



Secondary prevention of  
**HEART ATTACK  
AND STROKE**

Country profile for  
**Belgium**

## About this report

This country profile is part of a multi-year policy project on the secondary prevention of heart attack and stroke in Europe. It is based on interviews and consultation with national experts as well as an analysis of data and research for Belgium.

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All figures cited are based on the most recent data available at the time of research (October 2020).

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# EXECUTIVE SUMMARY

**Heart attack and stroke are the biggest killers in Belgium and affect a significant part of the Belgian population.** They accounts for 12% and 7% of all deaths, respectively.<sup>1</sup> Heart attack is the most serious consequence of coronary heart disease (CHD). Around 407,500 people are estimated to be living with CHD, with around 43,000 new cases each year.<sup>2</sup> Approximately 15,200 strokes occur every year and the total number of those affected is estimated at 138,000.<sup>2</sup>

**The financial burden on society and the healthcare system is substantial.** CHD and cerebrovascular disease account for one third of the total healthcare cost for cardiovascular disease (CVD). Overall, they cost Belgian society more than €2 billion per year.<sup>3</sup>

**A range of gaps and inequalities in the use and availability of guideline-recommended follow-up care means people who survive a heart attack or stroke are at an increased risk of repeat events.** Provision of secondary prevention in Belgium ranks in the bottom 30% of European countries.<sup>4</sup>

**Cardiac rehabilitation, in particular, seems to be a major missed opportunity in heart attack patients.** There are not enough cardiac rehabilitation centres, resulting in unmet needs for an estimated 52,500 cardiac patients each year.<sup>5</sup> Drop-out rates are also relatively high.<sup>6</sup> This is significant, as it has been found that individuals who discontinue rehabilitation face a risk of subsequent cardiovascular events (including heart attack or stroke) or death that is twice that of those who attend more than half of sessions.<sup>7</sup>

**Resources for community stroke rehabilitation are limited, which may restrict access to guideline-recommended therapies.** There is a shortage of multidisciplinary rehabilitation teams in primary care to support general practitioners (GPs).<sup>8</sup> Stroke rehabilitation has also been reported to focus on restoring lost function rather than on secondary prevention.

**Despite significant improvements in recent years, management of long-term risk factors in people who have had a heart attack remains suboptimal.** Nearly half of heart attack patients continue to experience high blood pressure and over a third have high cholesterol six months to three years after the event.<sup>9</sup>

**At the national level, there is a worrying lack of focus on secondary prevention in heart attack and stroke given the high rates of repeat events.** Belgium has no dedicated national CVD strategy or plan, and policies addressing secondary prevention in heart attack or stroke are lacking.

**The development of relevant national policy is likely being impacted by a lack of national data to effectively evaluate health service performance in secondary prevention.** Quality indicators exist for acute care in heart attack, but none have been published for secondary prevention.<sup>10</sup> National stroke-specific registries are also lacking.<sup>8</sup>

# INTRODUCTION

**Cardiovascular disease (CVD) – including heart attack and stroke – is Belgium’s biggest killer<sup>11</sup> and thus a major societal concern.** Records show that around 43,000 cases of coronary heart disease (CHD) occur in Belgium each year, along with around 15,000 strokes.<sup>2</sup> Heart attack is the most serious complication of CHD.

**Heart attack and stroke management places a significant demand on the public budget.** The costs to the Belgian healthcare system of CHD and cerebrovascular disease, which includes stroke, amount to more than €2 billion per year.<sup>3</sup> In 2016, CHD and stroke claimed 15,145 and 9,326 lives, respectively.<sup>2</sup>

**Health policy is split between Belgium’s federal government, which controls acute care policy, and the regional governments, which control preventive policy.** Such a division may give rise to challenges in evaluating national performance and streamlining acute care and secondary prevention.<sup>12</sup>

**At a policy level, there is no formal CVD plan and, while CVD management is implicitly included in overarching strategies, secondary prevention appears to be absent.** Belgium is engaged in a Country Cooperation Strategy with the World Health Organization. In the strategy non-communicable diseases, which encompass heart attack and stroke, are considered an improvement priority.<sup>11</sup> The recent chronic disease strategy also refers to CVD prevention and management.<sup>11,13</sup> CVD secondary prevention, however, is not explicitly referred to in these high-level documents.

## Key definitions

### **CARDIOVASCULAR DISEASE (CVD)**

is an umbrella term which describes diseases of the heart, blood vessels and circulation (the flow of blood through the arteries). It includes coronary heart disease (often called ischaemic heart disease) and cerebrovascular diseases (i.e. those relating to arteries in the brain).

### **CORONARY HEART DISEASE (CHD)**

is characterised by atherosclerosis (a build-up of fatty substances) on the walls of arteries that serve the heart – coronary arteries. The most dangerous consequence of CHD is a heart attack.

**HEART ATTACK** happens when an obstruction in the coronary artery cuts off oxygen-rich blood. This deprives the heart of oxygen and, as a result, heart muscle tissues start to die (infarct). Heart attack is also called myocardial infarction.

**CEREBROVASCULAR DISEASE** is a group of conditions which affect the blood vessels of the brain. The most common type of cerebrovascular disease is stroke.

**STROKE** is caused when blood supply is blocked to a part of the brain, which leaves it deprived of oxygen. Most strokes are caused by blood clots (ischaemic), but some happen because of a burst blood vessel (haemorrhagic). As it is linked to the cardiovascular system, stroke is a type of cerebrovascular disease, but because of its effects on the brain and nervous system, the World Health Organization classifies stroke as a neurological disease.

**SECONDARY PREVENTION** describes preventive care that aims to stop an existing illness from progressing. In the context of heart attack and stroke, secondary prevention is a combination of interventions to prevent another heart attack or stroke from occurring. It typically spans lifestyle changes (dietary changes, increased physical activity and smoking cessation), risk-reducing medication, rehabilitation and psychosocial support.

# THE CASE FOR CHANGE

## Economic cost of heart attack and stroke

**Heart attack and stroke have a significant impact on society, in terms of both direct healthcare costs and indirect costs, such as informal care and loss of productivity.**

CHD and cerebrovascular disease account for one third of the total healthcare cost for CVD in Belgium – over €2 billion per year.<sup>3</sup> Nearly €400 million per year is claimed by the direct costs of CHD but indirect costs are twice as high at just over €800 million.<sup>3</sup> A similar disparity, though slightly less pronounced, is present in cerebrovascular disease, where the direct yearly costs are estimated at just under €400 million, while indirect costs surpass €550 million (see *Table 1*).

Table 1. Coronary heart disease and cerebrovascular disease: direct and indirect costs to society in 2015<sup>3</sup>

	Direct cost		Indirect cost		Total
	Healthcare costs	Productivity losses due to mortality	Productivity losses due to illness	Informal care	
<b>Coronary heart disease</b>	€399,420	€236,061	€169,232	€414,157	€1,218,450
<b>Cerebrovascular disease</b>	€393,701	€122,074	€157,266	€287,365	€960,406
<b>Combined cost</b>	€793,121	€358,135	€326,498	€701,522	€2,179,276

Cost in thousands per year.

## Epidemiology

**Heart attack and stroke are the leading causes of death in Belgium.** They account for 12% and 7% of all deaths, respectively.<sup>1</sup> Heart attack, the most serious consequence of CHD, affects approximately 15,000 people in Belgium every year.<sup>14</sup> The number of strokes is also close to 15,000 each year, and there are an estimated 138,000 stroke survivors in Belgium (see *Table 2*).<sup>2</sup>

**In similarity with much of the European Union (EU), Belgium has seen slow progress in reducing the behavioural risk factors that can lead to heart attack and stroke.** In 2017, roughly 40% of all deaths could be attributed to behavioural risk factors, including alcohol consumption, tobacco smoking, poor diet and low physical activity.<sup>15</sup> Alcohol consumption remains above the EU average and obesity affects 16% of the adult population.<sup>15</sup>

Table 2. Coronary heart disease and stroke (2019): epidemiological data for Belgium<sup>2</sup>

	Coronary heart disease <sup>a</sup>	Stroke <sup>b</sup>
Number of people living with the disease (prevalence)	407,559	138,000
Number of new cases per year (incidence)	43,493	15,218
Deaths	15,145	9,326

a. Including heart attack.

b. Ischaemic and haemorrhagic stroke.



# POLICY PRIORITIES

Achieving national policy leadership in secondary prevention of heart attack and stroke

## Policy leadership

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Healthcare policies are split between Flanders, Wallonia, Brussels, East Cantons and federal structures. Belgium has eight health ministers; this fragmentation makes accessing the state of play and generating data nearly impossible.

PROFESSOR PETER SINNAEVE, UNIVERSITAIR ZIEKENHUIS LEUVEN

**Belgium has no overarching national strategy for CVD, nor for heart attack or stroke specifically.** However, other national policy frameworks could be supportive to future work. Two high-level strategies address chronic disease prevention and management, and recognise CVD as a priority chronic disease to address.<sup>11,13</sup>

**Healthcare decision-making is split between federal and regional structures, which may explain national policies being more strategic in nature.** Acute care is the responsibility of the federal government and prevention falls under the regional governments. The nature of secondary prevention, which includes diagnosis, treatment and prevention, makes it challenging to coordinate specific national strategies that span both federal and regional policy domains.<sup>12</sup> This may explain why the national strategies rarely make specific healthcare practice recommendations.

Table 3. Heart attack and stroke: summary of key policies for secondary prevention

	Heart attack	Stroke
<b>Key policies</b>	There is no dedicated national strategy for cardiovascular disease, heart attack or stroke, although there are high-level national strategies that include chronic disease management as a priority. <sup>11,13</sup>	

**Broader chronic disease initiatives, while not specific to secondary prevention following a heart attack or stroke, could help to shape a supportive environment.**

Traditionally, Belgian health policy has focused on acute care, but with rising numbers of people facing multiple conditions and chronic disease, health authorities have had to rethink their policy focus.<sup>11</sup> This has resulted in an integrated care strategy and extensive funding of integrated care pilots for chronic disease management.<sup>13</sup> In 2015 the federal government released the Joint Plan for Chronic Disease along with funding for the management of integrated care pilot programmes in every region.<sup>13</sup> Belgium is also engaged in a Country Cooperation Strategy with the World Health Organization, which runs from 2016 until 2022. Non-communicable diseases are a strategic priority for improvement.<sup>11</sup>

**Guidelines and clinical leadership**



There is a need for a structured approach to secondary prevention where specialists and general practitioners agree on the same targets for risk-factor control.

PROFESSOR JOHAN DE SUTTER, GHENT UNIVERSITY

**Endorsement of clinical guidelines varies among cardiac professionals, complicating care provision for secondary prevention along the care pathway.**

The Belgian Society of Cardiology endorses the European Society of Cardiology's guidelines for the prevention and management of heart attack<sup>16</sup> and includes European guideline-recommended indicators on its STEMI (ST-elevation myocardial infarction) registry.<sup>17</sup> Many individual cardiac specialists are aware of the European guidelines, including them in discharge letters and on information materials; however,

as in many countries, the translation into patient care is often disappointing.<sup>12</sup> General practitioners (GPs) have developed their own guidelines, particularly on lipid control and hypertension, which may be more lenient or more stringent than those followed by other specialists. This adds to the challenge of fragmented care in Belgium.<sup>12</sup> Belgian cardiac and general practice medical societies are reported to be working together to address this issue by developing a common approach to risk factor management.<sup>18</sup>

**Quality indicators and monitoring processes for guideline adherence are not mandated in federal legislation, despite the existence of recommendations from the Belgian Stroke Council since 2009.** The Council published recommendations for stroke units and care, including quality care indicators and monitoring processes, which were partially included in federal legislation in 2014.<sup>19,20</sup> However, these have not been legislated and there is currently no process to monitor adherence.<sup>21</sup> The Belgian Stroke Council follows the European Stroke Organisation’s guidelines (see *Table 4*).

Table 4. Heart attack and stroke: national clinical guidelines for secondary prevention

Heart attack	Stroke
<p><b>The Belgian Society of Cardiology</b> endorses the European Society of Cardiology (ESC) guidelines which cover secondary prevention:<sup>16</sup></p> <ul style="list-style-type: none"> <li>• cardiovascular disease prevention in clinical practice (2016)<sup>22</sup></li> <li>• management of acute myocardial infarction in patients presenting with ST-segment elevation (2017)<sup>23</sup></li> </ul> <p><b>It also endorses</b> a range of recently updated ESC guidelines which emphasise management of key risk factors to reduce repeat events:<sup>24</sup></p> <ul style="list-style-type: none"> <li>• diabetes, pre-diabetes and cardiovascular disease</li> <li>• dyslipidaemias</li> <li>• chronic coronary syndromes</li> <li>• arterial hypertension.</li> </ul>	<p><b>The Belgian Stroke Council</b> endorses the European Stroke Organisation guidelines,<sup>16</sup> but the monitoring and quality control processes it recommends have not been legislated and there is currently no process to monitor adherence.<sup>19-21</sup></p>

## Advocacy and awareness raising

**There is limited evidence of concerted advocacy efforts around secondary prevention in heart attack and stroke.** The apparent lack of activities to increase public and political awareness of secondary prevention is worrying, given the absence of national policy addressing secondary prevention for these conditions and the healthcare gaps that currently exist.

**There is some online information to help people who have experienced a heart attack to understand their condition and participate in rehabilitation.** People may access a comprehensive map of rehabilitation and cardiac support programmes across the country on the Belgian Cardiology League website.<sup>25</sup> Information on rehabilitation, physical activity, diet and medication is also available on the Mon Coeur website, which has been developed by the Belgian Working Group on Cardiovascular Prevention and Rehabilitation.<sup>26</sup>

**In stroke, though advocacy activities appear to be limited, there are some initiatives that could be further built on.** The Belgian Stroke Council has collaborated with the French stroke organisation AVC-France to publish a stroke survivor's 'guide to life'.<sup>27</sup>

## Ensuring availability of comprehensive data

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There's never been a lot of interest in secondary prevention because all of the data you can find about our country is from large cohort studies, not from national registries or national databases. And this has been the case for over 30–40 years.

PROFESSOR JOHAN DE SUTTER

**Belgium appears not to have a tradition of routinely collecting and using data in healthcare policy, which may explain the limited avenues for data collection for secondary prevention.** Different policy structures between the federal and regional levels make collecting and collating data on CVD secondary prevention a challenge.<sup>11,12</sup> Experts have noted that Belgium's division into three regions, each with

its own language, makes national data collection using a single database extremely difficult.<sup>18</sup> Where data are collected, they are rarely well integrated into policy and decision-making.<sup>11</sup>

**Cardiac care quality indicators for secondary prevention do not seem to be sufficiently available.** Experts have reported that existing cardiac registries do not collect any data related to heart attack patients' long-term management, for example the number of patients who stop smoking or reach their target cholesterol levels.<sup>18</sup> Acute cardiac care is monitored through quality indicators, developed by the Belgian Cardiac Society's Interdisciplinary Working Group on Acute Cardiology, which have been embedded in the national registry since 2007.<sup>10</sup> The question is whether these indicators might be expanded to cover elements relevant to secondary prevention. Belgium's limited availability of secondary prevention data compared with other European countries is currently a barrier to evaluation<sup>12</sup> (see *Table 5*).

**There are no national stroke registries, suggesting the evaluation of secondary prevention in stroke care across Belgium is challenging.** Stroke care provision seems to be assessed only through non-specific registries,<sup>8</sup> with no process to embed quality indicators and monitor service provision.<sup>28</sup> As monitoring and evaluation are integral to health system performance assessment,<sup>29</sup> the lack of infrastructure to do this at a national level may suggest an inconsistent focus on evidence-based stroke care quality improvement.

**Some stroke data are available in the acute setting, and there might be scope for expanding them to incorporate secondary prevention.** Belgium is a member of the International Stroke Thrombolysis Register, which collects data on access to thrombolysis.<sup>30</sup> Stroke mortality data are captured in the Belgian Sentinel Network of General Practitioners and the Institute of Health population surveys.<sup>31</sup>

Table 5. Cardiovascular disease registries in Belgium

Registry	Description
<b>Belgian Interdisciplinary Working Group on Acute Cardiology STEMI registry<sup>17</sup></b>	National registry of all patients with the most severe type of heart attack (ST-elevation myocardial infarction, STEMI) admitted to Belgian hospitals (2007–present)
<b>Belgian registry of percutaneous coronary interventions<sup>32</sup></b>	National registry of percutaneous coronary intervention delivery
<b>International Stroke Thrombolysis Register<sup>30</sup></b>	An international registry which draws on thrombolysis data from the network countries' registries

## Initiation of secondary prevention in the acute care setting

**Acute management of CVD in Belgium has seen a significant improvement over the past decade as access to specialist acute care has become easier.** Specialist acute care is vital, not only for timely stabilisation but also to serve as the setting in which secondary prevention efforts should commence. Heart attack mortality (age and gender standardised rate of adults aged 45+) declined from around 8.4% of all patients hospitalised for heart attack in 2007 to 6.8% in 2017.<sup>33</sup> Stroke mortality also declined over this period, though to a lesser extent, from around 9.4% to 8.3% of all patients hospitalised for ischaemic stroke.<sup>33</sup> These improvements reflect numerous developments, including better access to heart attack and stroke crisis care and the creation of specialised units to treat serious illnesses.<sup>1</sup> In heart attack, for example, Belgium has a high density of percutaneous coronary intervention centres, which are reported to consistently deliver the appropriate interventions for secondary prevention, such as the initiation of statins and beta-blockers.<sup>18</sup>

**Encouragingly, following a heart attack, most patients are discharged on the appropriate medications to prevent repeat events.** Analysis of 22,000 heart attack patients admitted to 60 Belgian hospitals (2008–2016) found that 96% of patients were prescribed antiplatelets, 94% statins, 87% beta-blockers and 78% angiotensin-converting-enzyme (ACE) inhibitors.<sup>10</sup>

**In stroke, the lack of a formal accreditation process for specialist units means that it is unclear whether guideline-recommended care and measures for secondary prevention are consistently being delivered.** The acute management of stroke is coordinated by accredited stroke units, with defined transfer protocols between general hospitals and hospitals with a stroke unit.<sup>19</sup> While direct admission to a stroke unit is seen as vital to ensure patients have access to specialist care, including secondary prevention, there is no formal accreditation process to assess whether these units are complying with accepted standards as laid out in federal legislation<sup>34</sup> and Belgian Stroke Council guidelines.<sup>8</sup> The lack of an accreditation process also makes it difficult to assess whether the supply of stroke units and beds is meeting national demand.<sup>8</sup>

## Securing participation in structured secondary prevention programmes

**In heart attack, international reports show that Belgium lags behind other European countries in quality of structured secondary prevention, but this could be due to poor quality of data.** Belgium's CVD secondary care provision has been ranked in the bottom 30% of European countries.<sup>4</sup> However, as data collection in Belgium is limited (see *Ensuring availability of comprehensive data*, p. 12),<sup>4,12</sup> this assessment may not be accurate.

**Too few cardiac rehabilitation centres exist, which has resulted in a large unmet need for this important intervention.** While cardiac rehabilitation has been proven to prevent repeat heart attacks, a lack of facilities has resulted in unmet needs for an estimated 52,500 cardiac patients every year.<sup>5</sup> The number of cardiac rehabilitation facilities is reported to have expanded in recent years; however, significant regional variation in service provision still exists.<sup>18</sup> The government is reported to have shown a reluctance to further expand cardiac rehabilitation services due to the associated increase in costs.<sup>18</sup> Technological developments such as telemedicine may hold promise for improving access to cardiac rehabilitation in Belgium, but they are at an early stage of implementation. Telemedicine has been trialled in cardiac rehabilitation, but not on a significant scale (regionally or nationally); it has yet to be adopted into practice.<sup>35</sup>

**Low rates of participation in cardiac rehabilitation may also be due to low awareness of its benefits, suggesting a need to improve patient communication.** A patient survey across 15 Belgian hospitals found that one of the main reasons for people to refuse rehabilitation was their belief that they did not need it because they could recover independently. Older people were also found to be less likely to

take up an offer of multidisciplinary rehabilitation, with national experts suggesting that programmes may need to be redesigned to meet the needs of these patients.<sup>36</sup> Belgium has been found to have a relatively high drop-out rate of heart attack patients from cardiac rehabilitation provided shortly after hospital discharge, with a recent ESC survey putting the figure at 25–50% of patients.<sup>6</sup> The drop-out rate is worrying, as patients who withdraw from cardiac rehabilitation face a risk of further cardiovascular events or death that is twice that of patients who attend more than 50% of sessions.<sup>7</sup>

**There is a significant disparity between high-level recommendations that call for structured CVD secondary prevention and practice in hospitals.** While federal recommendations call for all cardiology centres, including those that provide basic cardiology care, to offer a form of cardiac rehabilitation,<sup>37</sup> most secondary prevention takes the form of ad hoc advice during follow-up appointments, which focus on medication adherence more than lifestyle change.<sup>12</sup> Furthermore, some hospitals do not have the capacity to meet this recommendation. For example, the Walloon (French-speaking) region will require a training programme to bring the number of recognised rehabilitation physicians to a sufficient level.<sup>37</sup>

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There is an enormous patient population that we don't reach due to challenges in accessing care. For example, if you have an obese, older patient who is immobile and relies on others for transport, and you try to get them to come to the centre three times a week, they often give up and stop coming.

PROFESSOR PETER SINNAEVE, UNIVERSITAIR ZIEKENHUIS LEUVEN

**Rehabilitation following a stroke is well provided in hospitals but often not post-discharge.** Rehabilitation usually starts while the patient is still in hospital,<sup>38</sup> as recommended by the European Stroke Organisation.<sup>39</sup> Early discharge of stroke patients is promoted because healthcare financing puts pressure on neurologists to reduce the length of hospital stay.<sup>40</sup> Two thirds of stroke patients are discharged home within a month, where the family doctor manages rehabilitation and secondary prevention<sup>41</sup> with guidance from a supervising neurologist.<sup>42</sup> However, the doctor is often not supported by a multidisciplinary rehabilitation team, due to a shortage in the community setting,<sup>8 41</sup> leading to suboptimal rehabilitation provision. This is supported



by studies – a 2016 study of more than 600 patients found that being at home was associated with receiving significantly less physiotherapy and occupational therapy than being in a nursing home,<sup>41</sup> while a national study found that one month post-discharge nearly 40% of paralysed patients were not receiving physiotherapy.<sup>41</sup>

## Increasing primary care capacity for long-term risk management

**In the first year after a heart attack, patient follow-up and support is standardised across Belgium but, following that, care often becomes fragmented.** After a heart attack, patients are followed up by a cardiologist and GP for six months to a year. However, after the first year, care becomes dependent on the care system the patient is in (private, academic or not-for-profit), who is following them up and where they live, all of which entail variable processes.<sup>12</sup> It has been reported that the lack of a clearly defined patient pathway can result in therapies for secondary prevention not being optimised, as GPs and cardiologists look to each other to initiate care.<sup>18</sup>

**There have been significant improvements in the management of long-term risk factors for heart attack patients in Belgium, but gaps remain.** Comparison of 2006 and 2012 European-level studies found a reduction in the number of Belgian heart attack patients continuing to experience risk factors after an event: 7% fewer patients had elevated blood pressure and 17% fewer patients had high cholesterol levels post-event.<sup>9</sup> Belgium also ranks above the European average for weight management and smoking cessation post-heart attack.<sup>9,11</sup> Despite these improvements, in 2012 nearly half of heart attack patients had high blood pressure and more than a third had high cholesterol.<sup>9</sup> Belgium's performance in these risk factors lags behind France, Spain and the UK.<sup>4</sup>

**The number of heart attack patients taking guideline-recommended medication seems to be suboptimal.** A European review suggests that statin, antiplatelet and beta-blocker use post-heart attack in Belgium should be improved to meet guideline-recommended levels.<sup>4</sup>

**Long-term prevention efforts in stroke are also of concern.** Only 50% of patients in rehabilitation received lipid-lowering medicines, compared with 80% of patients in the UK.<sup>43</sup> In addition, 46% of stroke patients received combinations of antithrombotic, lipid-lowering and antihypertensive medications, which is far lower than in other European countries.<sup>43</sup>

# CASE STUDIES

## 1. **Wearable technology in cardiac rehabilitation**

The Research Unit of Cardiac Surgery at University Hospitals Leuven has been investigating the use of wearable technology in monitoring rehabilitation fitness.<sup>44</sup> Current wearable technology includes an accelerometer to measure several indicators: step counts, distance walked, and intensity, duration and type of movement.

The team used this technology to measure physical activity progress in a small number of patients who had undergone conventional or robotically assisted coronary artery bypass surgery. They noted that ‘unsupervised assessment of daily physical activity varied widely’, which could impact on the future use of these trackers for research.

## 2. **Stroke Coach: a personal digital coaching programme for stroke patients**

The Stroke Coach was developed on behalf of the Belgian Stroke Council to address the risk of repeat events among stroke patients by improving cardiovascular risk factor control.<sup>45</sup>

The stroke coach is a nurse-led self-management programme that uses both a personal coach and a digital platform to provide advice on implementing a healthy lifestyle. One educational session is provided during hospitalisation, with advice after discharge delivered through the digital platform and video appointments with the stroke coach.

The pilot was implemented in four Belgian hospitals and showed promise in the improvement of stroke recurrence rates, medication adherence and quality of life; further trials are needed to demonstrate statistical significance.

# OUTLOOK

Repeat heart attack and stroke currently present a high risk in Belgium, but significant opportunities exist to improve patient outcomes.

A range of gaps in the use and availability of guideline-recommended follow-up care is contributing to this increased risk; addressing these gaps has the potential to improve patient outcomes and reduce healthcare costs. Cardiac rehabilitation seems to be a major missed opportunity in heart attack patients, with too few rehabilitation centres and a relatively high drop-out rate. Stroke rehabilitation services could also be significantly expanded to better meet the current levels of need, with enhanced service provision in the community potentially a key area for change. These services could also be adapted to put greater focus on lifestyle change. Significant opportunities exist during patients' long-term care, in particular the benefits that could be gained by bringing medication use for the control of long-term risk factors in line with European guidelines.

To take advantage of these opportunities, national and regional plans for the secondary prevention of heart attack and stroke will likely be needed to elicit and direct the standardisation of care, along with improved data collection to monitor and assess health service performance across the country.

# APPENDIX

## Leading organisations and data sources consulted for this report

Many leading organisations and sources of information were identified across the course of the research. These include:

Ligue Cardiologique Belge

Belgian Stroke Council

European Heart Index

Stroke Alliance for Europe

European Stroke Organisation

European Cardiology Society

Institut national d'assurance maladie-invalidité (INAMI)

Federaal Kenniscentrum voor de Gezondheidszorg

A significant volume of epidemiology data came from the Global Health Data Exchange. More information on this tool can be found here: <http://ghdx.healthdata.org/gbd-results-tool>

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