



fighting heart disease  
and stroke

european heart network

## **Cardiac and Stroke Rehabilitation a European Heart Network paper – 2013**

### ***Executive Summary***

Across the European Union, millions of patients live with the sequels of heart attacks and strokes. A crucial part of the treatment is rehabilitation including counselling, medical treatment and psychological support. Cardiac and stroke rehabilitation programmes help prevent recurrence, improve functional capacity, recovery and psychological well-being. They allow patients to get back to normal, and with an optimal quality of life.

However, access to and uptake of quality cardiac and stroke rehabilitation is patchy in most European countries. Yet, the benefits that rehabilitation bestows on patients as well as the wider society are considerable and suggest that every eligible patient should be legally entitled to participate in rehabilitation programmes.

Improving the implementation of cardiac and stroke rehabilitation programmes makes economic sense. These services are cost-saving and cost-effective and represent an investment rather than an expense.

In order to allow patients access to and uptake of quality cardiac and stroke rehabilitation programmes, the European Heart Network recommends that:

- Cardiac and stroke rehabilitation programmes must be an integral part of the patient's treatment plan and financed by the national health-care system
- Rehabilitation programmes should be accessible for all eligible patients, regardless of gender, age, socio-economic status, ethnicity or their place of living
- Appropriate health-care professionals must refer their patients to rehabilitation programmes and motivate them to take part in these programmes
- Hospitals and health-care professionals should adhere to national or international guidelines when implementing rehabilitation programmes
- National audits on the provision of rehabilitation should be carried out and include the following: uptake, availability, cost-effectiveness, patients' group referred, teams and programmes components, and span the spectrum of care provision including hospital, community and nursing homes
- Innovative eHealth solutions aiming at supporting rehabilitation should be investigated further
- Awareness-raising campaigns could be considered to improve understanding of the benefits of rehabilitation programme aiming at: the public, employers, appropriate health-care professionals and patients.

## **Aim**

The aim of this paper is to provide information to stakeholders about rehabilitation programmes for patients that have suffered a cardiac event or a stroke.

## **Introduction**

Across the European Union, millions live with the sequels of heart attacks and strokes. Cardiovascular diseases are chronic diseases that can be controlled, but at present, cannot be cured.

Cardiac prevention and rehabilitation services are effective and efficient channels for the delivery of care designed to stabilise, minimise or reverse the progression of the disease, prevent psychological complications, and aid vocational rehabilitation.<sup>1</sup>

Stroke rehabilitation services help to prevent a recurrent stroke and complications, ensure proper management of general health functions, prevent psychological complications, and aid vocational rehabilitation, encourage resumption of self-care activities, and provide emotional support to the patient and family. Effective rehabilitation interventions initiated early after stroke can enhance the recovery process and minimise the impact on activity and participation.<sup>2</sup>

This paper provides an overview of the benefits that rehabilitation programmes offer to patients and society.

## **Cardiac and Stroke Rehabilitation**

### ***What is it?***

Rehabilitation programmes are multifaceted and multidisciplinary interventions, which improve functional capacity, recovery and psychological well-being.<sup>3</sup> While cardiac and stroke rehabilitation programmes differ in content and complexity (given the higher likelihood of problems relating to cognition, language, functional loss and multi-morbidity associated with stroke), they share the same objective: allowing patients to get back to a normal life, in so far as possible, and with an optimal quality of life.

### ***Cardiac Rehabilitation***

After a cardiac event, patients require counselling to avoid recurrence through a combination of adherence to a medication plan and, as the case may be, adjustment of lifestyle risk factors

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<sup>1</sup> Leons et al, Cardiac rehabilitation and secondary prevention of coronary heart disease: an American Heart Association scientific statement from the Council on Clinical Cardiology (Subcommittee on Exercise, Cardiac Rehabilitation, and Prevention) and the Council on Nutrition, Physical Activity, and Metabolism (Subcommittee on Physical Activity), in collaboration with the American association of Cardiovascular and Pulmonary Rehabilitation. *Circulation*. 2005 Apr 5;111(13):1717.

<sup>2</sup> Duncan et al, Management of Adult Stroke Rehabilitation Care, American Stroke Association, 2005, <http://stroke.ahajournals.org/content/36/9/e100.full>.

<sup>3</sup> Piepoli et al, Secondary prevention through cardiac rehabilitation: from knowledge to implementation. A position paper from the Cardiac Rehabilitation Section of the European Association of Cardiovascular Prevention and Rehabilitation, *European Journal of Cardiovascular Prevention and Rehabilitation* 2010, 17:1–17

via smoking cessation programmes, diet counselling<sup>4</sup>, physical training and psychological support.

Cardiac rehabilitation is a structured programme of care to help patients slow the progression of coronary disease through changes in lifestyle and appropriate use of medication.<sup>5</sup> Traditionally cardiac rehabilitation is divided into three phases: phase I (in-patient services), phase II (in-patient and/or out-patient services) and phase III (long-term and community based management).<sup>6</sup> However, in reality, rehabilitation is an on-going lifelong process for patients, who need to follow such programmes as long as it is required.

### *Stroke Rehabilitation*

Rehabilitation programmes are crucial for patients having suffered a stroke; nearly 30% of stroke victims are permanently disabled<sup>7</sup>, and 'lesser' degrees of physical, cognitive and psychological disability can have a major impact on employment and well-being. Suited to the condition of the patient, stroke rehabilitation programmes may be composed of physiotherapy, occupational therapy, treatments for communication and cognition deficits and depression monitoring.<sup>8</sup>

Stroke rehabilitation is the process of overcoming or learning to cope with the effects of the stroke.<sup>9</sup> It is provided when the patient is medically stable, after a specialised stroke unit has assessed his/her condition at the time he/she was on the ward. Every stroke patient should have access to the appropriate levels of specialised short and long-term rehabilitation in hospital and in the community with therapists attached to their primary care team.

### ***What are the benefits?***

Rehabilitation services have proven to be effective both for heart and stroke patients. Greater access to rehabilitation reduces disability and long-term institutionalisation, increases independence, quality of life and the likelihood of survival. Pathways to specialist intensive neuro-rehabilitation services are also required for a proportion of people with complex disability needs due to stroke.

### *Cardiac Rehabilitation*

A systematic review of randomised controlled trials of 8 940 patients found that cardiac rehabilitation reduced the risk of dying from coronary heart disease by 26%, increased level of physical activity in 1 patient out of 5 and reduced the number of smokers by 5%.<sup>10</sup> An important aspect of cardiac rehabilitation is identifying and alleviating the anxiety and depression that often accompany heart disease. A scientific analysis of 104 patients aged 42

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<sup>4</sup> Piepoli et al, Secondary prevention through cardiac rehabilitation: physical activity counselling and exercise training, European Association of Cardiovascular Prevention and Rehabilitation, 2010.

<sup>5</sup> The National Audit of Cardiac Rehabilitation, Annual Statistical Report 2010, British Heart Foundation, 2010.

<sup>6</sup> Zwisler, A.-D.O., Træden, U.I., Videbæk, J., & Madsen, M. (2005). Cardiac rehabilitation services in Denmark: Still room for expansion. *Scandinavian Journal of Public Health* 33: 376-383

<sup>7</sup> World Health Organization 2004. Global Burden of Stroke. Part three: the burden. *The Atlas of Heart Disease and Stroke*, WHO, 2004.

<sup>8</sup> Guidelines for Management of Ischaemic Stroke and Transient Ischaemic Attack 2008, European Stroke Organisation, ESO.

<sup>9</sup> Northern Ireland Chest Heart and Stroke, Stroke Advice, 2010.

<sup>10</sup> Taylor RS, Brown A, Ebrahim S et al. 2004. Exercise-based rehabilitation for patients with coronary heart disease: systematic review and meta-analysis of randomized controlled trials. *American Journal of Medicine*; 116: 628-692.

to 54 years old following cardiac rehabilitation programmes with specific psychological support has demonstrated a decrease in anxiety (-46%) and depression (-58.5%), and an increase in quality of life (15.8%).<sup>11</sup>

### *Stroke Rehabilitation*

There is an abundance of data showing the clinical effectiveness of a rehabilitation programme for patients having suffered a stroke, especially when the multi-disciplinary team are involved in person-centred goal acquisition. It can reduce recurrence, improve vital functions<sup>12</sup> and decrease depression.<sup>13,14</sup> Stroke rehabilitation has proven to be effective in reducing death (4% in 6-month case fatality)<sup>15</sup> and time spent in hospitals (length of stays on average 8 days shorter).<sup>16,17</sup>

### ***Who recommends? Who carries out?***

Many national and international guidelines recommend rehabilitation. It has been shown that health-care professionals play a central role in impressing upon their patients the importance of following a rehabilitation programme.

### *Cardiac Rehabilitation*

Cardiac rehabilitation is recommended with the highest level of scientific evidence class I by the European Society of Cardiology in the treatment of patients with coronary artery disease (CAD)<sup>18</sup>, and after a cardiac event<sup>19</sup>. From a 2010 survey of 28 European countries, evidence showed that in 16 countries (57%), cardiac rehabilitation programmes were based on national guidelines.<sup>20</sup> It is recommended that cardiac rehabilitation teams should be composed of a cardiologist, specialist cardiac nurse, physiotherapist, exercise specialist, occupational therapist, dietician, psychologist, cardiac rehabilitation coordinator, pharmacist, vocational counsellor and social worker.<sup>21</sup>

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<sup>11</sup> Lavie et al, Adverse Psychological and Coronary Risk Profiles in Young Patients With Coronary Artery Disease and Benefits of Formal Cardiac Rehabilitation, 2006, Arch Intern Med. 2006;166:1878-1883.

<sup>12</sup> Langhorne et al, Estimating the impact of stroke unit care in a whole population: an epidemiological study using routine data, J Neurol Neurosurg Psychiatry 2010;81:1301-1305 doi:10.1136/jnnp.2009.195131, 2010.

<sup>13</sup> Ostir GV, et al. Patterns of change in depression after stroke. J Am Geriatr Soc 2011; 59(2):314-320.

<sup>14</sup> Gordon et al, Physical Activity and Exercise Recommendations for Stroke Survivors, 2004, Circulation. 2004; 109: 2031-2041.

<sup>15</sup> Foley et al, The Efficacy of Stroke Rehabilitation, The Evidence-Based Review of Stroke Rehabilitation, August 2011, [www.ebrsr.com](http://www.ebrsr.com).

<sup>16</sup> Langhorne et al, Estimating the impact of stroke unit care in a whole population: an epidemiological study using routine data, J Neurol Neurosurg Psychiatry 2010;81:1301-1305 doi:10.1136/jnnp.2009.195131, 2010.

<sup>17</sup> Langhorne P, et al: Early supported discharge services for stroke patients: a meta-analysis of individual patients' data. Lancet 2005;365:501-506.

<sup>18</sup> Piepoli et al, Secondary prevention through cardiac rehabilitation: from knowledge to implementation. A position paper from the Cardiac Rehabilitation Section of the European Association of Cardiovascular Prevention and Rehabilitation, European Journal of Cardiovascular Prevention and Rehabilitation 2010, 17:1-17

<sup>19</sup> European Guidelines on cardiovascular disease prevention in clinical practice (version 2012)

The Fifth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of nine societies and by invited experts)

Developed with the special contribution of the European Association for Cardiovascular Prevention & Rehabilitation (EACPR), Perk et al, 2012, <http://www.escardio.org/guidelines-surveys/esc-guidelines/GuidelinesDocuments/guidelines-CVD-prevention.pdf>.

<sup>20</sup> The European Cardiac Rehabilitation Inventory Survey (ECRIS), Prof Birna Bjarnason-Wehrens, German Sport University Cologne, on behalf of the European Association of Cardiovascular Prevention and Rehabilitation, 2010.

<sup>21</sup> Wood DA, et al., on behalf of EUROACTION Study Group. Nurse-coordinated multidisciplinary, family-based cardiovascular disease prevention programme (EUROACTION) for patients with coronary heart disease and asymptomatic individuals at high risk of cardiovascular disease: a paired, cluster randomized controlled trial. Lancet 2008; 371:1999-2012.

## *Stroke Rehabilitation*

Regarding stroke, the European Stroke Organisation, in its 2009 guidelines, recommends with scientific evidence class I that acute stroke patients are admitted to a stroke unit to receive coordinated multidisciplinary rehabilitation.<sup>22</sup> Stroke rehabilitation teams are multidisciplinary and normally consist of stroke physician (geriatrician, neurologist or rehabilitation physician), stroke nurse specialists and nurses with training in stroke care and rehabilitation, physiotherapist, occupational therapist, speech and language therapist, dietician and psychologist.<sup>23</sup>

### ***What is provided and what is the uptake?***

#### *Cardiac Rehabilitation*

In a 2010 survey<sup>24</sup> all countries reported the availability of phase II cardiac rehabilitation, with differences in types and durations of the programmes. In the majority of the countries (64%), both inpatient and outpatient programmes were available. However, in 15 countries out of 28 the uptake of eligible patients for phase II does not exceed 30%.

Considering long term cardiac rehabilitation (mostly referred to as phase III), figures are even more worrying. Indeed, the same survey indicated that even if 25 countries out of 28 provided for long term maintenance, the uptake is very low as in 7 countries out of 28, only 10% of patients follow the programmes.<sup>25</sup>

#### *Stroke Rehabilitation*

Despite the severe consequences of stroke, the provision of stroke rehabilitation programmes is still under-developed in many European countries. One national study across the spectrum of care showed deficits in rehabilitation services and staffing in prevention, hospital, community and nursing home sectors.<sup>26</sup>

### ***The economics of rehabilitation***

In addition to the significant health benefits that rehabilitation programmes bring to patients, there are important economic gains.

#### Cost savings to the public

A direct economic consequence for public finances of absence of rehabilitation is an increase in hospital stays and medication.

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<sup>22</sup> Guidelines for Management of Ischaemic Stroke and Transient Ischaemic Attack 2008, the European Stroke Organisation, 2009.

<sup>23</sup> Northern Ireland Chest Heart and Stroke, Stroke Advice, 2010.

<sup>24</sup> The European Cardiac Rehabilitation Inventory Survey (ECRIS), Prof Birna Bjarnason-Wehrens, German Sport University Cologne, on behalf of the European Association of Cardiovascular Prevention and Rehabilitation, 2010

<sup>25</sup> *Ibidem*.

<sup>26</sup> Horgan F, McGee H, Hickey A, Whitford DL, Murphy S, Royston M, Cowman S, Shelley E, Conroy RM, Wiley M, O'Neill D. From prevention to nursing home care: a comprehensive national audit of stroke care. *Cerebrovasc Dis.* 2011;32(4):385-92.

### *Cardiac Rehabilitation*

In 2009, coronary heart diseases cost almost €20 billion in direct health-care costs to the national health systems of the EU Member States.<sup>27</sup> This amount does not include indirect costs. Cardiac rehabilitation programmes, if applied efficiently, may reduce these direct costs, especially by reducing re-admissions to hospitals. Rehabilitation programmes may increase the chances of patients getting back to work and have the potential to reduce disability allowances (allowances depend on the country, in Sweden 64% of the former income, in Switzerland 60%).

### *Stroke Rehabilitation*

The majority of stroke costs relate to chronic aspects of the illness<sup>28</sup>, and early and continuing rehabilitation offer an opportunity to make significant savings, as well as a major reduction in personal suffering. Stroke is also a huge burden to health-care costs, estimated at €19 billion in 2009 to the Member States of the EU.<sup>29</sup>

### Cost savings to the private sector

The main cost for the private sector is loss of productivity for employers due to sick leave and increased absenteeism.<sup>30</sup> A potential additional cost that may affect the private sector is the lost productivity due to informal care. Indeed, many patients need help from family or friends who may need a more flexible work schedule.

### *Cardiac Rehabilitation*

A study from 2009 showed that heart patients leave the labour market 10 years before persons who share a similar lifestyle and socioeconomic background.<sup>31</sup> In 2009, productivity loss and informal care cost of coronary heart diseases amounted to €41 billion in the EU.<sup>32</sup>

### *Stroke Rehabilitation*

In 2009, productivity loss and informal care cost amounted to €19 billion in the EU.<sup>33</sup>

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<sup>27</sup> Leal J, Luengo-Fernandez R, Gray A. Economic Costs. In: Nichols M, Townsend N, Scarborough P, et al. European CardiovascularDisease Statistics 2012 edition.: European Heart Network; 2012,Brussels, European Society of Cardiology, Sophia-Antipolis.

<sup>28</sup> Smith S, Horgan F, Sexton E, Cowman S, Hickey A, Kelly P, McGee H, Murphy S, O'Neill D, Royston M, Shelley E, Wiley M. The cost of stroke and transient ischaemic attack in Ireland: a prevalence-based estimate. *Age Ageing*. 2011 Dec 1. [Epub ahead of print] PubMed PMID: 22134905

<sup>29</sup> Leal J, Luengo-Fernandez R, Gray A. Economic Costs. In: Nichols M, Townsend N, Scarborough P, et al. European CardiovascularDisease Statistics 2012 edition.: European Heart Network; 2012,Brussels, European Society of Cardiology, Sophia-Antipolis.

<sup>30</sup> U.S. Department of Health and Human Services, <http://aspe.hhs.gov/health/prevention/index.shtml#CARDIOVASCULAR>.

<sup>31</sup> Kruse M. et al 2009: Short and long-term labour market consequences of coronary heart disease: a register-based follow-up study. *European Journal of Cardiovascular Prevention & Rehabilitation*; 16 (3), 387-91

<sup>32</sup> Leal J, Luengo-Fernandez R, Gray A. Economic Costs. In: Nichols M, Townsend N, Scarborough P, et al. European CardiovascularDisease Statistics 2012 edition.: European Heart Network; 2012,Brussels, European Society of Cardiology, Sophia-Antipolis.

<sup>33</sup> *Ibidem*.

## Costs to patient

Of course, patients are the ones that suffer the most economically when they can no longer return to work and, therefore, lose their incomes.<sup>34</sup> Further to these economic costs, the loss of quality of life as a result of being left with avoidable disability is likely the heaviest burden for patients.

## ***Cost-effectiveness of rehabilitation***

Numerous analyses show that rehabilitation programmes are cost-effective.<sup>35</sup>

### *Cardiac Rehabilitation*

A 2004 study found that, compared to no cardiac rehabilitation, a cardiac rehabilitation programme resulted in an incremental cost-effectiveness ratio of about €9 000 per quality adjusted life year (QALY)<sup>36</sup> (the internationally recognised benchmark is around €38 000 per QALY).

### *Stroke Rehabilitation*

Stroke rehabilitation is also highly cost-effective, with an incremental cost-effectiveness ratio of stroke units care followed by early supported discharge of €12 338 per QALY.<sup>37</sup>

## ***Discussion and recommendations***

There is a need to reinforce access to and uptake of quality cardiac and stroke rehabilitation. Adherence is effective in reducing risk of mortality, relapse, decreasing risk factors, improving quality of life and makes economic sense.

### *Cardiac Rehabilitation*

Despite the evidence of significant benefits for patients, the uptake is not optimal. The majority of the countries surveyed (15 out of 28) reported a patient participation of less than 30%.<sup>38</sup>

It is thus extremely important that patients are provided with and informed about the opportunity to follow a cardiac rehabilitation programme. The information should be given by health-care professionals, as referrals from general practitioners or cardiologists are crucial to ensure optimal patient adherence. Health-care professionals must refer their

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<sup>34</sup> Cardiac rehabilitation: clinical effectiveness and utilisation in Belgium – Supplement KCE reports 140S Belgian Health Care Knowledge Centre, 2010.

<sup>35</sup> Cheuk-Man Yu et al, A short course of cardiac rehabilitation program is highly cost effective in improving long-term quality of life in patients with recent myocardial infarction or percutaneous coronary intervention, 2004, doi:10.1016/j.apmr.2004.05.010. Saka et al, Cost-Effectiveness of Stroke Unit Care Followed by Early Supported Discharge, 2009, doi: 10.1161/STROKEAHA.108.518043.

<sup>36</sup> Clinical and cost effectiveness of cardiac rehabilitation presented to the group developing the NICE guideline: Secondary prevention in primary and secondary care for patients following a myocardial infarction, Angela Cooper, Royal College of General Practitioners, 2004.

<sup>37</sup> Cost-Effectiveness of Stroke Unit Care Followed by Early Supported Discharge, Saka et al, 2009, doi: 10.1161/STROKEAHA.108.518043.

<sup>38</sup> The European Cardiac Rehabilitation Inventory Survey (ECRIS), Prof Birna Bjarnason-Wehrens, German Sport University Cologne, on behalf of the European Association of Cardiovascular Prevention and Rehabilitation, 2010.

patients to rehabilitation after discharge and they must carefully explain the benefits to their patients so as to encourage them to take part in a cardiac rehabilitation programme.<sup>39</sup>

### *Stroke Rehabilitation*

There is little data on the participation of patients in stroke rehabilitation programmes, but estimations from various countries indicate an extremely low uptake (an audit in Ireland showed that acute rehabilitation was only available to one in four patients).<sup>40</sup> Moreover, the provision of stroke rehabilitation services is still under-developed in Europe, despite efforts to improve it.

### *Recommendations*

Considering the significant benefits that rehabilitation bestows on patients as well as the wider society, every eligible cardiac/stroke patient should be legally entitled to participate in rehabilitation programmes.

In order for patients to be able to benefit from the rehabilitation services in an equitable manner, these should be free of charge. As the cost savings and cost-effectiveness of such services have been demonstrated by several studies, rehabilitation programmes should be seen as an investment rather than an expense.

In order to allow all patients access to and uptake of cardiac and stroke rehabilitation programmes, several steps are necessary:

- Cardiac and stroke rehabilitation programmes must be an integral part of the patient's treatment plan and financed by the national health-care system
- Rehabilitation programmes should be accessible for all eligible patients, regardless of gender, age, socio-economic status, ethnicity or their place of living
- Appropriate health-care professionals must refer their patients to rehabilitation programmes and motivate them to take part in these programmes
- Hospitals and health-care professionals should adhere to national or international guidelines when implementing rehabilitation programmes
- National audits on the provision of rehabilitation should be carried out and include the following: uptake, availability, cost-effectiveness, patients' group referred, teams and programmes components, and span the spectrum of care provision including hospital, community and nursing homes
- Innovative eHealth solutions aiming at supporting rehabilitation should be investigated further
- Awareness-raising campaigns could be considered to improve understanding of the benefits of rehabilitation programme aiming at: the public, employers, appropriate health-care professionals and patients.

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<sup>39</sup> The National Audit of Cardiac Rehabilitation, Annual Statistical Report 2011, British Heart Foundation, 2011.

<sup>40</sup> The Irish Heart Foundation's National Audit of Stroke Care, 2008, Irish Heart Foundation, Dublin.