, Height, Waist Circumference, Hip Circumference) section with input fields for Visina (165,0), Težina (64,60), Opseg struka, and Opseg bokova, along with a date field (09.09.2013) and BMI calculation (BMI: 23,73 Idealna TT).
- TLAK** (Blood Pressure) section with input fields for Sistolički (130,0) and Diastolički (80,00) pressures, a date field (18.09.2013), and a radio button for Positivna obiteljska anamneza (DA/NE).
- PUŠENJE** (Smoking) section with radio buttons for Nepušač, Bivši pušač, and Pušač - cigareta (with sub-options for lule and cigara), and checkboxes for Izvršeno savjetovanje and Letak - pušenje.
- GUK** (Glucose) section with input fields for GUK (4,60) and a date field (20.08.2013), a radio button for Dokazana šećerna bolest (DA/NE), and a checkbox for Izvršeno mjerenje glukoze u krvi.
- LIPIDOGRAM** (Lipidogram) section with input fields for Uk. kolesterol, HDL kolesterol, LDL kolesterol, and Trigliceridi.
- KARDIOVASKULARNI RIZIK** (Cardiovascular Risk) section with a field for Vjerojatnost fatalnog CVI: [Progress bar].

Source: Presentation during the assessment mission by the Health Insurance Fund. Key health system issues in Croatia.

There are two types of e-panel: preventive panels and chronic diseases panels. Preventive panels are routine panels that are filled in for entire adult population, containing personal information (age, gender), physical measures (weight, height, blood pressure) and exposure to risk factors such

as smoking and alcohol consumption. Built-in formulas allow calculation of indicators such as body mass index, waist:hip ratio and 10-year risk for CVD (according to prediction charts prepared by WHO and the International Society of Hypertension). The panels are filled in opportunistically at a recommended frequency of 6–12 months, with an automatic pop-up reminder function. The second type are chronic disease panels specifically designed for the three NCDs (CVDs, chronic obstructive pulmonary disease and diabetes) that require close monitoring in PHC. In addition to the data recorded in preventive panels, the chronic disease panels include information specific to one of the three CVDs, such as blood glucose, cholesterol or spirometry values. For example, the diabetes panel allows continuous recording of the results of foot and eye examinations (Fig. 17).

Fig. 17. E-panel system output for a patient with diabetes mellitus, in chronological order

Date	ICD - 10 Code	Weight	Height	BMI	Blood pressure	Blood glucose	HbA1c	24h micro-albuminuria	Blood cholesterol	HDL	LDL	Triglycerides	Creatinine	Diabetes-related amputations	Foot examination	Fundoscopy
10.06.2013	E 11	100	170.0	34.6	130/70	9.2			4.9	0.9	3.00	1.22	77.0			
18.06.2013	E 11	100	170.0	34.6	135/75	7.4			4.9	0.9	3.00	1.22	77.0			
26.06.2013	E 11	100	170.0	34.6	135/75	7.5			4.9	0.9	3.00	1.22	77.0			
02.08.2013	E 11	100	170.0	34.6	135/70	9.7			4.9	0.9	3.00	1.22	77.0			
27.11.2013	E 11	100	170.0	34.6	130/80	9.3	6.7	0.02	4.9	0.9	3.00	1.22	77.0		No signs of diabetic foot	No signs of diabetic retinopathy
25.02.2014	E 11	100	170.0	34.6	130/80	8.7	6.7		7.5	0.9	3.00	1.64	83.0		No signs of diabetic foot	
06.08.2014	E 11	100	170.0	34.6	130/80	8.7	6.7		7.5	0.9	3.00	1.64	83.0			
17.11.2014	E 11	101	170.0	34.95	135/75	8.7	8.4		7.5	0.9	3.00	1.64	83.0		No signs of diabetic foot	No signs of diabetic retinopathy

Source: Presentation during the assessment mission by the Health Insurance Fund. Key health system issues in Croatia, translated and adapted by authors.

The panel system includes reminders about missing data, a history of patient manipulations and basic decision support tools. The information collected also allows clinical audits and quality improvement assessments.

Financial and non-financial (“five-star practices”) incentives for use of e-panels in PHC have resulted in rapid uptake and national extension of the initiative, and use of the e-panels has increased the status of GPs as information holders and care coordinators for patients with NCDs. The first output indicators indicate that GPs are satisfied with the new system, the quality of PHC services is improving, and CVD and diabetes detection rates in PHC are increasing. Several interviewees noted that the existence of a common information platform simplifies the establishment of group practices, with economies of scale in efficient sharing of diagnostic equipment and specialist consultations.

Platforms for e-prescription, e-referrals, e-ordering, e-proposals, applications to monitor waiting lists and e-pathways have also improved service delivery for patients in PHC and facilitated their transition to successive levels of care. The HIF plans to create an integrated information system from PHC to hospital level by introducing electronic medical records and transferring PHC records from e-panels to hospitals electronically; currently, panel data are usually printed out and given to patients before hospitalization. Better integration of information collected in PHC and at secondary levels could improve the continuity of care and reduce duplication of diagnostic and laboratory procedures. The recently launched e-citizens platform is designed as one electronic tool for all public administration, both to simplify interaction with citizens and to further connect the health system and other Government services.

One of the strengths of e-panels is that they are a demand-driven, bottom-up initiative, as users of the software provided input into the design. Users of the panels and other IT support systems in health care have raised concern about access to patient data and its confidentiality. Interoperability and capacity to integrate existing IT solutions for health should be guiding principles for further reforms.

6. Policy recommendations

Croatia has initiated health system reforms to address the growing burden of NCDs with both WHO-recommended population interventions and individual services. The aim of the policy recommendations below is to direct and scale-up further reform in this field. At the end of the initial mission, the assessment team and national stakeholders, including the Ministry of Health, made recommendations and agreed on the following four strategic directions for immediate action.

Strategic direction 1. Strengthen a multi-stakeholder response

In order to accelerate implementation of a comprehensive NCD action plan, a national mechanism should be established for engagement, policy coherence and joint accountability among different sectors. The recommendations are to:

- establish an intersectoral committee, commission or task force coordinated at the highest political level and supported by a national technical group; and
- ensure whole-of-government and whole-of-society involvement in preparing an integrated multisectoral NCD action plan, with targets and indicators in line with those of the WHO global monitoring framework for NCDs.

Strategic direction 2. Scale up cost-effective population interventions

Major gains can be made with relatively low-cost, high-impact, evidence-based population interventions. These include strengthening policies for tobacco and alcohol control, physical activity and nutrition. Croatia was one of the first countries to ratify the WHO Framework Convention on Tobacco Control and has adopted a number of regulations for alcohol and tobacco control, including taxation and bans on advertising. In general, adequate legislation is in place, but full enforcement remains a challenge. With regard to diet, few population-wide policies are in place, although the recently adopted national salt reduction strategy shows political commitment in this area. Therefore, the recommendations are to:

- intensify and scale up legislation and enforcement of policies on tobacco and alcohol control and on promoting a healthy diet and physical activity;
- improve accountability for NCD interventions by strengthening surveillance of risk factors and their determinants while ensuring the values of equity and social justice;
- strengthen the competence of public health professionals in intersectoral work, health impact assessments and economic assessments of other sector policies for better prevention and control of NCDs;
- strengthen coordination mechanisms to oversee implementation of intersectoral NCD activities both horizontally and vertically; and
- expand the role of nongovernmental organizations in the design and implementation of activities for NCD prevention and control.

Strategic direction 3. Improve the provision of core individual services by optimizing models of care, improving quality and aligning incentives

Provision of core individual services at all levels of care is the most cost-effective way of improving NCD outcomes and preventing acute conditions like AMI and stroke. For efficient provision of such services, their scope, models of care and financial arrangements should be aligned in primary and secondary care. To achieve universal coverage of target populations with core individual services, the recommendations are to:

- improve models of care delivery for prevention and control of NCDs, by:
 - scaling-up coverage of WHO-recommended cost-effective interventions for prevention and control of NCDs;
 - enhancing the management of NCDs in PHC;
 - devising strategies for patient empowerment and self-care for NCDs;
 - harmonizing strategic integration of community health centres and family group practices by engaging patients and representatives of all groups of health professionals;
 - improving the continuity and coordination of care for NCDs between primary and secondary levels (e.g. shifting the tasks of care coordinators to PHC nurses);
 - further integrating primary care with public health and social care services to define the priorities of communities and providing targeted individual interventions;
- ensure a high quality of care for NCDs and continuous quality improvement, by:
 - preparing nationally relevant clinical guidelines and patient pathways with input from professional groups and patient organizations;
 - monitoring use of and adherence to clinical guidelines and protocols for NCDs through internal quality improvement mechanisms in health facilities with focus on NCD outcomes;
 - adapting programmes for health work-force training and continuous professional development to fill existing gaps in knowledge, skills and competence in the management of NCDs, designing peer learning methods and ensuring their accessibility to all professional groups;
 - implementing quality assurance programmes by collecting, analysing and reporting indicators of quality disaggregated by age, gender, socioeconomic status and NCD risk factors; and
- better align financial incentives to improve NCD outcomes, by:
 - extending coverage of the new contracting model to GPs in health centres;
 - re-profiling hospitals to better address NCDs;
 - using incentives to overcome regional disparities in the distribution of health workers and ensuring the accessibility of services to the population; and
 - reviewing the reimbursement and pricing of key pharmaceuticals for the treatment of NCDs to ensure cost-effective use of essential drugs and wider use of generics.

Strategic direction 4. Build targeted information systems

Croatia has made significant progress in identifying shared risk factors for NCDs and monitoring the dynamics of NCDs in PHC. The commitment and leadership of the Ministry of Health and the HIF should continue in making further reforms, by:

- building an integrated information system for all levels of care, the Ministry of Health, the HIF and the NIPH;
- addressing concerns about data confidentiality and interoperability in the evolution of the information system; and
- building information systems for passive data collection for effective NCD surveillance and monitoring indicators of quality and performance.



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Annex 1. Criteria for scoring coverage of population-based interventions

Intervention	Score		
	Limited	Moderate	Extensive
Tobacco			
Raise tobacco taxes	Tax < 25% of retail price	Tax 25–75% of retail price	Tax > 75% of retail price
Provide 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 about the dangers of tobacco and tobacco smoke	Warning labels required on tobacco products, size not specified	Warning labels on all tobacco products covering ≥ 30% of package size (front and back)	Warning labels cover > 50% of package size (front and back), with pictures (standardized packaging)
Ban tobacco advertising, promotion and sponsorship	No ban or ban on national television, radio and print	Ban on direct and indirect advertising and promotion	Ban on all advertising and promotion, including at points of sale, with effective enforcement
Provide quit lines and nicotine replacement therapy (NRT) ^a	No quit lines or government-funded cessation services, but NRT available to individuals at full cost	Quit lines and government-funded cessation services available (possibly for payment; NRT available at full cost)	Toll-free quit lines, cessation services and NRT available and affordable (covered at least partially)
Prevent harmful use of alcohol			
Raise taxes on alcohol	Alcohol taxes follow price index	Alcohol taxes follow price index; special taxes on products attractive to young people	Alcohol taxes follow price index and are related to alcohol content; special taxes on products attractive to young people
Restrict or ban alcohol advertising and promotion	Regulatory frameworks exist to regulate content and volume of alcohol marketing	Regulatory frameworks exist to regulate content and volume of alcohol marketing, including direct and indirect marketing and sponsorship	Full ban on alcohol marketing of any kind
Restrict retail sales of alcohol	Regulations on serving alcohol in government and educational institutions	Regulations on serving alcohol in government institutions and ban in educational institutions	All government and educational institutions free of alcohol
Enact and enforce regulation on minimum purchase age ^a	Minimum purchase age 18 years for all alcohol products	Minimum purchase age 18 years for all alcohol products and effective enforcement	Minimum purchase age 18 years for all alcohol products and effective enforcement; loss of licence to sell alcohol if found breaking the law
Implement blood alcohol limit for driving ^a	Blood alcohol content ≤ 0.5 g/L	Blood alcohol content ≤ 0.5 g/L and 0 for novice and professional drivers	Blood alcohol content ≤ 0.2 g/L and 0 for novice and professional drivers

Intervention	Score		
	Limited	Moderate	Extensive
Improve diet and physical activity			
Reduce salt intake and salt content of foods	< 10% reduction in salt intake in past 10 years	About 10% reduction in salt intake in past 10 years	>10% reduction in salt intake in past 10 years
Replace <i>trans</i> -fats with unsaturated fats	No evidence that <i>trans</i> -fats have been significantly reduced in the diet	<i>Trans</i> -fats reduced in some food categories and food producers but not overall	<i>Trans</i> -fats eliminated from the food chain through government legislation and/or self-regulation
Reduce free sugar intake ^a	Reduction of intake of free sugars mentioned in policy documents but no action taken	Reduction of intake of free sugars by 5% is mentioned and partially achieved in food categories	Reduction of intake of free sugars by 5% monitored with a focus on sugar-sweetened beverages
Increase consumption of fruit and vegetables ^a	Increasing consumption of fruit and vegetables is mentioned but no monitoring data collected to support it	Increasing consumption of fruit and vegetables is in line with the WHO/FAO recommendation of ≥ 400 g/day, and some initiatives exist	Increasing consumption of fruit and vegetables is in line with the WHO/FAO recommendation of ≥ 400 g/day, with population initiatives and incentives to increase availability, affordability and access
Reduce marketing pressure on children of food and non-alcoholic beverages ^a	Marketing of foods and beverages to children noted as a problem but not translated into action in government initiatives	WHO recommendations on marketing acknowledged and steps taken for self-regulation to reduce marketing pressure on children	WHO recommendations on marketing and the implementation framework on marketing followed consistently, including mechanism for monitoring
Promote awareness about diet and activity ^a	No work-force development for nutrition and physical activity; nutrition and physical activity not priorities in primary care	Some work-force development for nutrition and physical activity; nutrition and physical activity starting to be considered priorities in primary care	Work-force development for nutrition and physical activity; nutrition and physical activity are priorities in primary care

^a Additional criteria to those in the *Global action plan for the prevention and control of noncommunicable diseases 2013–2020*. Geneva: World Health Organization; 2013 (http://www.who.int/nmh/events/ncd_action_plan/en/, accessed 26 September 2014).



Annex 2. Criteria for scoring coverage of individual services for cardiovascular disease and diabetes

Service	Limited	Moderate	Extensive
Cardiovascular diseases			
Risk stratification in primary health care (PHC)	10-year CVD risk is documented in < 30% of records of patients > 40 years of age with at least one main CVD risk factor. Specific risk factors are not routinely documented.	10-year CVD risk is documented in 30–60% of records of patients > 40 years of age with at least one main CVD risk factor. Risk factor documentation is incomplete, or systematic methods are not used.	10-year CVD risk is routinely documented in > 60% of records of patients > 40 years of age with at least one main CVD risk factor. Systematic method used for calculation with routine documentation of specific risk factors.
Effective detection and management of hypertension	< 30% of estimated cases with high blood pressure are identified in PHC. Evidence-based generic antihypertensive drugs are infrequently prescribed, and no effort is made to address patient adherence.	30–60% of estimated cases with high blood pressure are identified in PHC. Evidence-based antihypertensive drugs are prescribed often (25–75%), and there is some effort to increase patient adherence but not systematically.	> 60% of estimated cases of high blood pressure are identified in PHC. Evidence-based generic antihypertensive drugs are prescribed routinely (> 75%); government-funded efforts to increase adherence are systematic.
Effective primary prevention in high-risk groups	Prescribers are not aware of indications for primary prophylaxis. < 10% of patients with very high (> 30%) 10-year CVD risk are identified and prescribed multidrug regimens (antihypertensive, aspirin and statins). Aspirin is prescribed indiscriminately to all patients with hypertension.	Prescribers are aware of indications for primary prevention with a multidrug regimen. Coverage of very high-risk patients with primary prophylaxis is low (10–25%), or appropriate drug regimens are prescribed but with very low patient adherence. Aspirin is prescribed indiscriminately to all patients with hypertension.	Patients at very high risk for CVD are routinely prescribed multidrug regimens, including statins. Coverage of at-risk patients is > 25%. Evidence indicates good long-term patient adherence. Aspirin is not prescribed to patients with hypertension and low or medium risk for CVD.
Effective secondary prevention after AMI, including aspirin	< 25% of patients receive aspirin, beta-blockers and statins after AMI.	25–75% of patients receive aspirin, beta-blockers and statins after AMI.	> 75% of patients receive aspirin, beta-blockers and statins after AMI.
Rapid response and secondary care after AMI and stroke ^a	< 25% of patients with AMI or stroke receive diagnosis and care within 6 h of first symptoms.	25–50% of patients with AMI or stroke receive diagnosis and care within 6 h of first symptoms.	> 50% of patients with AMI or stroke receive diagnosis and care within 6 h of first symptoms.

Service	Limited	Moderate	Extensive
Diabetes			
Effective detection and general follow-up ^a	<p>< 75% of PHC practices establish and maintain a register of all patients aged ≥ 17 years with diabetes.</p> <p>< 25% detection and registration rate based on estimated prevalence of type 2 diabetes in the adult population. No evidence-based, systematic method used to select asymptomatic patients for screening</p>	<p>25–75% of PHC practices establish and maintain a register of all patients aged ≥ 17 years with diabetes.</p> <p>25–50% detection and registration rate is based on estimated prevalence of type 2 diabetes in the adult population. An evidence-based, systematic method is used to select asymptomatic patients for screening, but coverage is limited.</p>	<p>More than 75% of PHC practices establish and maintain a register of all patients ≥ 17 years with diabetes.</p> <p>> 50% detection and registration rate is based on estimated prevalence of type 2 diabetes in the adult population. An evidence-based, systematic method is used to select asymptomatic patients for screening, with high coverage.</p>
Patient education on nutrition and physical activity and glucose management	<p>< 25% of people with type 2 diabetes had at least three PHC visits in the past year.</p> <p>< 25% of people registered with diabetes receive organized dietary counselling.</p> <p>PHC has no capacity for counselling on physical activity.</p> <p>< 25% of people registered with diabetes had a glycosylated haemoglobin measurement in the past 12 months.</p>	<p>25–75% of people with type 2 diabetes had at least three PHC visits in the past year.</p> <p>25–75% of people registered with diabetes receive organized dietary counselling.</p> <p>Counselling on physical activity is offered routinely in PHC.</p> <p>25–75% of people registered with diabetes had a glycosylated haemoglobin measurement in the past 12 months.</p>	<p>> 75% of people with type 2 diabetes had at least three PHC visits in the past year.</p> <p>> 75% of people registered with diabetes receive organized dietary counselling.</p> <p>Counselling and options for physical activity through partnerships are offered routinely.</p> <p>> 75% of people registered with diabetes had a glycosylated haemoglobin measurement in the past 12 months.</p>
Hypertension management in diabetes patients	<p>< 25% of people registered with diabetes with hypertension have achieved a blood pressure < 140/90 mm Hg; angiotensin-converting enzyme (ACE) inhibitors are not routinely prescribed as first-line antihypertensive medication.</p>	<p>25–75% of people registered with diabetes with hypertension have achieved a blood pressure < 140/90 mm Hg; ACE inhibitors are routinely prescribed as first-line antihypertensive medication.</p>	<p>> 75% of people registered with diabetes with hypertension have achieved a blood pressure < 140/90 mm Hg; ACE inhibitors are routinely prescribed as first-line antihypertensive medication.</p>
Preventing complications	<p>< 25% of people registered with diabetes had a foot examination, eye examination (fundoscopy) and urine protein test in the past 12 months.</p>	<p>25–75% of people registered with diabetes had a foot examination, eye examination (fundoscopy) and urine protein test in the past 12 months.</p>	<p>> 75% of people registered with diabetes had a foot examination, eye examination (fundoscopy) and urine protein test in the past 12 months.</p>

AMI, acute myocardial infarction; CVD, cardiovascular disease; PHC, primary health care

^a Additional criteria to those in the *Global action plan for the prevention and control of noncommunicable diseases 2013–2020*. Geneva: World Health Organization; 2013 (http://www.who.int/nmh/events/ncd_action_plan/en/, accessed 26 September 2014).

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