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# Kardiovaskularna prevencija i rehabilitacija: gdje smo i kuda idemo?

## *Cardiovascular prevention and rehabilitation: where are we and where are we heading to?*

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**SAŽETAK:** U Republici Hrvatskoj tijekom 2010. godine zabilježeno je 25.631 smrti zbog kardiovaskularnih bolesti (KVB), s udjelom od 49,2% u ukupnom mortalitetu. Pristupanje ukupnim preventivnim, dijagnostičkim, terapijskim i sveobuhvatnim rehabilitacijskim mjerama u bolesnika koji imaju razvijenu aterosklerotsku KVB, s ciljem postizanja maksimalnog zdravlja, osobne, obiteljske i socijalne dostatnosti, kao i sprječavanja novog kardiovaskularnog događaja, glavni su zadaci organizirane zdravstvene djelatnosti sekundarne prevencije. Uspješno provedeni, oni dovedu do značajnog povećanja preživljenja, poboljšanja kvalitete života, smanjenja potrebe za intervencijskim, kirurškim ili perkutanim zahvatima, uz krajnje značajnu redukciju ukupnog društvenog i ekonomskog opterećenja. U skladu s općeprihvaćenim konceptom kontinuuma u razvoju aterosklerotske bolesti i definicijom KVB kao izoliranog događaja unutar navedenog neprekinutog slijeda, temeljni pristup prevenciji treba donekle zanemariti tradicionalnu podjelu na "primarnu" i "sekundarnu" prevenciju, barem u načelnim razmatranjima ovog tematskog područja. Suvremena strategija nameće dva osnovna cilja: opću populacijsku preventivnu strategiju, te strategiju preventivnih mjera u visokorizičnih bolesnika izjednačenih s onima koji su već oboljeli od KVB. Navedeno je temelj profiliranja suvremenih općih i specifičnih preventivnih planova u zaštiti od KVB. U svjetlu porasta značaja prevencije kardiovaskularnih bolesti, rehabilitacija kardiovaskularnih bolesnika imat će sve veću važnost u cjelokupnom zbrinjavanju i sprječavanju pobola i smrtnosti od kardiovaskularnih bolesti, uz smanjenje troškova i povećanje kvalitete života.

**KLJUČNE RIJEČI:** kardiovaskularne bolesti, kardiološka rehabilitacija, prevencija.

**SUMMARY:** In 2010, there were 25,631 deaths caused by cardiovascular diseases (CVD), which accounted for 49.2% of total mortality in the Republic of Croatia. Applying the total preventive, diagnostic, treatment and comprehensive rehabilitation measures in patients who have developed atherosclerotic CVD aimed at achieving maximum health, personal, family and social sufficiency and prevention of new cardiovascular event are the main tasks of organized health activity of secondary prevention. When successfully conducted, they lead to a significant increase in survival, improvement of life quality, reduction in the need for interventional, surgical or percutaneous interventions, with an utmost significant reduction in overall social and economic burden. In accordance with generally accepted continuum concept in the development of atherosclerotic diseases and CVD definition as an isolated event within the specified uninterrupted continuum, the basic approach to the prevention should ignore the traditional division into "primary" and "secondary" prevention to a certain extent, at least in principal considerations of this thematic area. Contemporary strategy suggests the two basic objectives: the general population preventive strategy and the strategy of preventive measures in high risk patients equalized with those who are already suffering from CVD. The above is the foundation for modern profiling of contemporary general and specific preventive plans in protection from CVD. In the light of an increasing importance of prevention of cardiovascular diseases, the rehabilitation of cardiovascular patients will have an increasing importance in the overall management and prevention of morbidity and mortality from cardiovascular diseases, while reducing costs and improving the life quality.

**KEYWORDS:** cardiovascular diseases, cardiac rehabilitation, prevention.

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**A**terosklerotska bolest srca i krvožilja, kao značajan uzrok pobola i vodeći uzrok smrti osoba srednje i starije životne dobi, zbog visokih troškova zdravstvene zaštite i ukupnog ekonomskog opterećenja društva, predstavlja jedan od glavnih javnozdravstvenih problema razvijenih zemalja<sup>1</sup>. U Republici Hrvatskoj je 2010. godine zabilježeno 25.631 smrti zbog kardiovaskularnih bolesti (KVB) s udjelom od 49,2% u ukupnom mortalitetu. Na drugom su mjestu po broju hospitalizacija s udjelom od 13,5%, iza novotvorina, te na drugom mjestu po morbiditetu registriranom u obiteljskoj medicini.<sup>2</sup> Analiza prema spolu pokazuje da su KVB vodeći uzrok smrti u oba spola, i to u 55,7% umrlih žena (14.702) i 42,6% umrlih muškaraca (10.929).<sup>2,3</sup> Opća stopa smrtnosti od KVB u žena je 643,1/100.000, a u muškaraca 512,7/100.000. Vodeće dijagnostičke podskupine u ukupnom mortalitetu bile su ishemijske bolesti srca s udjelom od 21,6% i cerebrovaskularne bolesti s udjelom od 14,6%. Stope mortaliteta rastu s dobi i više su za muškarce u svim dobnim skupinama, posebice za ishemijsku bolest<sup>3</sup>

Terapijske intervencije imaju nezaobilaznu ulogu u sveukupnoj strategiji smanjenja KVB. Čini se kako su upravo najskuplje intervencije paradoksalno malog doprinosa sveukupnom smanjenju pobola od KVB, najvjerojatnije zbog njihove prekasne primjene. Zanimljivo je kako revaskularizacijske procedure u Sjedinjenim Američkim Državama čine svega 5% doprinosa u smanjenju mortaliteta KVB. Smatra se kako čak 45-75% smanjenja smrtnosti od KVB postiže prevencijom i promjenom rizičnog ponašanja, dok kod preostalih 55-25% ulogu imaju terapijske intervencije.<sup>4</sup> Nakon više desetljeća udjela KVB s više od 50% u ukupnom mortalitetu, posljednjih je nekoliko godina u Republici Hrvatskoj po prvi puta uočen obećavajući pokazatelj zaustavljanja uzlaznog trenda. Na inicijativu Hrvatskoga kardiološkog društva (HKD), a uz potporu tadašnjeg Ministarstva zdravstva i socijalne skrbi, Hrvatskog zavoda za zdravstveno osiguranje i bolničkih ustanova stvorena je *Hrvatska mreža perkutane koronarne intervencije* — nacionalna mreža modernog zbrinjavanja akutnog koronarnog sindroma (ACS) čija je dobrobit mjerljiva padom smrtnosti i dugoročnih komplikacija ove bolesti. U dosta skromnijim uvjetima rezultati zbrinjavanja ACS podjednaki su najrazvijenijim zemljama zapada.<sup>5</sup> Istovremeno su učinjeni i bitni pomaci na drugoj strani kontinuuma KVB. Zahvaljujući još jednom nacionalnom projektu HKD — studiji TASPIC-CRO (*Treatment and secondary prevention of ischemic coronary events in Croatia*) registrirano je poboljšanje rezultata zbrinjavanja u sekundarnoj prevenciji.<sup>6</sup> Osvješćivanje struke o potrebi primjene optimalne farmakološke terapije sukladno smjernicama Europskoga kardiološkog društva (ESC) olakšala je bolja informiranost i edukacija članova HKD. Aktualna izdanja ESC smjernica prevode se na hrvatski jezik i objavljuju u tiskanom izdanju i elektroničkom obliku na web portalu društva *Kardio.hr*, a članovi se educiraju i upoznaju s aktivnostima prilikom redovitih stručnih sastanaka i u nacionalnom kardiološkom časopisu *Kardio list*. Opća populacija također ima bolju priliku za informiranje i aktivnu borbu protiv čimbenika rizika KVB, jer su medijski istupi članova HKD u tiskanim i elektroničkim medijima učestali. Prilika za direktan kontakt s liječnikom ili medicinskom sestrom pruža se i prilikom obilježavanja Svjetskog dana srca ili Hrvatskog tjedna zdravlja srca koje organiziraju HKD, Hrvatska udruga kardioloških sestara i Zaklada "Hrvatska kuća srca".

Sve navedeno očituje se kontinuiranim smanjenjem ukupne smrtnosti od ACS, pogotovo u zadnjem desetljeću, koje se može iščitati, primjerice, iz podataka Registra akutnog infarkta miokarda i akutnog koronarnog sindroma za grad Za-

**A**therosclerotic cardiovascular disease as a significant cause of morbidity and the leading cause of death in middle-aged and elderly persons is due to high medical costs and the total economic burden for the society a major public health problem in developed countries.<sup>1</sup> In 2010, 25,631 deaths were recorded in Croatia caused by cardiovascular diseases (CVD) which accounted for 49.2% of total mortality. It takes the second place according to the number of hospitalizations accounting for 13.5% following the neoplasm and takes the second place according to the morbidity recorded in the family medicine.<sup>2</sup> The analysis by gender shows that CVD are the leading cause of death in both genders, namely causing 55.7% of deaths in women (14 702) and 42.6% of deaths in men (10.929).<sup>2,3</sup> The general rate of mortality from CVD in women was 643.1/100,000 and 512.7/100,000 in men. The leading diagnostic subgroups in the total mortality were ischemic heart diseases accounting for 21.6%, and cerebrovascular diseases accounting for 14.6%. Mortality rates rise with age and are higher for men in all age groups, particularly for ischemic disease.<sup>3</sup>

Therapeutic interventions have a crucial role in the total strategy of reduction of CVD. The most expensive interventions seem to contribute to the total reduction in incidence of morbidity from CVD to a paradoxically small degree, most likely because they are too late. It is worth noting that revascularization procedures in the United States of America make up only 5% of the contribution in reducing the mortality from CVD. It is believed that even 45-75% of reduction in mortality from CVD is achieved by prevention and changing the risk behavior, while for the remaining 55-25% therapeutic interventions play an important role.<sup>4</sup> After CVD accounted for more than 50% of all deaths in the last few decades, in total mortality during the last few years a promising indicator of halting the upward trend was observed for the first time in the Republic of Croatia. At the initiative of the Croatian Cardiac Society (HKD), backed by the Ministry previously known as the Ministry of Health and Welfare, the Croatian Institute for Health Insurance, and Hospital institutions, the *Croatian Network of Percutaneous Coronary Intervention* — a national network of modern management of acute coronary syndromes (ACS) was created whose benefit can be measured by reducing mortality and long-term complications of this disease. Although working in more modest conditions, the results of management of ACS equal the results achieved in the most developed countries in the west.<sup>5</sup> At the same time, some important progress was achieved on the other side of the CVD continuum. Owing once again to the national HKD project — the TASPIC-CRO study (*Treatment and secondary prevention of ischemic coronary events in Croatia*), the improvement of the results of management in the secondary prevention was recorded.<sup>6</sup> Raising the physicians' awareness about the need to apply the optimal pharmacological therapy according to the guidelines of the European Society of Cardiology (ESC) was facilitated by more detailed information provided and education that HKD members received. The current editions of the ESC guidelines have been translated into Croatian and are published in the printed and electronic format on the web portal of the society *Kardio.hr*, while the members are educated and made familiar with the activities while attending ordinary expert meetings and in the national cardiology journal *Kardio list*. The general population also has a better opportunity to get informed and to actively combat the CVD risk factors, because the appearance of the HKD members in printed and electronic media is frequent. The opportunity for a

greb (Slike 1 i 2), populacijskog registra koji se vodi kontinuirano od 1979. godine.<sup>7</sup> Usprkos smanjenju broja pacijenata s ACS koji umiru prije dolaska u bolnicu tijekom zadnjih 30-ak godina i danas njih čak oko 50% umire izvan bolnice. Očito su moderne metode liječenja i poduzete preventivne mjere polučile dobre rezultate, ali, nažalost, to još uvijek nije dovoljno. Iz svega navedenog nameće se zaključak kako je strategija smanjenja mortaliteta od KVB u budućnosti upravo temeljena na upornom provođenju mjera primarne i boljoj sekundarnoj prevenciji.

direct contact with a physician or a nurse is given on the occasion of celebrating the World Heart Day and the Croatian Week of the Heart Health organized by the HKD, Croatian Association of Cardiac Nurses and the Foundation "Croatian Heart House".

All this is reflected in a continuous reduction of total mortality from ACS, especially during the last decade, which can be seen, for example, from the data included in the Registry of acute myocardial infarction and acute coronary syndrome for the city of Zagreb (Figure 1 and 2), the population registry which has been continuously maintained since 1979.<sup>7</sup> Despite the reduction of the number of patients with ACS who die before the arrival at the hospital during the past 30 years, even today there are about 50% of them who die outside the hospital. The modern methods of treatment and undertaken preventive measures have obviously given some good results, but unfortunately, this is still not enough. The above stated makes us conclude that the strategy of reducing mortality from CVD in the future is focused on the persistent conducting of primary prevention and better secondary prevention measures.

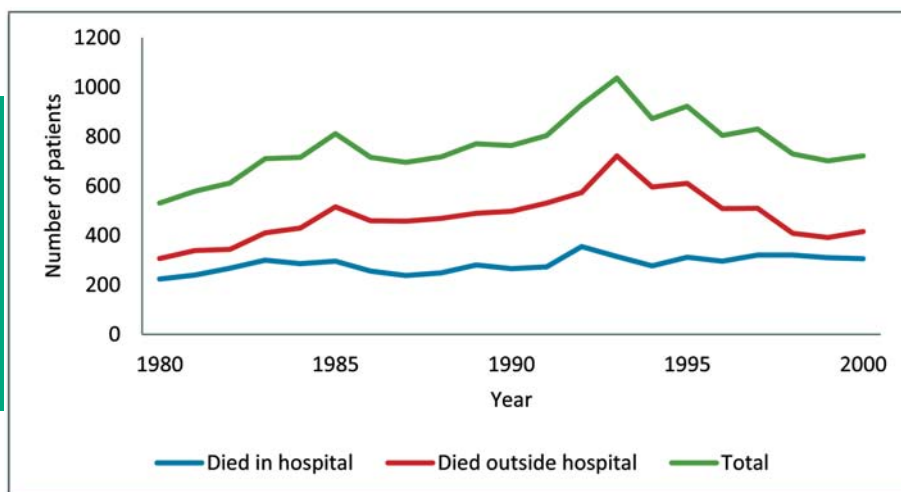
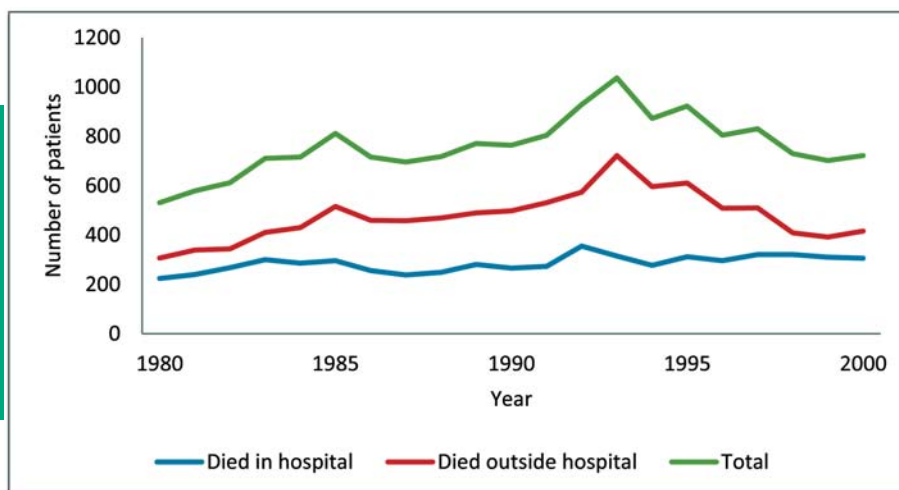


Figure 1. Citizens of the city of Zagreb who died from acute myocardial infarction in the period from 1980 to 2000 considering the place of death.

Figure 2. Citizens of the city of Zagreb who died from acute coronary syndrome in the period from 2003 to 2010 considering the place of death.



## Kardiološka rehabilitacija

Max Joseph Örtel (Dillingen, 1835.—1897.), njemački je liječnik koji je najveći dio svog radnog vijeka proveo u Münchenu, a poznat je kao izumitelj stroboskopa za pregled grkljana i kao eksperimentator sa sporama difterije. Za kardiorehabilitacijsku povijest, međutim, značajniji je kao pisac

## Cardiac rehabilitation

Max Joseph Örtel (Dillingen, 1835.—1897) was a German physician who spent most of his career in Munich, and was famous as an inventor of stroboscope required for examining larynx and as an experimenter of diphtheria spores. However, regarding the cardiac and rehabilitation history, he



knjige *Terapije za smetnje krvotoka (Therapie der Kreislaufsstörungen, 1884.)* i ideator terapije kretanja za prvenstveno srčane bolesnike, koju je zacrtao zajedno s Charlesom Mundeom. Terapija je podrazumijevala redovite, najprije kraće šetnje, nikad do iscrpljenja, nikad odmah po obroku, uz mogućnost kombiniranja s plivanjem i veslanjem, s ciljem da bi se ubrzao ritam metabolizma, probave, ojačali mišići i kardiovaskularni sustav. Kada se u današnje vrijeme učinila analiza treninga terapije za smetnje krvotoka, pronađen je zapanjujući nivo podudarnosti između Örtelove empirije s modernim konceptima i instrumentarnim mjerenjima. Time se Örtel s pravom može smatrati pionikom kardiorehabilitacijske ideje.

Suvremeni kardiorehabilitacijski programi dizajnirani su kasnih pedesetih i početkom šezdesetih godina prošlog stoljeća s osnovnom idejom smanjenja negativnih učinaka mirovanja nakon preboljelog infarkta miokarda. Od 1980. godine postaju dio standardne procedure u kardiološkom liječenju s ciljem što ranije funkcijske rehabilitacije. Teži se bolesnika vratiti u normalan život, omogućiti ponovno postizanje, unaprjeđenje i održavanje tjelesne sposobnosti, poticati usvajanje navika zdravog života i smanjenje kardiovaskularnih čimbenika rizika.<sup>4</sup>

Kardiološka rehabilitacija predstavlja organizirani skup postupaka usmjeren dijagnostičkoj procjeni, optimalizaciji terapije i pripremi bolesnika za trajnu samostalnu sekundarnu prevenciju KVB. Navedeni učinci organizirane i sustavne kardiološke rehabilitacije sustavno su procijenjeni u nizu multicentričnih studija.<sup>4,8-10</sup> Glavni zadaci organizirane zdravstvene skrbi u djelokrugu sekundarne prevencije uključuju sveobuhvatno pristupanje preventivnim, dijagnostičkim, terapijskim i rehabilitacijskim mjerama. Njihov je cilj postizanje maksimalnog zdravlja, uključujući sfere osobne, obiteljske i socijalne dostatnosti, uz istovremeno sprječavanje novih kardiovaskularnih incidenata kod bolesnika koji imaju izraženu aterosklerotsku KVB. Uspješno provedeni, postupci sekundarne prevencije dovode do značajnog poboljšanja preživljenja, unaprjeđenja kvalitete života, smanjenja potrebe za intervencijskim, kirurškim ili perkutanim zahvatima, uz značajnu redukciju ukupnog društvenog i ekonomskog opterećenja.

Kako je rehabilitacija organizirani skup postupaka, težište znanstvenog propitivanja njenog djelovanja postupno se fokusiralo na analizu međuodnosa pojedinih rehabilitacijskih zahvata s određenim patogenetskim čimbenicima koronarne bolesti srca (KBS). Unutar pozamašnog broja analiziranih međuodnosa izdvaja se pozitivan utjecaj fizičkog treninga, promjene životnog stila, prekida pušenja i uravnotežene prehrane u sekundarnoj prevenciji. Moduliranje upalne osnove aterosklerotske bolesti ostaje i dalje izazovno područje nedovoljne istraženosti.<sup>10,11</sup>

Rehabilitaciju kardiovaskularnih bolesnika čine opsežni, dugotrajni programi koji uključuju medicinsku evaluaciju, fizički trening, modifikaciju kardiovaskularnih čimbenika rizika, edukaciju i savjetovanje. Programi su dizajnirani da ograniče fiziološke i psihosocijalne učinke srčanih bolesti, smanje rizik iznenadne srčane smrti ili reinfarkta, kontroliraju simptome bolesti, stabiliziraju ili smanje aterosklerotske procese i poboljšaju psihosocijalni i radni status bolesnika.

Ciljevi sekundarne prevencije integrirani su u ciljeve kardiovaskularne rehabilitacije, uz znatno šire definirane ciljeve rehabilitacije, prije svega u domeni poboljšanja kvalitete života i smanjenja psihosocijalnih učinaka bolesti.<sup>12,13</sup>

is more significant as the author of the book *Therapy for vascular disorders (Therapie der Kreislaufsstörungen, 1884)* and ideator of the movement therapy primarily for cardiac patients, developed by him together with Charles Munde. The therapy included regular, at first, short walks, never exhausting ones, never immediately after a meal, where possible, accompanied by swimming and rowing, with an aim to accelerate the pace of metabolism, digestion, strengthen the muscles and cardiovascular system. At the time when the training therapy for vascular disorders was analyzed in recent times, an amazing level of equivalence between Örtel's empiricism and modern concepts and instrumental measurements was found. Owing to this fact, Örtel can be regarded as a pioneer of cardiac and rehabilitation idea.

Contemporary cardiac and rehabilitation programs were designed in the late 50-ies and early 60-ies during the last century with a basic idea to reduce a negative effect of rest following the history of myocardial infarction. Since 1980, they have become a part of the standard procedure in cardiac treatment aimed at achievement of functional rehabilitation as early as possible. More serious patients are to be brought back to a normal life, whereas their physical abilities are to be re-established, improved and maintained. They are encouraged to adopt habits of a healthy life and reduce cardiovascular risk factors.<sup>4</sup>

Cardiac rehabilitation is an organized set of procedures focused on diagnostic evaluation, treatment optimization and preparation of patients for a permanent independent secondary prevention of CVD. These effects of organized and systematic cardiac rehabilitation have been systematically evaluated in a series of multicenter studies.<sup>4,8-10</sup> The main tasks of an organized medical care within the scope of secondary prevention include conducting comprehensive preventive, diagnostic, therapeutic and rehabilitative measures. Their goal is to achieve maximum health, including the spheres of personal, familial and social sufficiency, while simultaneously preventing new cardiovascular events in patients who have pronounced atherosclerotic CVD. When successfully conducted, the secondary prevention procedures lead to a significant improvement of survival, improvement of life quality, reduction of the need for interventional, surgical or percutaneous procedures, thereby significantly reducing the total social and economic burden.

Since the rehabilitation program is an organized set of procedures, the focus of scientific inquiry into its activities has gradually focused on the analysis of the interrelationship of specific rehabilitation procedures with specific pathogenetic factors of coronary heart disease (CHD). In a rather large number of analyzed interrelationships, physical training, change to lifestyle, giving up smoking and a balanced diet have proved to have a positive effect in the secondary prevention. Modulating the inflammatory basis of atherosclerotic disease still remains a challenging area which remained insufficiently explored.<sup>10,11</sup>

Rehabilitation of cardiovascular patients includes comprehensive and long programs involving medical evaluation, physical training, modification of cardiovascular risk factors, education and counseling. The programs are designed to limit the physiological and psychosocial effects of heart disease, reduce the risk of sudden cardiac death or reinfarction, control the symptoms of the disease, stabilize or reduce atherosclerotic processes and improve psychosocial and working status of patients.

The goals of the secondary prevention are integrated in the cardiovascular rehabilitation goals, with much broadly defi-

Rehabilitacija se provodi u tri temeljne faze<sup>14</sup> (Slika 3):

- I. faza akutna i rana postakutna hospitalna faza
- II. faza kasna postakutna hospitalna faza
- III. faza održavajuća faza

**Prva faza rehabilitacije** započinje odmah nakon akutne faze bolesti ili kardiokirurškog zahvata, još u jedinici intenzivnog liječenja i nastavlja se na kliničkom kardiološkom ili kardiokirurškom odjelu. Obuhvaća vježbe disanja i razgibanja u krevetu, potom posjedanje u krevetu, ustajanje i šetnje bolesnika hodnikom. Započinje edukacija bolesnika i obitelji o bolesti i čimbenicima kardiovaskularnog rizika. Kod otpusta se nastoji procijeniti stanje 5-minutnom ergometrijom sa 50-75 W opterećenja. Zabranjuje se pušenje i uvodi terapija sekundarne prevencije.

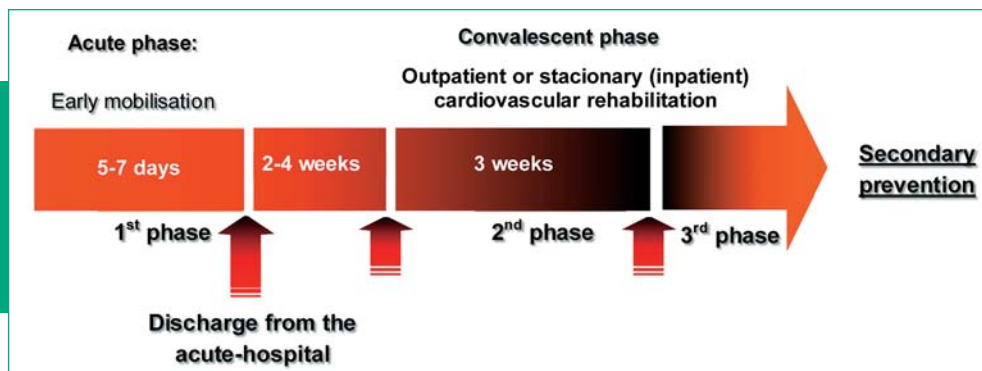
ned goals of rehabilitation, especially in the area of improving the life quality and reducing the psychosocial effects of diseases.<sup>12,13</sup>

The rehabilitation is conducted in three basic phases<sup>14</sup> (Figure 3):

- Phase 1 acute and early postacute hospital phase
- Phase 2 late postacute hospital phase
- Phase 3 maintenance phase

**The first rehabilitation phase** begins immediately following the acute phase of the disease or cardiac surgery in the intensive care unit and continues in the clinical cardiology department or department of cardiac surgery. It includes breathing and stretching exercises in bed, followed by lying down in bed, getting up and patient's walks taken through the corridor. The patient's and family's education about the disease and cardiovascular risk factors starts. Upon discharge, the condition is to be evaluated by 5-minute stress test with 50-75 watt of load. Smoking is prohibited and secondary prevention therapy is introduced.

Figure 3. Structure of cardiovascular rehabilitation programs.



Nastavak **rehabilitacije u drugoj fazi** može uslijediti neposredno ili par tjedana nakon prve faze. Bolesnik se upućuje u ustanove za stacionarnu ili ambulantnu rehabilitaciju gdje se provodi druga (konvalescentna) faza. Ova faza traje 3-5 tjedana u stacionarnoj ili do 8-12 tjedana u ambulatnoj rehabilitaciji.

Oblik provođenja kardiovaskularne rehabilitacije (ambulatni ili bolnički) ovisi prije svega o stratifikaciji rizika kod bolesnika, ali i o tradicijskim, finansijskim, logističkim i drugim čimbenicima. Ciljevi ove faze su: unaprjeđenje oslabljene ili od ranije slabe tjelesne kondicije, stabilizacija kardiološkog statusa, redukcija rizika progresije bolesti, psihološka stabilizacija i priprema za punu socijalnu reintegraciju s obnavljanjem radnih sposobnosti. U ovoj fazi sudjeluju kardiolozi, fizijatri, educirane medicinske sestre i fizioterapeuti, dijetetičari, psiholozi, a po mogućnosti socijalni radnici i specijalisti medicine rada. Prilikom prijema bolesnika se reevaluiraju stanje bolesti, uz selekcioniranje u skupine različite težine tjelesnog treninga. Intenzitet, forma i trajanje treninga je individualizirano prema stanju bolesnika u rasponu od strogo doziranog individualnog treninga pod kontinuiranim nadzorom, kroz niz kategorija do skupnog treninga s raznovrsnim odabirom vježbi uz nadzor. Tjelesni trening u drugoj fazi podrazumijeva više oblika aktivnosti: vježbe disanja i razgibanja, opterećenje na bicikl-ergometru, vježbe u prirodi i šetnje trim stazama, rekreacijsko plivanje, stolni tenis i drugo. Uz rijetke izuzetke, nastoji se vježbe provoditi u skupini, pod nadzorom fizioterapeuta, eventualno i liječnika, po potrebi uz

The continuation of **rehabilitation in the second phase** may follow immediately or a few weeks following the phase 1. The patient is sent to institutions for inpatient or outpatient rehabilitation where the second (convalescent) phase is carried out. This phase lasts for 3-5 weeks in inpatient or 8-12 weeks in outpatient rehabilitation facility.

The way of conducting cardiovascular rehabilitation (outpatient or in-hospital) mainly depends on the risk stratification in patients, but it also depends on traditional, financial, logistic and other factors. The aims of this stage are: improvement of impaired or poor physical condition from earlier times, stabilization of cardiac status, reduction of disease progression risk, psychological stabilization and preparation for the full social reintegration with restored working abilities. Cardiologists, physiatrists, trained nurses and physiotherapists, dietitians, psychologists, and possibly social workers as well as occupational medicine specialists participate in this phase. At the time of admitting a patient, the disease status is reevaluated thereby selecting various severities of physical training in groups. Intensity, form and duration of the training is individualized according to a patient's condition, ranging from strictly dosed individual training under continuous supervision, through a series of categories to the group training with various selection of exercises under the supervision. Physical training in the second phase includes several types of activities: breathing and stretching exercises, load on ergometer bicycle, exercises in the nature and walks taken through the jogging trails, recreational swimming, table

EKG monitoring, intervalno, s doziranim povećanjem intenziteta opterećenja i trajanja treninga, obično od 15 minuta u početku do dva puta po 30 minuta. Tjelesni trening počinje 5-10 minutnim zagrijavanjem, nastavlja se s 30-tak minuta "pune" aktivnosti (s intervalnim odmorima) i završava 5-10 minutnim "hlađenjem". Težina vježbi se u pravilu određuje prema trenutnoj funkcijskoj sposobnosti i stupnju rizika (**Tablica 1**).

tennis etc. Very exceptionally, the exercises are to be done in a group, under the surveillance of a physical therapist and physician, if possible, and if necessary with ECG monitoring, in intervals, with dosed increase in load intensity and training duration, usually lasting for 15 minutes at the beginning to maximally twice a day per 30 minutes. Physical training begins with 5 to 10 minute warm-up, followed by a 30-minute "full" activities (with interval breaks) and ends with 5 to 10 minute "cooling". The complexity of exercises is principally determined according to the current functional ability and the level of risk (**Table 1**).

	Risk		
	Low	Intermediate	High
<b>Workload</b>	≥ 6 MET	75 W or 4-6.9 MET	≤ 50 W or ≤ 4 MET
<b>Ischemia on ECG</b>	No or at high intensity of exercise	At intermediary intensity of exercise	At rest or minimal intensity of exercise
<b>Left ventricle ejection fraction</b>	≥ 50 %	31-49% and patient functionally capable	≤ 40 % and patient of impaired functional capacity
<b>Complex arrhythmias</b>	None	Repetitive VES	With hemodynamic repercussions, VT
<b>Exercise program monitoring</b>	Self-monitoring, with occasional controls by staff	Under surveillance	Under surveillance with continuous ECG monitoring

**Table 1. Cardiovascular risk stratification and recommendations type or intensity of the training.**

MET=metabolic equivalent, W=watt, VES=ventricular extrasystoles, ECG=electrocardiography, VT=ventricular tachycardia.

Bolesnici se na početku druge faze rehabilitacije podvrgnu psihološkom testiranju, nakon čega slijedi edukacija, a po potrebi i rad s psihologom. Uz navedeno polaznici rehabilitacije detaljnije upoznaju uzroke i simptome bolesti, njihov značaj i način otklanjanja, odnosno liječenja, dobivaju detaljne savjete oko sekundarne prevencije. Procjena rizika i ocjena radne sposobnosti uz biheavioralističke intervencije važan je dio druge faze rehabilitacije. Smatra se kako stabilni bolesnici, bez komplikacija bolesti, s EF >50%, bez stenokardija i aritmija mogu započeti poslovne aktivnosti odmah na početku 3. faze rehabilitacije, no većina onih koji će biti radno sposobni počinju s radom tek nakon 3-6 mjeseci. Ocjena mora biti individualizirana za svakog bolesnika uz uvažavanje svih specifičnosti i zahtjeva poslova koje obavlja. Zanimanja koja uključuju visok stupanj odgovornosti za druge, posebne zdravstvene kategorije ili pripremljenost reevaluirati nadležna komisija (vozači autobusa, piloti).

Stratifikacija rizika osnova je za individualne intervencije i prilagođavanje načina provođenja rehabilitacije. Čine ju:

- medicinska evaluacija bolesnika, uključujući komplikacije tijekom akutne faze liječenja, sadašnji status i procjenu rizika kao prvi korak u kardiovaskularnoj rehabilitaciji.
- procjena koronarnih čimbenika rizika, neadekvatnog stila života i rizika kardiovaskularnih incidenata
- evaluacija edukacijskog i psihosocijalnog statusa, stila života i socijalnih potreba

Procjena rizika bolesnika na kardiovaskularnoj rehabilitaciji prikazana je u **Tablici 2**.

At the beginning of the second phase of rehabilitation, the patients undergo psychological test, followed by education and training, and if necessary, they will start, they will working with a psychologist. In addition, the patients undergoing rehabilitation learn more details about the causes and symptoms of the disease, their importance and method of their removal or treatment. They also receive advice on secondary prevention. Risk assessment and the evaluation of the work capacity along with behavioral interventions is an important part of the second phase of rehabilitation. Stable patients having no disease complications, with EF >50%, without stenocardia and arrhythmia are believed to be able to start their working activities immediately at the beginning of the third phase of rehabilitation, but the most of those who will be capable of work will start with work only after 3 to 6 months. The evaluation must be individualized for each patient taking into account all the peculiarities and demands of jobs that such a person does. Occupations that involve a high degree of responsibility for others, special health categories or preparedness are reevaluated by the competent commission (bus drivers, pilots).

The risk stratification is the basis for individual interventions and adjustment of manners of conducting rehabilitation. It includes:

- Medical evaluation of a patient, including the complications during the acute phase of treatment, current status and risk assessment as the first step in cardiovascular rehabilitation.
- Assessment of coronary risk factors, inappropriate lifestyle and risk of cardiovascular incidents
- Evaluation of educational and psycho-social status, lifestyle and social needs

Risk assessment of patients undergoing cardiovascular rehabilitation program is shown in **Table 2**.

In-hospital cardiovascular rehabilitation program is more suitable for patients with moderate and high degree of risk,



Low	Intermediate	High
No complications in acute treatment	LVEF 31-49% or <40% and patient functionally capable	Post cardiorespiratory arrest, reanimated
LVEF ≥50%	Ischemia at intermediate level of exercise, or exercise induced ST denivelation ≤2 mm, or detected reversible ischemia in stress-echocardiography or perfusion scan tomography	Complications of acute coronary syndrome treatment (cardiogenic shock, heart failure, malignant arrhythmias, respiratory failure, recurrent ischemia)
Without residual ischemia at testing	Without sustainable VT	Persisting complications (heart failure, recurrent ischemia, respiratory distress, renal failure, acute infectious disease, significant deterioration of functional capacity)
Without complex arrhythmias		LVEF ≤30% or <40% and patient of impaired functional capacity
Exercise capacity ≥6 MET		Multivessel coronary disease, stress test induced ischemia with ≥2mm ST denivelation, or extensive ischemia at rest or at minimal intensity of exercise (<6 MET or <100 W), or severe perfusion deficit on tomography
		Complex ventricular arrhythmias at rest or worsened during exercise
		Systolic blood pressure drop >15mmHg during exercise, or of insufficient raise during exercise

MET=metabolic equivalent, W=watt, VT= ventricular tachycardia.

**Table 2.** Risk assessment for patients enrolled in cardiac rehabilitation programs.

**Table 3.** Cardiovascular risk assessment and recommendations for rehabilitation programs.

Recommendations for rehabilitation program	Major cardiovascular events risk		
	Low	Intermediate	High
Outpatient	+++	++	-
Stationary	+	+++	+++

Stacionarna kardiovaskularna rehabilitacija pogodnija je za bolesnike umjerenog i visokog stupnja rizika, dok su bolesnici niskog rizika bolji kandidati za ambulantnu rehabilitaciju (Tablica 3).

Ciljevi stacionarne kardiovaskularne rehabilitacije jednaki su ciljevima ambulantne rehabilitacije, ali su programi posebno strukturirani da omoguće intenzivnije i/ili kompleksnije intervencije.

#### Prednosti su stacionarne rehabilitacije:

- može početi ranije nakon akutne faze bolesti ili intervencije,
- uključuje kompliciranije bolesnike s višim rizikom, ili klinički nestabilne bolesnike,
- uključuje teže pokretne i/ili starije bolesnike (osobito one s komorbiditetom),
- pomaže u tranziciji iz akutne hospitalne faze u stabilnije kliničke uvjete i u održavanju samostalnog života kod kuće.

#### Osobite indikacije za stacionarnu kardiovaskularnu rehabilitaciju imaju:

- bolesnici s teškim komplikacijama u akutnoj fazi liječenja, iza srčanog infarkta, PCI (perkutane koronarne intervencije), kirurške revaskularizacije srca, ili drugih kardiokirurških zahvata,
- bolesnici s perzistirajućom kliničkom nestabilnosti ili komplikacijama nakon akutnog incidenta ili intervencije, ili ozbiljnim popratnim bolestima s visokim kardiovaskularnim rizikom,
- klinički nestabilni bolesnici s uznapredovalom srčanom insuficijencijom (NYHA III-IV),
- bolesnici nakon transplantacije srca,

while the low-risk patients are the better candidates for outpatient rehabilitation programs (Table 3).

Objectives of in-hospital cardiovascular rehabilitation programs are equivalent to the outpatient rehabilitation programs, but the programs are specifically structured to provide intensive and/or more complex interventions.

#### The advantages of in-hospital rehabilitation programs:

- May start earlier following the acute phase of a disease or intervention,
- Includes more complicated and higher risk patients or clinically unstable patients,
- Includes disabled patients and/or elderly patients (especially those with comorbidity),
- Assists in the transition from the acute hospital phase into stable clinical conditions and maintenance of independent living at home.

#### The below patients have special indications for in-hospital cardiovascular rehabilitation:

- Patients with severe complications in the acute phase of the treatment, following myocardial infarction, PCI (percutaneous coronary intervention), surgical revascularization of the heart, or other cardiac and surgical procedures,
- Patients with persisting clinical instability or complications following the acute incident or intervention, or serious concomitant diseases with a high cardiovascular risk,
- Clinically unstable patients with advanced heart insufficiency (NYHA III-IV),
- Patients following the heart transplantation,



- koronarni bolesnici rano otpušteni iz bolnice, čak i bez komplikacija, osobito ako su stariji, žene, ili s visokim rizikom progresije kardiovaskularnih bolesti,
- koronarni bolesnici koji nisu u mogućnosti obaviti ambulantni oblik rehabilitacije iz bilo kojeg razloga.

Najbolji se rezultati postizu ukoliko je moguće odmah nakon stacionarne rehabilitacije nastaviti dugotrajni program ambulantne rehabilitacije.

U okrilju racionalizacije troškovne učinkovitosti skraćuje se prosjek broja dana akutnog bolničkog liječenja. Na taj način vrijeme provedeno u primarnoj ustanovi uglavnom je nedovoljno dugo za postizanje sveobuhvatnog funkcionalnog oporavka ili kvalitetno utemeljenu procjenu dugoročne stabilnosti zdravstvenog stanja kardiovaskularnog bolesnika. Mogućnosti edukacije u akutnoj bolnici vremenski su limitirane, stjecanje vještina i kondicije potrebnih za praćenje fizičkih treninga je umanjeno, a otežana je stručna stratifikacija budućih rizika temeljem aktualnih promjena zdravstvenog stanja. Nasuprot tome prevalencija KVB u društvu raste, povećava broj i udio starijih bolesnika, osoba ženskog spola, javljaju se bolesnici opterećeni kroničnim komorbiditetima koji zahvaćaju nekoliko organskih sustava s ranije učinjenim kompleksnim kardiološkim ili kardiokirurškim intervencijama. Navedenim argumentima razvidno je da raste potreba za dobro strukturiranom i organiziranom integrativnom rehabilitacijom kardiovaskularnih bolesnika.<sup>15</sup>

#### **Organizacijske strukture kardiovaskularne rehabilitacije prema SZO su:**

1. Bazične strukture (jedinice) — na komunalnoj razini (uz škole, sportske dvorane, klubove).
2. Intermedijarni centri — obično uz bolnice za akutno liječenje.
3. Napredni (nacionalni) centri — napredno strukturirani veliki centri kardiovaskularne rehabilitacije s visokom razinom medicinskih programa i usluga.

U Republici Hrvatskoj postoje dva dobro organizirana, suficijentno kadrovski i tehnološki opremljena centra stacionarne i ambulantne kardiovaskularne rehabilitacije: Specijalna bolnica za medicinsku rehabilitaciju Krapinske Toplice i Thalassoherapia Opatija, uz samo jedan kvalitetno organiziran centar ambulantne rehabilitacije — Polikliniku za prevenciju kardiovaskularnih bolesti i rehabilitaciju u Zagrebu. Navedeni kapaciteti svakako su premali za potrebe zemlje s izrazito visokom incidencijom i smrtnošću od KVB.

Zbog nepoznavanja važnosti, dugogodišnjeg zanemarivanja, nedovoljne informiranosti liječnika i bolesnika samo manji broj bolesnika prolazi formalno organiziranu kardiovaskularnu rehabilitaciju, a time se dugoročno povećavaju troškovi njihove kasnije medicinske i socijalne, uz smanjeno preživljavanje i manju kvalitetu života.

**Treća faza rehabilitacije** nastavlja se na drugu fazu i traje doživotno. Naučene vježbe bolesnici provode kod kuće ili u klubovima ambulantno, optimalno 2-3 puta dnevno po 30 minuta, minimalno 3 puta tjedno. Bolesnika kontrolira liječnik opće medicine i 2-4 puta u prvoj godini kardiolog, s time da se 2-3 mjeseca nakon otpusta s rehabilitacije druge faze napravi maksimalni, simptomima ograničen test opterećenja.

- Coronary patients early discharged from hospital, even without complications, especially if they are elderly persons, women or persons with a high risk of progression of cardiovascular diseases,
- Coronary patients who are unable to take part in outpatient rehabilitation program for any reason whatsoever.

The best results are achieved if it is possible to continue the long lasting outpatient rehabilitation program immediately after the in-hospital rehabilitation program.

For the purpose of achieving cost efficiency, the average number of days of acute in-hospital treatment is shortened. In this way, the time spent in the primary institution is generally not long enough to achieve a comprehensive functional recovery and quality assessment of long-term stability of the health of a cardiovascular patient. The opportunities for training in the acute hospital are time limited, the possibility of acquiring skills and stamina necessary to monitor the physical trainings is reduced, while the professional stratification of future risks based on the current changes to the state of health has become more difficult. On the other hand, the prevalence of CVD rises in the society, there is an increasing number and portion of elderly patients, female patients, there are patients suffering from chronic comorbidities that affect several organ systems with earlier performed complex cardiac or cardiac-surgical interventions. The above arguments show ever increasing need for well-structured and organized integrative rehabilitation of cardiovascular patients.<sup>15</sup>

#### **Organizational structures of cardiovascular rehabilitation according to WHO are:**

1. Basic structures (units) at municipal level (near schools, sports halls, clubs).
2. Intermediary centers — usually near acute hospitals.
3. Advanced (national) centers — advanced high volume cardiovascular rehabilitation centers with a high level of medical programs and services.

In the Republic of Croatia there are two well-organized centers of in-hospital and outpatients cardiovascular rehabilitation sufficiently equipped with personnel and technology: Special Hospital for Medical Rehabilitation Krapinske Toplice and Thalassoherapia Opatija, with only one well-organized outpatient rehabilitation center — Institute for Prevention of Cardiovascular Diseases and Rehabilitation Zagreb. The above capacities are certainly too small for the requirements of the country with an extremely high incidence and mortality from CVD.

As a consequence of unawareness of the importance, long time ignorance, lack of information that doctors and patients should be provided with, only a small number of patients undergo a formally organized cardiovascular rehabilitation program causing thus a long-term increase in their medical and social expenses accompanied by the reduced survival and impaired life quality.

**The third rehabilitation phase** continues after the second phase and lasts for the entire lifetime. Patients do the acquired exercises at home or in outpatient clubs, optimally 2 to 3 times a day for 30 minutes at least 3 times a week. The patient is followed-up by a general practitioner and by a cardiologist 2 to 4 times during the first year whereas, a maximum, the symptom limited stress test is to be done after 2 to 3 months following the discharge from the rehabilitation program.

## Izazovi u preventivnoj kardiologiji

Kako je ranih devedesetih je postojao niz sličnih, zbunjujućih nacionalnih i međunarodnih smjernica za prevenciju KVB, s ciljem unapređenja postojeće prakse, Europsko društvo za aterosklerozu, ESC i Europsko društvo za hipertenziju su, temeljem ugovorene suradnje, izradili sustav preporuka za prevenciju KBS i objavili ih 1994.<sup>16</sup> Snaga izrađenih smjernica bila je u tome što su one predstavile jednostavan i nedvojbena iskaz kako su KVB rezultat međudjelovanja višestrukih rizičnih čimbenika. Tijekom 1995. i 1996. godine ESC provodi studiju usmjerenu na koronarne bolesnike pod nazivom *The first European survey of European Action on Secondary and Primary Prevention by Intervention to Reduce Events I* (EUROASPIRE I) koja uključuje devet europskih zemalja. Rezultati navedenog istraživanja su između ostalog ukazali na visoku prevalenciju promjenjivih čimbenika rizika u koronarnih bolesnika široke varijabilnosti u ispitivanih zemalja. 1998. godine predstavljene su smjernice koje su afirmirale prioritete u promjeni životnog stila, čimbenicima rizika i ciljnim terapijskim odrednicama izrečenim u prvim smjericama iz 1994. godine.<sup>17</sup> Tijekom 1999. i 2000. provedeno je drugo EUROASPIRE istraživanje (EUROASPIRE II) u petnaest europskih zemalja. Rezultati navedenog istraživanja ponovno su ukazali na nepovoljne trendove u životnom stilu koronarnih bolesnika s poboljšanjem u liječenju dislipidemija, većem korištenju kardioprotektivnih lijekova, no i tada bez adekvatnog dostizanja ciljnih vrijednosti ukupnog kolesterola i bez poboljšanja u liječenju arterijske hipertenzije.<sup>18</sup> Godine 2003. predstavljene su supranacionalne Europske smjernice za prevenciju KVB u kojima se termin KBS mijenja i uvodi termin KVB koji uključuje sve oblike aterosklerotske bolesti (KBS, periferna arterijska i cerebrovaskularna bolest).<sup>19</sup> Naglasak na primarnu i sekundarnu prevenciju per se značajno se smanjio, no zapravo izvanredno supstituirao sveobuhvatnim odnosno globalnim pristupom prema kojem je rizik KVB kontinuum. Izvorni partneri ovog preventivnog poduhvata iskazali su potrebu za pomoći drugih tijela i eksperata, posebno s područja bihevioralne medicine i dijabetesa, kao i nužnost pojednostavljenja preporuka do razine praktičnih savjeta i njihovog približavanja obiteljskim liječnicima, medicinskim sestrama i volonterskim tijelima / udrugama kao što je npr. Heart Foundations. Temeljen na 12 europskih kohortnih studija uveden je SCORE (**S**ystemic **C**oronary **R**isk **E**valuation) sustav za procjenu rizika, čime se omogućavala procjena 10-godišnjeg kardiovaskularnog rizika, i to posebno za europske regije visokog i niskog rizika.

Na tragu navedenih smjernica EUROASPIRE III (2006.—2007.) uključuje 22 europske zemlje, uključujući četrnaest zemalja koje su sudjelovale u EUROASPIRE II i osam zemalja koje sudjeluju u svim EUROASPIRE istraživanjima.<sup>20</sup> U navedenom je istraživanju sudjelovala i Hrvatska, a prošireno je na hospitalizirane koronarne bolesnike i prvu liniju srodstva bolesnika s preuranjenom KBS te visoko rizične bolesnike s medikamentozno liječenom arterijskom hipertenzijom, dislipidemijama i dijabetesom u primarnoj prevenciji. Time je navedena studija zahvatila čitav spektar prioriteta definiranih u smjericama iz 2003. godine. Usporedba između osam zemalja koje su sudjelovale u svim EUROASPIRE istraživanjima uvjerljivo ukazuje na potrebu za učinkovitijim intervencijama koje imaju za cilj promjenu životnog stila u koronarnih bolesnika. Nepovoljni trendovi u pušenju, veća prevalencija u mladih žena i alarmantan porast pretilosti postaju sve veći razlozi za zabrinutost. Iako je sveukupna učestalost pušenja gotovo nepromijenjena (20,3%,

## Challenges in preventive cardiology

Since in the early nineties there was a series of similar, confusing national and international guidelines for the prevention of CVD, with an aim of improving the existing practices, the European Atherosclerosis Society, ESC and the European Society of Hypertension jointly designed, a system of recommendations for the prevention of CHD and published them in 1994.<sup>16</sup> The importance of the designed guidelines was that they simply and unambiguously proved that the CVD was a consequence of an interaction of multiple risk factors. During 1995 and 1996, the ESC conducted a study focused on coronary patients entitled: *The first European survey of European Action on Secondary and Primary Prevention by Intervention to Reduce Events I* (EUROASPIRE I), which included 9 European countries. The results of the above survey suggested, inter alia, the high prevalence of variable risk factors in coronary patients of wide variability in the countries where the survey was conducted. In 1998, the guidelines were presented and they affirmed the priorities regarding the change to the lifestyle, risk factors and target therapeutic guidelines indicated in the first guidelines designed in 1994.<sup>17</sup> During 1999 and 2000, the second EUROASPIRE survey (EUROASPIRE II) was conducted in 15 European countries. The results of this survey again showed some negative trends in the lifestyle of coronary patients with an improvement in the treatment of dyslipidemia, greater use of cardioprotective drugs, however even in that case without achieving adequate target values of total cholesterol and improvement in the treatment of hypertension.<sup>18</sup> In 2003 the supranational European Guidelines for CVD prevention were presented which included a change made to the term CHD and which introduced the term CVD including all the types of atherosclerotic disease (CHD, peripheral arterial and cerebrovascular disease).<sup>19</sup> The emphasis on primary and secondary prevention per se has significantly decreased, but in fact it has been remarkably substituted by comprehensive or global approach according to which the CVD risk is the continuum. The original partners of this preventive undertaking expressed the need for assistance from some other bodies and experts, especially in the field of behavioral medicine and diabetes, pointed out the necessity of simplifying recommendations to the level of practical advice and making them available to the family physicians, nurses and voluntary bodies/associations such as Heart Foundations. Based on 12 European cohort studies, SCORE (**S**ystemic **C**oronary **R**isk **E**valuation) a system for risk assessment was introduced, thereby allowing for assessment of 10-year cardiovascular risk, especially for the European high and low risk regions.

In line with these guidelines, EUROASPIRE III (2006-2007) includes 22 European countries, including 14 countries that participated in the EUROASPIRE II and 8 countries that participate in all EUROASPIRE surveys.<sup>20</sup> Croatia participated in this survey as well, while the survey was extended to hospitalized coronary patients and first-line relatives of patients with premature CHD and high risk patients with medicamentously treated arterial hypertension, dyslipidemia and diabetes in primary prevention. This is how the above survey comprised the entire range of priorities defined in the 2003 guidelines. The comparison between the eight countries that participated in all the EUROASPIRE surveys convincingly shows the need for more efficient interventions aimed at changing the lifestyle of coronary patients. Negative trends in smoking, higher prevalence in younger women and an alarming increase in a number of obese people are some

21,2% i 18,2%) povećan je udio žena (<50 godina) s 30,0% na 50,0% u vremenskom razdoblju trajanja EUROASPIRE studija. Prevalencija pretilosti značajno je porasla: 25%, 32,6%, na 38,0%, uz paralelno povećanje centralne pretilosti. Unatoč znatnog povećanja primijene antihipertenziva, regulacija arterijskog tlaka još uvijek nije zadovoljavajuća, dok je liječenje dislipidemija poboljšano iako još uvijek gotovo polovica svih bolesnika ne dostiže postavljene ciljane vrijednosti lipida u serumu. Članovi HKD uključeni su i aktivno sudjeluju u globalnoj borbi protiv KVB, na nacionalnom nivou djelatnosti radnih grupa i ustrojbenih jedinica. Regionalno i na institucijskom nivou dolazi do poboljšanja kvalitete djelatnosti zdravstvene skrbi različitih grupa kardiovaskularnih bolesnika u okrilju medicine zasnovane na dokazima kroz poticanje praćenja nekoliko registara.<sup>7,21</sup>

Na kongresu ESC 2007. godine predstavljene su i nove smjernice za prevenciju KVB, uz naglasak na hitno povećanje broja centara organizirane zdravstvene djelatnosti sekundarne prevencije, kao što su kardiorehabilitacijski centri.<sup>22</sup>

## Zadaci suvremene prevencije KVB

Kao jedan od vodećih suvremenih javnozdravstvenih problema KVB nužno trebaju sustavni pristup prevenciji koji mora uključivati daljnje napore u razvoju svijesti opće populacije i upravljačkih struktura. U skladu s općeprihvaćenim konceptom kontinuuma u razvoju aterosklerotske bolesti i definicijom KVB kao izoliranog događaja unutar navedenog neprekinutog slijeda, temeljni pristup prevenciji treba donekle zanemariti tradicionalnu podjelu na "primarnu" i "sekundarnu" prevenciju, barem u načelnim razmatranjima ovog tematskog područja. Suvremena strategija nameće dva osnovna cilja: opću populacijsku preventivnu strategiju te strategiju preventivnih mjera u visokorizičnih bolesnika izjednačenih s onima koji su već oboljeli od KVB. Navedeno je temelj profiliranja suvremenih općih i specifičnih preventivnih planova u zaštiti od KVB.

Učinkovitost napora u prevenciji KVB izravno ovisi o jasnoj definiciji svih promjenjivih pojedinačnih rizičnih čimbenika kao ciljnih točaka preventivnih planova i akcija. U tom je smislu nužan nastavak provedbe postojećih i formiranje novih, integriranih i sveobuhvatnih programa unutar medicinskih ustanova, ali i svih drugih dostupnih društvenih zajednica. Nadalje, takvo načelo integrativnosti ne može i ne treba podrazumijevati sveobuhvatnost svake pojedinačne akcije već nameće strogu koordinaciju pojedinačnih, specifičnih akcija koje u svojoj ukupnosti trebaju obuhvatiti sve značajne i promjenjive rizične čimbenike. Takvi programi moraju biti suptilno formulirani, temeljeni na biomedicinskim činjenicama, ali u komunikacijskom i općem metodološkom pristupu što atraktivniji, usmjereni redefiniranju općih poželjnih, "modernih" obrazaca svakodnevnog ponašanja. Njihova provedba treba maksimalno koristiti postojeće društvene resurse, uključiti stručnjake, ali i druge istaknute osobe na pozitivnim načelima suvremenih promotivnih programa. Implementacija treba biti fleksibilna i u skladu s primarnim zabilježenim odgovorom populacije uključene u akciju, ona treba predstavljati trajno prilagodljiv niz poduhvata usklađen s trenutnim društvenim, političkim i socijalnim prilikama te aktualnim promjenama interesa korisnika.<sup>23</sup>

Dugoročna strategija prevencije KVB treba obuhvatiti sve promjenjive rizične čimbenike i dostupne strategije djelovanja: promociju fizičke aktivnosti (svih oblika: organizirane kinetoterapije, ali i spontanih dnevnih aktivnosti), prehrambe-

important reasons for our concern. Although the overall prevalence of smoking has almost remained unchanged (20.3%, 21.2% and 18.2%) a percentage of women (<50 years) increased, namely from 30.0% to 50.0% during the period of EUROASPIRE survey. The prevalence of obesity significantly increased: from 25%, 32.6% to 38.0%, with a parallel increase in central obesity. Despite a significant increase in use of antihypertensive drugs, the blood pressure regulation is still unsatisfactory, while the treatment of dyslipidemia has improved, although still nearly half of all patients fail to reach the set target values of serum lipids. The HKD members are involved and actively participate in the global combat against CVD, at the national level of the working groups' and organizational units' activities. At regional and institutional level, we can see an improvement of the quality of healthcare activities of different groups of cardiovascular patients in the evidence-based medicine by promoting the monitoring of several registries.<sup>7,21</sup>

At the 2007 ESC Congress, the new guidelines for the CVD prevention were presented, thereby placing an emphasis on an urgent increase in the number of organized medical centers for secondary prevention, such as the cardiac rehabilitation centers.<sup>22</sup>

## Tasks of contemporary prevention of CVD

Being the leading contemporary public health problem, CVD necessarily requires a systematic approach to prevention which must include further efforts in raising the awareness of the general population and governance structures. In accordance with generally accepted concept of the continuum in the development of atherosclerotic disease and the definition of CVD as an isolated event within the indicated uninterrupted sequence, the basic approach to prevention should to a certain degree ignore the traditional division into "primary" and "secondary" prevention, at least in the principal considerations of this thematic area. The contemporary strategy suggests two basic objectives: the general population preventive strategy and the strategy of preventive measures taken in high risk patients equalized with those who are already suffering from CVD. The above is the foundation of profiling of contemporary general and specific preventive plans in protection from CVD.

The efficiency of efforts made for the purpose of preventing CVD directly depends on a clear definition of all variable individual risk factors as target points of prevention plans and actions. In this sense, it is necessary to continue the implementation of the existing and create new, integrated and comprehensive programs in the medical institutions and all other available social communities. Furthermore, such as integration principle cannot and should not include the comprehensiveness of each individual action, but it imposes strict coordination of individual, specific actions that in their entirety should include all significant and variable risk factors. Such programs must be a subtly formulated, based on biomedical facts, but in the communication and the general methodological approach they should be an attractive as possible, focused on redefinition of general desirable, "modern" patterns of daily behavior. Their implementation should maximally use the existing social resources. They should include not only the experts, but also some other prominent persons abiding by positive principles of contemporary promotion programs. The implementation should be flexible and in accordance with the primary recorded response of the population involved in the action. It should re-



nih intervencija s posebnim naglaskom na načelu utemeljenosti na dokazima (promoviranje općih i specifičnih prehrambenih načela, isticanje nužnosti propitivanja utemeljenosti različitih prehrambenih intervencija na činjenicama — razvoj kritičnog pristupa stručne javnosti i opće populacije), isticanje medicinskog značaja pretjerane uhranjenosti i pretilosti, poticanje programa redukcije tjelesne težine, širenje mreže strukturiranih škola nepušenja i daljnje promocije štetnosti pušenja, promocija korištenja bodovnih sustava za procjenu KVB rizika u stručnoj javnosti i općoj populaciji, promocija Europskih smjernica za prevenciju KVB, isticanje značaja identifikacije čimbenika rizika i ranih simptoma/znakovna KVB, poticanje svijesti o nužnosti i nezamjenjivoj koristi koju donosi sustav kardiološke rehabilitacije za ukupno zdravstveno stanje nacije, promocija koristi “uloženo-dobiveno” za sve programe prevencije i rehabilitacije KVB.<sup>22</sup>

Kontinuirani razvoj i dosljedno promoviranje sveobuhvatnog nacionalnog preventivnog KVB-programa, prema međunarodnim iskustvima neupitno donosi dugoročne, nezamjenjive uspjehe u prevenciji kroničnih nezaraznih bolesti i ukupnoj promociji zdravlja.

Daljnji napredak u prevenciji KVB, u razdoblju koji slijedi, treba voditi računa o dodatnom uključivanju i intenzivnijoj suradnji sa stručnjacima nekardiolozima (nefrolozi, dijabetolozi, stručna društva za arterijsku hipertenziju, dijabetes i debljinu, pedijatri, klinički nutricionisti, stručnjaci s područja prehrambene tehnologije, specijalisti javnog zdravstva, epidemiolozi i dr.), udrugama građana i drugim subjektima čije su aktivnosti komplementarne ciljevima Radne skupine za prevenciju i rehabilitaciju KVB.

## Zaključak

U svjetlu porasta značaja primarne i sekundarne prevencije KVB, rehabilitacija kardiovaskularnih bolesnika imat će sve veću važnost u cjelokupnom zbrinjavanju i sprječavanju pobola i smrtnosti od KVB, uz smanjenje troškova i povećanje kvalitete života. Područje rehabilitacije KVB, svojim neupitnim značajem i svekolikom korišću u ukupnom zdravstvenom sustavu, zahtijeva upornu promociju u svim smjerovima, u prvom redu prema državnoj zdravstvenoj administraciji. Visok zdravstveni i financijski učinak programa kardiološke rehabilitacije, rane stacionarne rehabilitacije u okvirima izvrsnog funkcioniranja Hrvatske mreže perkutane koronarne intervencije i odgođene ambulantne kardiološke rehabilitacije u okvirima ukupne prevencije KVB, zahtijevaju inzistiranje prema zdravstvenoj administraciji i zdravstvenim osiguravateljima o ispravnom vrednovanju, primjerenom tretiranju, financiranju te povećanju dostupnosti ovakvih programa u skladu s pozitivnom praksom razvijenih europskih zdravstvenih sustava, a sve u cilju prilagođavanja strategije prevencije i rehabilitacije KVB aktualnim stajalištima i praksi ESC.

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present a permanently adaptable series of undertakings compliant with current social and political circumstances, and current changes to the beneficiaries' interests.<sup>23</sup>

Long-term strategy of CVD prevention should include all the variable risk factors and available strategies for action: promotion of physical activities (all types: organizing kinesiotherapy and spontaneous daily activities), dietary interventions placing a special emphasis on the principle of evidence-based practice (the promotion of general and specific dietary principles, highlighting the necessity of examining whether various dietary interventions are based on the facts — the development of the critical approach of scientific community and general population), emphasizing the medical significance of excessive body weight and obesity, encouraging the weight reduction program, expanding the network of non-smoking structured schools and further promotion of harmful effects of smoking, promotion of the use of scoring systems for the CVD risk assessments in the scientific community and general population, the promotion of the European guidelines on CVD prevention, emphasizing the importance of identifying risk factors and early symptoms/signs of CVD, raising awareness of the necessity and irreplaceable benefit of cardiac rehabilitation system for the total health of the nation, promotion of the benefit “invested-gained” for all CVD prevention and rehabilitation programs.<sup>22</sup>

Continuous development and consistent promotion of comprehensive national preventive CVD program, according to international experience unquestionably results in long-term, irreplaceable success in prevention of chronic non-contagious diseases and overall promotion of health.

Further progress in prevention of CVD during the forthcoming period, should take into account the inclusion and more active cooperation with experts, non-cardiologists (nephrologists, diabetologists, expert societies of for hypertension, diabetes and obesity, pediatricians, clinical nutritionists, experts in food technology, public health specialists, epidemiologists, etc.), civic associations and other entities' associations whose activities are complementary to the objectives of the Working Group for CVD Prevention and Rehabilitation.

## Conclusion

In light of an increasing importance of primary and secondary prevention of CVD, the rehabilitation of cardiovascular patients will have an increasing importance in the overall management and prevention of morbidity and mortality from CVD, accompanied by reduction in costs and improvement of life quality. The area of rehabilitation from CVD with its unquestionable importance and overall benefit in overall medical system requires persistent promotion in all areas, primarily in public health administration. A high medical and financial impact of the cardiac rehabilitation program, early in-hospital rehabilitations within the excellent functioning of the Croatian Network of Percutaneous Coronary Intervention and delayed outpatient cardiac rehabilitation within the framework of overall CVD prevention, require insisting on health administration and health insurers to properly evaluate, appropriately treat, finance and provide better availability of such programs in accordance with best practices of the developed European healthcare systems, all aimed at making the strategy of CVD prevention and rehabilitation compliant with the ESC current attitudes and practices.

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