

Acknowledgements

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The full version of the paper is available on the EHN website (<http://www.ehnheart.org/>) under 'Publications and Papers'.

This full version contains more detailed analysis, references and case studies.

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1 Introduction

Physical activity has a critical role to play in the prevention and treatment of cardiovascular disease across Europe. The human body evolved to be physically active, yet much routine bodily movement has disappeared from our daily lives. This has been associated with many aspects of poor health. This report focuses on cardiovascular disease, but physical inactivity is also strongly associated with obesity, diabetes, poor mental health and some cancers.

This report summarises the findings of a more detailed review of the role of physical activity in preventing and treating cardiovascular disease across Europe. It aims to provide a concise summary of recent knowledge, based on the most recent systematic reviews, meta-analyses, and scientific and policy summary statements.

This summary report is written primarily for policy-makers who have an influence on European or national-level policies influencing physical activity. It may also be of interest to members of the European Heart Network (EHN), whose work encompasses advocacy for policy change, support for cardiovascular patients and funding research.

Finally, what is meant by the term ‘physical activity’? In this report the authors use the classic definition: any bodily movement produced by skeletal muscles that results in energy expenditure. This means that as well as sport and deliberate exercise, we are interested in the role of daily activities such as walking, cycling, climbing stairs, and active play and recreation.



2 Cardiovascular disease in Europe

The fifth edition of European Cardiovascular Disease Statistics, which was published in 2017 by the European Heart Network (EHN), showed that diseases of the heart and circulatory system remain the leading cause of mortality and a major cause of morbidity in Europe.

Mortality

- Each year cardiovascular disease (CVD) causes 3.9 million deaths in Europe and over 1.8 million deaths in the European Union (EU).
- CVD accounts for 45% of all deaths in Europe and 37% of all deaths in the EU.

Patterns

- CVD is the main cause of death in men in all but 12 countries of Europe and is the main cause of death in women in all but two countries.
- Death rates from both ischaemic heart disease (IHD) and stroke are generally higher in Central and Eastern Europe than in Northern, Southern and Western Europe.

Trends

- Over the past 25 years, the absolute number of CVD cases has increased in Europe and in the EU, with increases in the number of new CVD cases found in most countries. The absolute increase is due to the ageing of the population.

- Age-standardised CVD mortality is now falling in most European countries, including Central and Eastern European countries which saw considerable increases up to the beginning of the 21st Century.
- The reductions in CVD mortality rates that have been achieved over the past 50 years thanks to population-wide interventions/behavioural changes (e.g. reduced hypertension due to a decrease in salt intake) and advances in treatment (e.g. new drugs to control high blood pressure and to lower cholesterol levels in the blood; arterial stents to treat heart attacks) are now slowing down. Suspected causes include the rising prevalence of obesity and diabetes along with the ageing of the population.

Morbidity

- In 2015, more than 85 million people across Europe were living with CVD; 48% of cases (41.2 million) had occurred in males and 52% (44.1 million) in females.
- The most prevalent cardiovascular conditions were peripheral vascular disease and IHD. Peripheral vascular disease accounted for 15.3 million cases (37% of all CVD) among males and for just over 21 million cases (48% of all CVD) among females, while IHD was responsible for almost 17 million cases (41% of all CVD) in males and just over 13 million cases (30% of all CVD) in females.

3 Physical activity levels in Europe

Physical activity in adult populations

There are many methodological challenges in measuring levels of physical activity participation at a population level. The most comprehensive approach has been taken by Guthold et al, who updated previously published country, regional and global estimates of adult prevalence of insufficient physical activity with new data and new methods, and estimated, for the first time, global and regional trends from 2001 to 2016. In summary:

- It is estimated that 28% of the global population is classed as physically inactive. This is higher for women (33%) than for men (23%).
- Across Europe, the prevalence of inactivity is somewhat lower: 23% for both sexes, 22% for men and 25% for women.
- Within Europe there is a large difference in the prevalence of physical inactivity between countries. For example, it is estimated that 12% of people in Moldova are inactive compared to 40% in Serbia. There is a trend for Nordic countries to be more active than countries in Southern Europe.

- The fact that physical activity varies greatly across countries, even within regions, suggests that the factors that influence inactivity lie mostly at the national, subnational or community level, which is where policies are needed to increase physical activity.
- When considering total activity (i.e. occupational as well as transport and leisure time activity), levels of inactivity increase with economic development. Adults are less active in high-income countries than in low- and middle-income countries, a pattern suggesting that inactivity will rise as middle-income countries develop economically.
- Between 2001 and 2016, levels of insufficient physical activity have decreased only marginally and insignificantly, with a global prevalence of 28% in 2001.

Physical activity in children and adolescents (5–17 years)

Analysis of the Health Behaviour in School-aged Children (HBSC) survey showed the following:

- Globally, 80% of 13 to 15-year-olds do not accumulate the recommended 60 minutes of moderate to vigorous physical activity per day.
- Girls are less active than boys.
- The European data is close to the global average.



4 The importance of physical activity for primary prevention of cardiovascular disease

Role of physical activity in prevention of cardiovascular disease

Strong scientific evidence from many studies shows convincingly that physically active people have a lower risk than physically inactive people of cardiovascular disease mortality and clinical events.

On the basis of this strong evidence, physical activity is recommended for prevention of cardiovascular disease (CVD) as well as a great number of other diseases and their risk factors. Physical activity is beneficial when taken up at any age, but the maximum benefits accrue from a lifetime of being active.

Specifically, physical activity is recommended for cardiovascular disease prevention by the leading scientific organisations in the field, including the European Society of Cardiology and the American College of Cardiology jointly with the American Heart Association. The most recent guideline, The Physical Activity Guidelines for Americans, offers more general physical activity recommendations for a number of health conditions (*Table 1*). The evidence for these recommendations is, however, strongly based on the studies of the effects of physical activity on cardiovascular outcomes.

Table 1. Physical Activity-Related Health Benefits for the General Population and Selected Populations Documented by the 2018 Physical Activity Guidelines Advisory Committee.

Adults, all ages	
All-cause mortality	Lower risk
Cardiometabolic conditions	Lower cardiovascular disease incidence and mortality (including heart disease and stroke) Lower incidence of hypertension Lower incidence of type 2 diabetes
Cancer	Lower incidence of bladder, breast, colon, endometrium, oesophagus, kidney, stomach, and lung cancers
Brain health	Reduced risk of dementia; improved cognitive function Improved cognitive function following bouts of aerobic activity Improved quality of life Improved sleep Reduced feelings of anxiety and depression in healthy people and in people with existing clinical syndromes Reduced incidence of depression
Weight status	Reduced risk of excessive weight gain Weight loss and the prevention of weight regain following initial weight loss when a sufficient dose of moderate-to-vigorous physical activity is attained An additive effect on weight loss when combined with moderate dietary restriction
Older adults	
Falls	Reduced incidence of falls Reduced incidence of fall-related injuries
Physical function	Improved physical function in older adults with and without frailty
Women who are pregnant or postpartum	
During pregnancy	Reduced risk of excessive weight gain Reduced risk of gestational diabetes No risk to foetus from moderate-intensity physical activity
During postpartum	Reduced risk of postpartum depression

The key points recommending physical activity for primary prevention of cardiovascular disease are contained in the European Society of Cardiology 2016 guidelines:

- It is recommended for healthy adults of all ages to perform at least 150 minutes a week of moderate-intensity or 75 minutes a week of vigorous-intensity physical activity or an equivalent combination.
- For additional benefits in healthy adults, a gradual increase of aerobic activity to 300 minutes a week of moderate intensity, or 150 minutes a week of vigorous intensity aerobic activity, or an equivalent combination is recommended.
- Multiple sessions of physical activity should be considered, each lasting at least 10 minutes and evenly spread throughout the week – i.e. on 4 – 5 days a week and preferably every day of the week.

The potential of physical activity as a measure of preventing cardiovascular disease is strengthened by the following facts:

- Even **low volumes** of leisure time physical activity decrease the risk of cardiovascular deaths as described above. This effect is seen especially in people over 65 years of age.

- Even **light physical activity** decreases the risk of cardiovascular disease including ischaemic heart disease, at least in women and light-intensity physical activity is associated beneficially with cardiovascular risk factors such as obesity and markers of lipid and glucose metabolism.
- The same amount of moderate-to-vigorous physical activity taken in **bouts** or in a **sporadic pattern** was similarly related to mortality risk as continuous activity and accumulating 150 mins/week moderate-intensity physical activity in bouts greater than one minute or in bouts greater than 10 minutes decreased cardiovascular risk by a similar amount.
- Even **infrequent** physical activity (once or twice a week) reduces the risk of cardiovascular disease.
- In people older than 60 – 65 years of age **recent** physical activity levels are more strongly associated with a number of health variables and are a stronger indicator of subsequent cardiovascular mortality risk than physical activity in the past.
- Physical activity in **all domains** (leisure time, transport, domestic and occupation) decreases the risk of cardiovascular disease mortality and events.



- **All commonly practiced physical activities**, especially walking, running and cycling reduce the risk of cardiovascular disease, but evidence of the effectiveness of a large number of sports is lacking due to a lack of research on the topic.
- Physical activity decreases the risk of cardiovascular disease also in people who have **elevated risk** for these diseases due to genetic risk, obesity and metabolic factors such as glucose intolerance.

Despite these reassurances that ‘any physical activity is better than none’, it is important to point out that greater volumes and intensity of physical activity lead to greater preventive benefits.

Role of physical activity in prevention of cerebrovascular disease (stroke)

Physical inactivity is an established risk factor of ischaemic stroke but only indirectly associated with the risk of hemorrhagic stroke through the raised possibility of elevated blood pressure, the main risk factor for rupture of a cerebral vessel.

The risk for ischaemic stroke is generally 25% to 30% lower in the most physically active compared with the least active individuals. This effect appears to hold for leisure time, occupational and mobility activity including walking, and it is seen in women and men of different ages.

As a whole, there is strong evidence of the protective effect of physical activity against the risk of stroke, and the findings correspond well with those related to cardiac diseases and physical activity.

Safety of physical activity and exercise training

Physical activity is a safe means for prevention of cardiovascular and many other common diseases. Aerobic physical activity practised in any mode within the recommended volume, frequency or intensity limits does not cause cardiovascular risks to healthy individuals.

However, even larger volumes of activity at high intensities practised for many years as sports increase the risk of negative effects on cardiovascular health such as atrial fibrillation, myocardial fibrosis, hypertrophy of left ventricular wall, coronary artery calcification and sudden cardiac death. Despite the increased risk of negative health effects caused by extremes of physical activity, the positive effects largely outweigh

the negative ones as seen, for example, in the longevity of endurance athletes.

Further, it is important to acknowledge that physical activity is known to trigger serious cardiovascular incidents including sudden cardiac death. This risk increases with the intensity of the activity and is higher in individuals who are unaccustomed to exercise and/or have low cardiovascular fitness. However, the risk of serious cardiovascular events during or immediately after physical activity and exercise training including exercise-based cardiac rehabilitation remains extremely low – well below 0.01 per 10 000 participant hours. In most cases of exercise-related sudden cardiac death occult CVD, most often ischaemic heart disease is present and the death is typically the first clinical event. The risk of serious cardiac events in physical activity and exercise is much lower in fit and regularly active individuals than those who are less fit and sedentary.

Mechanisms of action of physical activity

The full report provides detailed explanations for the mechanisms behind the association between physical activity and cardiovascular disease. These include the following:

- Effects on the development of the atherosclerotic plaques
- Effects on the vasculature and blood circulation of the heart
- Effects on the metabolism of the heart
- Effects on the autonomic regulation of the heart
- Effects on other organs and tissues

Conclusion

Physical activity, particularly systematically practised exercise, prevents or deters the development and progress of ischaemic heart disease and stroke and other cardiovascular diseases by many scientifically proven biological mechanisms. It is not known precisely which aspects of physical activity lead to optimal preventive effects. However, it is safe to state that overall it is necessary to carry out the amount, intensity, frequency, type and patterns of physical activity set out in the current guidelines. This advice is sufficient to bring about a major part of the potential benefits produced by most of these mechanisms.

Furthermore, it is clear that people who are (or have been) less physically active will benefit more from low amounts of physical activity.

5 Children, young people and cardiovascular disease

Introduction

Cardiovascular disease is not usually manifested in children and young people, (aged up to 17) but precursors of atherosclerosis such as fatty streaks in the arteries can be seen in children and the degree of atherosclerotic precursors is related to the level of CVD risk factors.

No studies have examined the progression of atherosclerosis from childhood until clinical manifestations in adults, thus the exact importance of this early atherosclerosis is not known. However, studies have found associations between physical inactivity and arterial stiffness and intima-media thickness. Clustering of CVD risk factors (high levels of several risk factors in the same child) is apparent already at the age of nine and it is associated with physical inactivity and low fitness. Therefore, even if clinical evidence for the long-term effect of a sedentary lifestyle is lacking, it is considered as poor health when many CVD risk factors are elevated in the same child over time.

Current guidelines from WHO, 5–17 years old children (WHO 2010)

For children and young people of this age group physical activity includes play, games, sports, moving from one place

to another, recreation, physical education or planned exercise in the context of family, school, and community activities. In order to improve cardiorespiratory and muscular fitness, bone health, cardiovascular and metabolic health biomarkers and reduce symptoms of anxiety and depression, the following are recommended:

- Children and young people aged 5–17 should carry out at least 60 minutes of moderate- to vigorous-intensity physical activity daily.
- Physical activity of a duration greater than 60 minutes daily to provide additional health benefits.
- Most daily physical activity should be aerobic, with vigorous-intensity activities incorporated at least three times per week, including those that strengthen muscle and bone.

In summary, clustering of CVD risk factors is apparent in children as young as 8–9 years. A simple fitness test and a measurement of their waist circumference and body height can, with good accuracy, identify children with an adverse CVD risk factor profile with the aim of improving their lifestyle.



6 The importance of physical activity for secondary prevention of cardiovascular disease

Secondary prevention and rehabilitation

Physical activity has a key role to play as part of secondary prevention and rehabilitation of ischaemic and other cardiac diseases, stroke and lower leg arterial disease. Secondary prevention aims to decrease the progression of an existing cardiovascular disease and to decrease its effects on the physical, mental and social health, functioning and well-being of people with these diseases.

The risk of recurrent clinical events and death is lower among the physically active than the inactive participants with ischaemic heart disease, with both ischaemic heart disease and diabetes or after percutaneous coronary intervention. Individuals with CVD can decrease the risk of an unfavorable course of their disease by becoming physically active or by increasing their activity and maintaining it. This behaviour may benefit most those who are sedentary and are at high risk of their disease worsening.

Exercise-based cardiac rehabilitation

Exercise is a critical component of secondary prevention of cardiovascular disease and is a core aspect of rehabilitation. The full report provides a detailed review of the effectiveness of cardiac rehabilitation. This shows that it can lead to important clinical benefits even in the era of improved cardiovascular therapy. However, positive results require multiple measures applied in a sufficiently large dose. Exercise training continues to be an important part of cardiac rehabilitation, although its relative contribution regarding the traditional clinical outcomes has decreased. Instead, the role of exercise training is more important in furthering patient-centered outcomes such as functional capacity.

Moderate-intensity aerobic activity is the most commonly recommended and used exercise mode in cardiac rehabilitation. Comparing the cardio-protective effects of moderate and vigorous intensity exercise at the same total energy expenditure in clinical trials generally shows that there is no difference on the effects in systolic blood pressure, lipid profile or body fat loss, but vigorous-intensity exercise causes greater improvements for diastolic blood pressure, glucose control and aerobic capacity.

Regarding the types of exercise, the most common modes are various forms of walking and cycling, but many other whole-body exercise modes can be used. For example, Tai Chi and Traditional Chinese Exercise have led to beneficial effects in primary and secondary prevention of CVD. It is interesting to note that resistance training is also included in most guidelines and recommendations related to prevention and rehabilitation of CVD, but it is emphasised much less than aerobic training.

Rehabilitation can be carried out in a specific centre or can be home-based, perhaps supported by telephone or online support. The full report presents the evidence for the effectiveness of each mode.

Rehabilitation of various cardiac conditions

Physical activity has a role to play in rehabilitation of a range of cardiac conditions, described in full in the main report:

- Stable angina
- Heart failure
- Atrial fibrillation
- People with implantable ventricular assist devices
- Patients with an implantable cardioverter defibrillator
- Patients early after cardiac surgery
- Heart transplant recipients
- Adults after heart valve surgery

Exercise-based rehabilitation of cerebrovascular disease (stroke)

Stroke has many negative impacts on health, calling for comprehensive rehabilitation provided by a multidisciplinary team of professionals and supported by peers. Physical activity is a critical component of stroke rehabilitation in all phases, especially once the patient is medically stable. Immediately after an acute stroke the first goals are aimed at preventing complications of prolonged inactivity, regaining voluntary movement and recovering basic activities of daily living. During the second phase, once the patient is medically stable, the aim is to regain the levels of pre-stroke physical activity as soon and as completely as possible. Then the patient progresses on to developing and maintaining an active lifestyle that meets the requirements for effective secondary prevention of stroke and other cardiovascular and chronic diseases related to physical inactivity. The importance of secondary prevention of stroke is shown by the finding that it can decrease stroke recurrence by 80%.

Exercise-based treatment and secondary prevention of lower extremity artery disease

Lower extremity artery disease is the most common form of peripheral atherosclerotic arterial diseases. Secondary prevention is an essential part of the management of the patients with lower extremity artery disease. International guidelines recommend supervised exercise as the first-line treatment for patients with peripheral arterial disease.

7 Recommendations for policy-makers

Context

The data presented in this document show convincingly the need for effective primary and secondary prevention of cardiovascular disease. It is clear that physical activity – and especially systematic exercise training – are effective means of CVD prevention, and critical components of promotion of good health more generally. However, the potential public health impact of physical activity is not maximised due to the high prevalence of sedentary lifestyle in most European populations.

In general, walking should be the primary mode of preventive and health-enhancing physical activity to be increased. Walking has been referred to as the ‘best buy in public health’. This is followed by cycling as, like walking, it can be integrated into daily lifestyles. Other forms of deliberate leisure-time physical activity are recommended next, so long as they are affordable, practical, effective and safe.

Primary prevention of CVD through increasing physical activity

Global Action Plan

Policy-makers across Europe have a rich menu of options for ways that they might influence public policy to enhance population levels of physical activity and reduce the risk of CVD. As pointed out above, the dose-response relationship between moderate-to-vigorous physical activity and CVD mortality is very similar to that of all-cause mortality, so many of the more general recommendations developed for population health improvement are appropriate here.

The most recent and focused evidence-based collection of policy recommendations for increasing physical activity across populations has come from the 2018 World Health Organization Global Action Plan on Physical Activity (GAPPA) 2018–2030. The GAPPA presents 20 clear recommendations for strategic and high-level actions that countries can take to enhance population-level physical activity. These include actions to:

- **create active societies** (through initiatives including communication campaigns and mass participation initiatives);
- **create active environments** (through, for example, work with the transport and environmental sectors);
- **create active people** (through, for example, physical education and primary care programmes); and
- **create active systems** (including policy frameworks, data systems and research capacity).

These recommendations were the output of an extensive and thorough evidence review and consensus process at a global level.



Case study example – walking in Vienna

Vienna is one of the best European examples of a city-wide approach to promoting walking. The city authorities have focused on walking for many years and have made extensive adaptations to the fabric of the city to create environments where people are more likely to choose to walk. Since 2003 the proportion of pedestrian zones and pedestrian surfaces in the city has risen by 30%.

European Strategy

For policy actions at a European level, more focused recommendations come from the **WHO Physical Activity Strategy for the WHO European Region 2016–2025**. The strategy aims

“to inspire governments and stakeholders to work towards increasing the level of physical activity among all citizens of the European Region by:

- Promoting physical activity and reducing sedentary behaviours;
- Ensuring an enabling environment that supports physical activity through engaging and safe built environments, accessible public spaces and infrastructure;
- Providing equal opportunities for physical activity regardless of gender, age, income, education, ethnicity or disability; and
- Removing barriers to and facilitating physical activity.

The strategy lists five priority areas, including 14 objectives. Many of these are highly relevant to the prevention of CVD through increased physical activity and are highlighted in the full report along with a selection of more detailed good practice examples from around the region.



Case study example – Iceland

In 2005, a project manager responsible for the comprehensive promotion of health enhancing physical activity (HEPA) was employed for the first time, and a national-level expert group established involving relevant stakeholders and experts.



Case study example – The city of Novi Sad

Novi Sad is the flagship 'Healthy City' in Serbia, where more than 90 km of bicycle paths have been constructed, along with the establishment of public rental schemes and mountain bike routes on the nearby Fruska Gora mountain. In addition, the Novi Sad Biking Initiative, a non-governmental organisation established in 2011, is promoting cycling as a healthy and sustainable form of urban mobility.



Case study example – cycling policy in Copenhagen

Copenhagen aims to be 'the world's best bicycle city by 2025'. Achieving this goal is an integral part of the city's health plan and essential for making the city CO2 neutral by 2025, while enhancing the liveability of the city.

Around 150 000 people cycle each day to work or educational institutions in the city of Copenhagen, representing a modal share of 36% of all trips. Copenhagen's plan for achieving a greater proportion of daily journeys undertaken by bicycles includes increasing the capacity of the cycle tracks to the city centre, in order to accommodate an additional 60 000 cyclists by 2025.



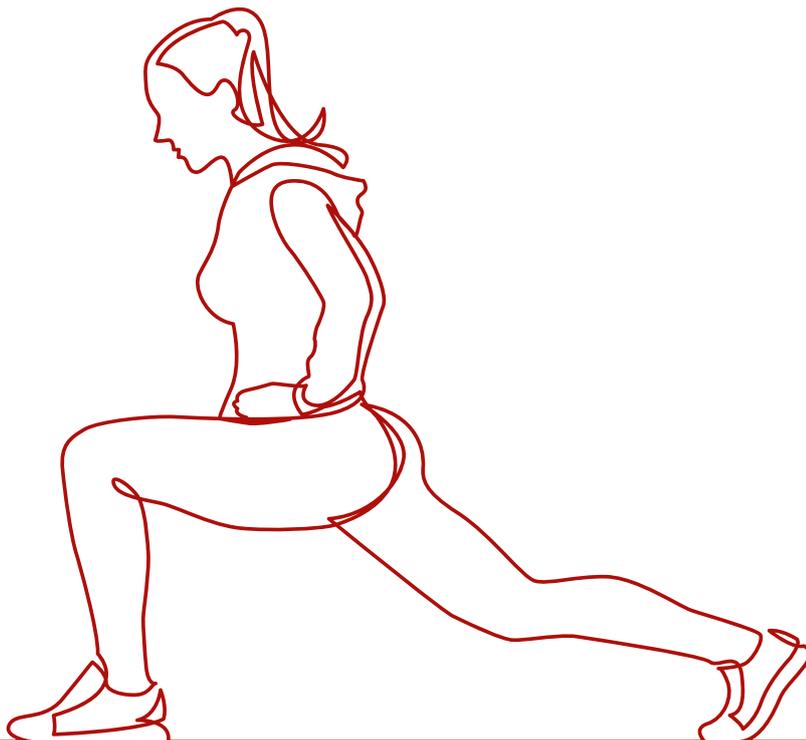
Case study example – Lithuania: Health Enhancing Workplace Awards

The Health Enhancing Workplaces Award contest is held in Lithuania as an effective way of encouraging employers to provide working conditions more conducive to physical and mental health. Health Enhancing Workplace award contest has taken place on regular basis since 2016. The first national award contest, 'Health Enhancing Company-2016', was organised, with its theme 'Health promotion at any age'.



Case study example – England – Moving health care professionals

'Moving health care professionals' is a multi-component, partnership-based programme to increase the awareness and skills of health professionals and to change their clinical practice in promoting physical activity to patients at high risk of or with health conditions. The programme provided physical activity sessions to over 20 000 health care professionals, and its e-learning modules have been completed over 10 000 times by these professionals.



Secondary prevention of CVD through increasing physical activity, and rehabilitation after CVD

Cardiac rehabilitation

The importance of secondary prevention is made clear in the position papers from the Cardiac Rehabilitation Section of the European Association of Cardiovascular Prevention and Rehabilitation and the European Heart Network (<http://www.ehnheart.org/patients/papers/1166:revised-ehn-paper-on-cardiac-and-stroke-rehabilitation.html>). This points out that increasing awareness of the importance of cardiovascular prevention is not yet matched by the resources and actions within health-care systems. Recommendations include:

- Health systems should ensure that systems are in place to ensure that exercise-based cardiac rehabilitation is offered routinely to patients after ischaemic heart disease.
- Rehabilitation programmes should be accessible for all eligible patients, regardless of gender, age, socio-economic status, ethnicity or location.
- Such rehabilitation programmes should be based on best available evidence, and should focus on early risk stratification, use of referral services and initiation of treatment to stop the progress of an established disease process.
- Consideration should be given to the development of home-based cardiac rehabilitation programmes, which can provide a viable alternative to programmes offered in a medical facility.
- Specific programmes should be put in place to tackle common barriers to effective secondary prevention found across Europe: poor availability of structured secondary prevention programmes; low rates of referral to structured secondary prevention interventions; and lack of quality and minimum standards in the delivery of preventive programmes.
- Health systems should ensure that peer support is included in cardiac rehabilitation programmes.



Case study example – Sweden exercise referral (EU-PAP)

The aim of the EU-funded ‘physical activity on prescription’ programme is to transfer the ‘physical activity on prescription’ best practice to 10 other countries in Europe.

The unique aspects of the Swedish physical activity on prescription (PaP) method:

- The counselling and prescription are individualised based on the patient’s circumstances;
- All licensed health-care professionals with adequate expertise may prescribe; and
- The patients participate in exercise activities outside the direction of health-care services – a central component in PaP is to integrate physical activity into everyday life.



Case study example – Spain

The ‘Live active’ (*Vie actiu*) programme is a local service in Benicarló Castellón in the autonomous community of Valencia. It comprises assessment and prescription of customised physical activity programmes in health and sport centres for patients with conditions or diseases such as diabetes and obesity. These programmes are supervised by health practitioners such as doctors, nurses and physiotherapists and by professionals in physical activity and sports.



Case study example – France: Adapted physical activity

Adapted physical activity has been used in France to enable people with chronic diseases to have a physically active lifestyle in order to reduce their risk factors and the functional limitations due to their condition. Several local authorities have introduced ‘sport on prescription’, a similar concept, but with different approaches. The aim of all the schemes is to encourage people with long-term conditions to practise regular, sustainable, adapted physical activity.

Physical activity after stroke

The 11th World Stroke Organisation Congress in 2018 highlighted the urgent need for effective, equitable and sustainable interventions to improve life after stroke.

- Health systems should ensure that there are seamless, sustainable, evidence-based physical activity pathways to support stroke survivors and their families.

Effectiveness of physical activity interventions

A recent review of interventions in the global literature on physical activity made one clear evidence-based recommendation for promoting physical activity among adults with pre-existing diseases:

- In the health-care setting, measures to promote physical activity in adults with pre-existing diseases must be (1) theory-based, (2) specific to physical activity behaviour and (3) tailored to the respective target group. In this context, exercise referral schemes have also proved recommendable.

In conclusion, there is a wide range of potential interventions and approaches that can be taken at local, national and European level. There is no single solution, but rather there needs to be action taken across the system, addressing the multiple determinants of physical activity behaviour. And interventions need to be designed and applied specifically according to the needs and circumstances of citizens and members of specific target groups.

8 Conclusion

As shown in this report regular physical activity plays a critical role in the prevention and treatment of cardiovascular disease (CVD) across Europe. The declining (age-adjusted) rates of cardiovascular disease across Europe show that we have had some successes with prevention efforts.

However, each year CVD still causes 3.9 million deaths across Europe and recent trends show there is a slowdown in CVD mortality improvements, leading to growing concern that the rate of CVD-related deaths may begin to increase again.

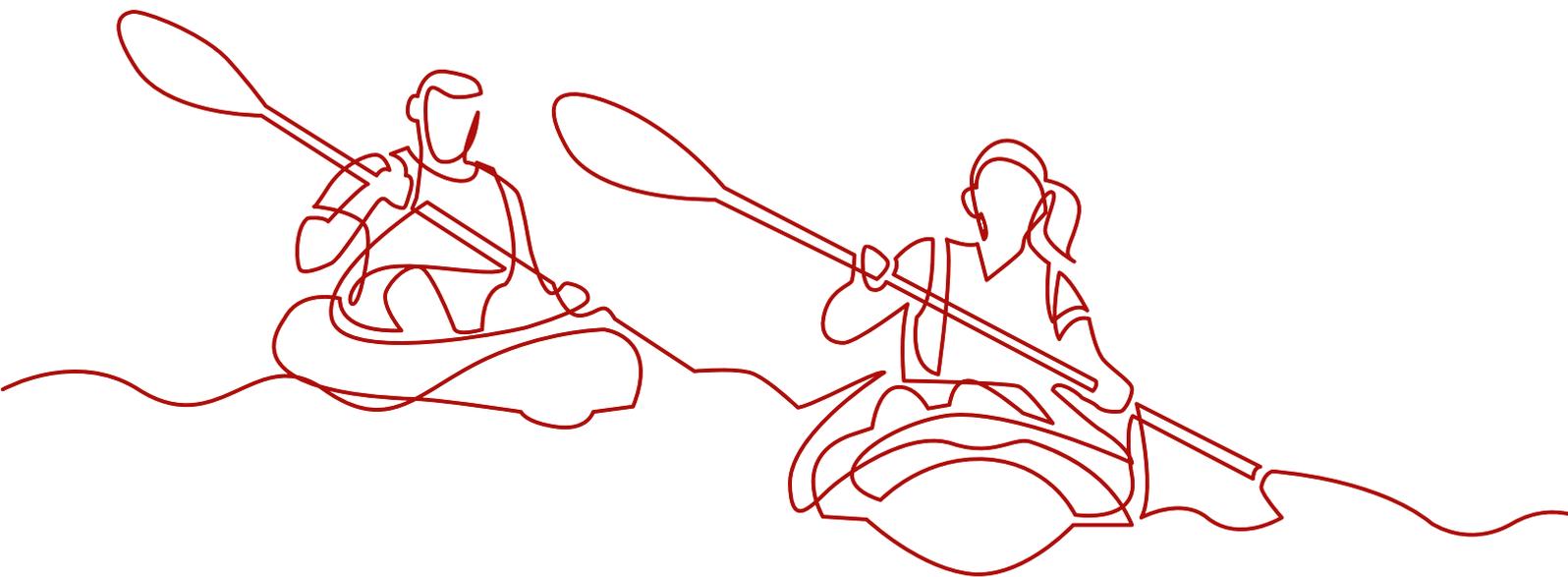
The wide variations in death rates across Europe show that significant challenges exist especially for those countries that (still) suffer from the highest burden of CVD mortality and morbidity.

Physical activity appears to have often been overlooked by policy-makers focused on CVD prevention. Yet it is a natural, universally accessible healthy behaviour with very few negative side-effects. In fact, the 'side-effects' (or 'by-products' of higher physical activity in a population) are also healthy and important:

cleaner air, reduced use of fossil fuels, lower carbon footprints and greater social inclusion.

Physical activity also plays a critical role in secondary prevention and rehabilitation for a wide range of conditions. Physical activity can be the difference between people recovering from cardiovascular disease and returning to normal active life or continuing a life as a patient. And yet again exercise-based cardiac rehabilitation appears to be under-utilised, with insufficient policy actions being taken to integrate physical activity into normal care. It does not have to be complex or over-demanding: even low levels of physical activity have health benefits and rehabilitation programmes can be undertaken at home.

Action needs to be taken across the 'system' at all levels. Policy-makers should focus on ensuring physical activity is central to CVD prevention and treatment. There are clear recommendations from the European Union and WHO reports, and these should be the focus of a renewed effort to place physical activity on the 'top of the podium' across Europe.



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