



Secondary prevention of  
**HEART ATTACK  
AND STROKE**

Country profile for

**Austria**

## 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 Austria.

The work was funded by Amgen (Europe) GmbH. All outputs developed as part of this project are non-promotional. Findings are based on existing literature and input and review from expert stakeholders, who have not been remunerated for their contributions. The Health Policy Partnership was appointed by Amgen to conduct research and drafting with full editorial control, incorporating input from expert stakeholders and the Amgen policy team on an equal and transparent basis. All outputs have been shared with contributors for final approval, and reviewed by Amgen's legal and medical team for the purposes of scientific accuracy and compliance with industry codes of conduct in public life.

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

## Acknowledgements

We thank the experts for providing pro bono input in interviews and during revision of drafts:

- ▷ **PROFESSOR PETER SIOSTRZONEK**, President, Austrian Society of Cardiology
- ▷ **PROFESSOR STEFAN KIECHL**, President, Austrian Stroke Society
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Please cite this report as: Budig K, Harding E. 2021. *Secondary prevention of heart attack and stroke: country profile for Austria*. London: The Health Policy Partnership.

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# EXECUTIVE SUMMARY

**Heart attack and stroke are a significant societal concern in Austria.** Official data sources estimate that more than 300,000 people are living with coronary heart disease (CHD), of which heart attack is the most serious consequence, and more than 130,000 have survived a stroke.<sup>1</sup>

**The financial cost to society and the healthcare system is substantial.** The direct cost of CHD and cerebrovascular disease to Austria's healthcare system amounts to €1.01 billion per year.<sup>2</sup>

**Despite post-acute care for heart attack and stroke having seen significant medical advances over the past two decades in Austria, repeat heart attack and stroke still present an unacceptable risk.** It is worrying that 20–25% of strokes are repeat events.<sup>3 4</sup> A ten-year repeat rate of 17% has been found in heart attack patients under the age of 40,<sup>5</sup> while older age groups are likely to be at an even greater risk.

**Existing medical models can reduce repeat events in both heart attack and stroke; however, their limited roll-out has contributed to a lack of care continuity after the acute stage.** For example, integrated stroke care pathways covering secondary prevention have been established in just three Austrian regions.<sup>6</sup>

**The underuse of these models is contributing to systemic gaps and inequalities in the availability of structured rehabilitation and long-term management for secondary prevention.** For example, a lack of cardiac rehabilitation facilities<sup>7</sup> has resulted in an estimated unmet need in over 27,000 cardiac patients,<sup>8</sup> with just around 42% of acute heart attack patients estimated to have accessed rehabilitation in 2014.<sup>9</sup>

**The unmet need for cardiac rehabilitation in Austria is being exacerbated by an overreliance on inpatient rehabilitation.** The outpatient sector is underdeveloped and underused compared with much of the European Union.<sup>10 11</sup> National experts have reported that of all patients that undergo cardiac rehabilitation each year, 94% are inpatients.<sup>10</sup>

**In stroke, despite the proven benefits of structured rehabilitation to prevent repeat events, too few patients are being referred to these services.** Analysis of patients in the Austrian Stroke Unit Registry between 2005 and 2016 found that only around 40% had been referred to stroke rehabilitation.<sup>3</sup>

**In long-term care post-heart attack and post-stroke, there is significant scope for the intensification of treatment to reduce secondary events.** Suboptimal use of guideline-recommended medications has been found in patients with coronary artery disease (53.3% of whom had a heart attack) three months after the event, with levels also deteriorating over time.<sup>12</sup>

**Greater emphasis is also needed on patient education, as too many patients are continuing their unhealthy behaviours after they have experienced a heart attack, despite the fact that this is putting them at an increased risk of repeat events.** In a study of patients with coronary artery disease (53.3% of whom had a heart attack), nearly 60% of smokers were still smoking five years later, and there was virtually no change in the percentage of patients who were overweight or obese.<sup>12</sup>

**Clinical leaders are beginning to recognise the need for greater use of existing policy instruments to improve secondary prevention in stroke.** A Quality Standard for Integrated Stroke Care,<sup>13</sup> released in early 2019, has a focus on long-term secondary prevention, which may lead to renewed interest in ring-fenced funding for integrated care. Clinical trials are underway to test new disease management programmes (DMPs) for secondary prevention of stroke.<sup>14</sup> The Ministry of Health is considering adding to its service catalogue a post-stroke DMP, which, if approved, would ensure its reimbursement and roll-out.<sup>15</sup>

**However, at the federal and state levels there is a lack of focus on secondary prevention in heart attack and stroke.** Given the high rates of repeat events, this is worrying. Dedicated formal policy is currently absent,<sup>16-19</sup> as is a strategic heart health plan.<sup>16</sup> There is also no specific policy for the prevention or management of non-communicable diseases, which include heart attack and stroke.<sup>17</sup>

**Effective health service planning in heart attack and stroke is being affected by a lack of national data on non-acute service use, which is proving to be a major barrier to the development of regional healthcare plans.**<sup>20</sup> Data gaps in heart attack include an absence of national registries covering the post-acute stage (with the exception of outpatient cardiac rehabilitation), while in stroke the national registry focuses solely on stroke units, despite around a third of stroke patients being treated in other wards.<sup>21</sup>

**The ongoing focus on inpatient services is slowing the expansion of outpatient rehabilitation facilities and their potential to fill current gaps in provision.** Outpatient cardiac rehabilitation is not explicitly regulated by social security legislation and health insurance bodies provide this service on a voluntary basis.<sup>10 22</sup> This has considerably slowed the development of the outpatient sector and resulted in a minority of patients having access to these services across the country.<sup>10 22</sup>

# INTRODUCTION

**In Austria, heart attack and stroke are a significant societal concern.** According to official data sources, more than 300,000 people are living with coronary heart disease (CHD), which can lead to a heart attack, and more than 130,000 have survived a stroke.<sup>1</sup>

**Heart attack and stroke present a significant cost to the public budget.** The direct cost of CHD and cerebrovascular disease to Austria's healthcare system amounts to €1.01 billion per year.<sup>2</sup>

**Dedicated formal policy addressing secondary prevention in heart attack and stroke is absent, with effective health service planning in this area being constrained by a lack of non-acute national data.** Most regional healthcare plans focus their improvement efforts on acute inpatient care, which can be linked to a lack of data from other sectors to benchmark services.<sup>20</sup> This could soon change in stroke, where recent clinical leadership efforts could lead to greater use of existing policy instruments to improve care pathways for secondary prevention.<sup>14</sup>

**Limited roll-out of medical models that can reduce repeat heart attack and stroke has contributed to a lack of care continuity after the acute stage, resulting in systemic gaps and inequalities.** Only a minority of heart attack and stroke patients receive rehabilitation and structured secondary prevention,<sup>3 8 9</sup> and interventions in long-term patient management are not optimised to lower patients' risk of repeat events.<sup>5 12 23</sup> While the outpatient sector could play a greater role in patient rehabilitation, an ongoing focus on inpatient services is slowing its expansion.<sup>10 22</sup> In some areas of secondary prevention, in particular access to cardiac rehabilitation, Austria appears to be falling behind the European average.<sup>24</sup>

## 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

**Direct healthcare costs of heart attack and stroke place a significant strain on the Austrian healthcare system, whereas the indirect costs affect Austria's society and economy.** In 2015, direct costs (including inpatient and outpatient care) were around €0.5 billion each for CHD and cerebrovascular disease.<sup>2</sup> In fact, Austria spends more per capita on direct healthcare costs of these conditions than almost any other country in the European Union (EU), having the joint second highest per capita spending for CHD (€59) and the third highest for cerebrovascular disease (€59).<sup>2</sup> Indirect costs (including informal care and loss of productivity) have been estimated at €1.67 billion for CHD and cerebrovascular disease combined.<sup>2</sup>

*Table 1* provides an in-depth look at direct and indirect costs of these diseases, according to data from the European Cardiovascular Disease Statistics 2017.<sup>2</sup>

Table 1. Coronary heart disease and cerebrovascular disease: direct and indirect costs to society in 2015<sup>2</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>	€509,647	€319,598	€267,262	€399,699	€1,496,206
<b>Cerebrovascular disease</b>	€507,578	€99,861	€179,458	€408,088	€1,194,985
<b>Combined cost</b>	€1,017,225	€419,459	€446,720	€807,787	€2,691,191

Cost in thousands per year.

## Epidemiology

**The large number of Austrians living with the consequences of a heart attack or stroke has created a significant demand for structured secondary prevention to manage them effectively in the long term.** Around 37,000 cases of CHD and 13,000 cases of stroke occur each year (see *Table 2*) and their prevalence is rising.<sup>1,25</sup> In the case of stroke, 20–25% of strokes each year are repeat events,<sup>3,4,14</sup> which suggests a worrying lack of appropriate post-acute care.

**Despite recent improvements in acute care, heart attack and stroke remain Austria’s biggest killers.** In 2014, CHD was still the leading cause of death, accounting for a staggering 19% of all deaths; stroke was in the third place at 6%.<sup>26</sup> Every year around 18,000 people in Austria die as a result of CHD and 5,000 die as a result of stroke.<sup>1</sup>

**Demographic and environmental factors are likely to cause even greater pressures in heart attack and stroke.** Austria’s ageing population is one such factor, with the proportion of citizens aged 65 years and over set to grow to nearly a third of the population (28.1%) by 2060, from 18.6% in 2017.<sup>27</sup> Tobacco use is a major risk factor for heart attack in younger adults, with 71% of heart attack patients under 40 found to be active smokers.<sup>5</sup> It is also a significant concern in stroke – in 2014, nearly one in four adults in Austria were daily smokers, a rate above the EU average of 21% and unchanged since 1997. Smoking rates are 83% higher in the least-educated sectors of the population compared with the most educated. Similarly, little progress has occurred in limiting alcohol consumption – at 12.3 litres per adult, this is the third highest rate in the EU.<sup>26</sup>

Table 2. Coronary heart disease and stroke (2019): epidemiological data for Austria<sup>1</sup>

	Coronary heart disease <sup>a</sup>	Stroke <sup>b</sup>
Number of people living with the disease (prevalence)	306,973	130,631
Number of new cases per year (incidence)	37,746	13,290
Deaths	18,087	5,374

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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Acute care continues to be prioritised over secondary prevention in national policy.

PROFESSOR ANDREAS ZIRLIK

**The apparent absence of national and regional policy and system improvement efforts is worrying, given the high rates of repeat events in both conditions.** Austria is lacking a dedicated formal policy addressing secondary prevention of heart attack and stroke.<sup>15</sup> There is no strategic heart health plan,<sup>16</sup> nor specific policy for the prevention or management of non-communicable diseases, which include heart attack and stroke.<sup>17</sup> Further, Austria's national health goals do not address secondary prevention in heart attack or stroke, and there are no national targets for the use of medications to prevent those illnesses.<sup>18</sup> In an effort to tackle the high mortality due to cardiovascular disease (CVD), in 2014 Austria's Ministry of Health released a report on the burden of CVD in the country.<sup>19</sup> Heart attack and stroke featured prominently in the report, but the issue of secondary prevention was not addressed.<sup>19</sup>

**A lack of non-acute data is constraining the regional development of policy covering post-acute care.** It is encouraging to see that the 2017 Austrian Structural Plan for Health<sup>28</sup> incorporates a Rehabilitation Plan<sup>9</sup> which sets out a phased rehabilitation model that includes long-term secondary prevention of CVD (see *Table 3*). However, while the Plan provides the framework for regional structural plans for healthcare, most of these still focus on acute inpatient care due to a lack of reliable performance data for other sectors, including post-acute and long-term care.<sup>20</sup>

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

	Heart attack	Stroke
<b>Key policies</b>	<p><b>The 2017 Austrian Structural Plan for Health</b> (Österreichischer Strukturplan Gesundheit 2017)<sup>28</sup> creates a vision for the development of the healthcare system. It includes a <b>Rehabilitation Plan 2016</b> (Rehabilitationsplan 2016)<sup>9</sup> which sets out a phased rehabilitation model. The model includes long-term secondary prevention, along with quality indicators for cardiovascular disease rehabilitation to facilitate standardised care.</p>	

**Previous national policy reforms introduced two instruments which showed early promise in facilitating integrated patient pathways for secondary prevention; however, their impact has not lived up to policymakers' expectations.** In 2005, disease management programmes (DMPs) were introduced to improve care coordination for people with chronic conditions.<sup>29</sup> This was alongside a Reformpool funding scheme, which united social health insurance and state government funds to enable the development of integrated care projects.<sup>29</sup> Despite showing early promise in facilitating integrated patient pathways for secondary prevention in heart attack,<sup>30</sup> these reforms are yet to meet the policymakers' expectations.<sup>29</sup> The development and uptake of DMPs has been slow, and it has been suggested that greater government support is needed to help organise these services.<sup>6</sup> The Reformpool has also failed to take off properly. In 2013, just 15.8% of its funds had been used,<sup>29</sup> and only three regions managed to develop extensive integrated stroke care pathways by 2019.<sup>13</sup>

**In heart attack, there are no comprehensive care pathways that address secondary prevention.** Austria lacks a national programme to standardise follow-up care for secondary prevention, likely contributing to the drop-off in care standards seen during patients' long-term management. In 2010, a DMP for post-heart attack patients was announced,<sup>30</sup> with the goal of creating a treatment pathway based on measures from the European guidelines.<sup>31</sup> However, we could find no evidence that the DMP has been implemented and the national experts we have interviewed are unaware of its existence.<sup>7,32</sup>

**Recent developments could lead to renewed interest in the use of the existing policy tools to improve stroke care and reduce repeat events.** In 2019, the Ministry of Health released a Quality Standard for Integrated Stroke Care (Qualitätsstandard Integrierte Versorgung Schlaganfall).<sup>28</sup> The Standard aims to aid the development of integrated and optimised patient pathways, which may renew interest in the provinces in the use of Reformpool funding. While its implementation by regional health systems is not legally required, the Ministry's declaration that it will assess implementation rates<sup>13</sup> is likely to facilitate uptake. DMPs have also been positioned by the Austrian Neurological Society and the Austrian Stroke Society as an integral part of modern stroke care focusing on secondary prevention<sup>6</sup> and clinical trials are underway to test new programmes in this area (see *Case study 1*, p. 25). If approved, reimbursement for the DMPs would be ensured, greatly facilitating their roll-out.<sup>15</sup>

## **Guidelines and clinical leadership**

**In heart attack, the Austrian Society of Cardiology is leading the efforts of clinical leadership on secondary prevention.** The Society has set up a Working Group for Outpatient Cardiological Prevention and Rehabilitation (AGAKAR),<sup>33</sup> which is developing joint Austrian–German cardiac rehabilitation guidelines.<sup>7</sup> The Society also endorses a range of clinical practice guidelines from the European Society of Cardiology (ESC), including those covering secondary prevention for heart attack.<sup>7</sup>

**Clinical leadership has also occurred around outpatient cardiac rehabilitation, though its national impact is limited by the current underuse of outpatient facilities.** AGAKAR has developed national guidelines for outpatient cardiac rehabilitation to improve and standardise care,<sup>34 35</sup> and established quality standards used to assess the majority of outpatient cardiac rehabilitation facilities.<sup>10</sup> However, the impact of this work is reduced by the fact that only 6% of cardiac rehabilitation occurs in this setting.<sup>10</sup>

**In stroke, the recent development of an Austrian model of integrated stroke care may drive future improvement efforts in secondary prevention.** The Quality Standard for Integrated Stroke Care,<sup>13</sup> released by the Ministry of Health in 2019, goes one step further than existing pathways by addressing secondary prevention after the rehabilitation phase. This may help to address the significant regional variation that currently exists in the availability of comprehensive stroke care pathways that cover secondary prevention. To date, such pathways exist in just three Austrian regions.<sup>13</sup> Their absence in most areas is likely contributing to poor referral rates to stroke rehabilitation, with around 60% of patients in stroke units not being referred.<sup>3</sup>

**Efforts are underway to standardise the use of follow-up appointments as part of the patient pathway in secondary prevention in stroke.** It has been reported that Austria’s stroke and neurological societies are currently in discussions with the Ministry of Health to secure reimbursement for the use of 3- and 12-month follow-up appointments with multidisciplinary teams.<sup>13</sup> These would allow a review of the use and effectiveness of therapies prescribed to reduce repeat events. The Ministry of Health is considering adding to its service catalogue (Medizinische Einzelleistung) a post-stroke DMP centred on three-month outpatient appointments that has been shown to significantly reduce the risk of repeat stroke or CVD (see *Case study 1*, p. 25). If approved, reimbursement for the DMP would be secured from 2021, facilitating its rollout and greatly contributing to the standardisation of post-stroke care. The DMP would also create a significant source of national data on post-acute risk factor control and target level achievement to help monitor and benchmark care.<sup>15</sup>

Furthermore, the Austrian Neurological Society and the Austrian Stroke Society have recently positioned DMPs as an integral part of modern stroke care to optimise secondary prevention.<sup>6</sup> Clinical efforts to address stroke recurrence have been further supported by the development of national stroke guidelines directly addressing secondary prevention (see *Table 4*).

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

Heart attack	Stroke
<p><b>European Society of Cardiology</b> cardiac guidelines, including those covering secondary prevention, are endorsed by the Austrian Society of Cardiology.<sup>7,33</sup></p>	<p><b>Outpatient cardiac rehabilitation: the Austrian model</b> (2012),<sup>34</sup> Working Group for Outpatient Cardiological Prevention and Rehabilitation (AGAKAR) national guidelines for outpatient cardiac rehabilitation.</p>
	<p><b>Quality Standard for Integrated Stroke Care</b> (2019)<sup>13</sup> is an Austrian model of integrated stroke care which includes secondary prevention during long-term care. Developed by the Ministry of Health.</p>
	<p><b>Position Paper – Update 2019</b><sup>36</sup> is an Austrian Stroke Society's update on the treatment of dyslipidaemia, including the use of statins for secondary prevention.</p>
	<p><b>Position Paper: Austrian Stroke Path</b> (2015),<sup>6</sup> a position paper from the Austrian Stroke Society and Austrian Neurological Society. It outlines the optimal stroke path, including secondary prevention.</p>
	<p><b>Acute Management and Secondary Prevention of Stroke</b> (2014),<sup>4</sup> clinical guidelines for clinicians with evidence-based recommendations.</p>

## Advocacy and awareness raising

**Advocacy around secondary prevention for heart attack and stroke appears to be relatively absent.** Public health campaigns are reported to have largely ignored CVD risk factor control, instead often focusing on raising awareness of cancer risk.<sup>32</sup> It has been suggested that there is a particular need for greater advocacy around blood lipids, such as cholesterol, to improve national understanding of this key risk factor.<sup>32</sup> The absence of concerted action to increase public and political awareness of secondary prevention is worrying, given the lack of national policy on these conditions and the gaps in health service provision, as discussed earlier.

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Most advocacy initiatives aim at primary prevention. There appears to be a real lack of dedicated secondary prevention initiatives.

DR PETER SIOSTRZONEK

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We have some stroke patient groups but they are not very well organised in Austria.

PROFESSOR STEFAN KIECHL

## Ensuring availability of comprehensive data

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We actually don't know how many reinfarctions [repeat events] we have and there are no data to show how many patients die in the first or second or third year after infarction. We have good data with acute percutaneous coronary intervention and exact numbers in the acute setting but after that there're no registers that cover these patients. If we had these data, we could demonstrate that secondary prevention is not as good as in other European countries... and then we could more easily discuss necessary changes with the national health authorities.

DR PETER SIOSTRZONEK

### **Mechanisms to support political accountability for the secondary prevention of heart attack and stroke are lacking in Austria, in contrast to many other European countries.**

In particular, a lack of nationally collected data is hampering the planning and performance assessment of service provision for secondary prevention in heart attack and stroke.

**In heart attack, oversight of the quality and effectiveness of secondary prevention measures is being limited by a lack of national data.** Critically, there is no national heart attack registry of post-acute care and no national data are being collected on the percentage of high-risk patients receiving drug therapy or counselling to prevent a heart attack.<sup>18</sup> While outpatient cardiac rehabilitation facilities accredited by AGAKAR are obliged to enter their care and outcomes data into the AGAKAR database,<sup>7,35</sup> only 6% of cardiac rehabilitation occurs in this setting.<sup>10</sup>

**Major initiatives have been introduced in the acute setting, and they could be expanded to incorporate secondary prevention.** One example is the Austrian Acute Percutaneous Coronary Intervention registry, which collects data on interventional reperfusion therapy in heart attack from 19 of the 25 percutaneous coronary intervention (PCI) centres. This includes some aspects relevant to secondary prevention, such as drug treatments.<sup>37</sup> The Austrian Society of Cardiology is reported to be applying to join the ESC's European Unified Registries On Heart care Evaluation And Randomized Trials (EuroHeart), which offers the potential to collect long-term follow-up data relevant to secondary prevention through a common IT- and dataset infrastructure.<sup>32 38</sup>

**In stroke, data gaps in the national stroke registry are impeding accountability and the benchmarking of services for secondary prevention.** While the Austrian Stroke Registry records the medications patients take to reduce repeat events, it does not record if this means patients are meeting guideline-recommended target levels, for example target low-density lipoprotein cholesterol (LDL-C).<sup>13</sup> In addition, while the registry collects data from each of Austria's 39 stroke units, including quality indicators for the secondary prevention of stroke and a 3-month follow-up,<sup>39</sup> only 5 units have achieved 90% documentation of outcome indicators.<sup>39</sup> This data gap restricts the registry's ability to enable a credible national assessment of service provision and performance for secondary prevention. It is compounded by the fact that the registry only covers stroke units, whereas around 34% of stroke patients are treated in other wards.<sup>21</sup>

For an overview of existing national-level registries of CVD care, see *Table 5*.

Table 5. Cardiovascular disease registries in Austria

Name	Description
<b>Working Group for Outpatient Cardiological Prevention and Rehabilitation (AGAKAR) database<sup>7</sup></b>	Collects patient care and outcome data for all outpatient rehabilitation facilities accredited by AGAKAR.
<b>Austrian Acute Percutaneous Coronary Intervention (PCI) registry<sup>37</sup></b>	Collects data from 19 PCI centres, including some aspects relevant to secondary prevention, such as medications.
<b>Austrian Stroke Registry<sup>39</sup></b>	Collects data from 39 stroke units, including quality indicators for secondary prevention.
<b>Vienna ST-Elevation Myocardial Infarction (STEMI) registry<sup>40</sup></b>	Collects data from acute services participating in the Vienna STEMI network, including short- and long-term all-cause mortality.

## Initiation of secondary prevention in the acute care setting

**Austria's in-hospital heart attack mortality rate still lags behind that in much of the EU, despite recent improvements achieved as a result of changes in acute treatment.** While regional ST-elevation myocardial infarction (STEMI) networks have brought areas of Austria in line with internationally accepted best practice,<sup>40 41</sup> significant variation in outcomes has been found between regions.<sup>42</sup> As a result, while Austria's in-hospital mortality rate for heart attack patients (standardised, aged 45+) dropped significantly between 2005 and 2015 (from 10.8 to 7.4 per 100 patients), it still remains significantly above the EU average of 6.8.<sup>26</sup>



**In stroke, and in direct contrast to heart attack, a greater proportion of patients in Austria are surviving the acute stage compared with many other EU countries.**

However, care gaps remain, with too few patients having access to stroke unit care and multidisciplinary rehabilitation therapies. Increased use of stroke units<sup>39</sup> has contributed to in-hospital mortality rate dropping to 6.8 per 100 stroke patients (standardised, aged 45+); for comparison, the EU average is 8.5.<sup>26</sup>

**The current supply of stroke units is not meeting demand.** As much as a third of stroke patients do not receive care in a stroke unit,<sup>21,43</sup> despite the fact that direct admission to a stroke unit is seen as the most important existing intervention for acute stroke.<sup>44</sup> Furthermore, inadequate access to multidisciplinary stroke rehabilitation therapies in Austrian hospitals has been reported.<sup>45</sup>

## Securing participation in structured secondary prevention programmes

**In heart attack, there appears to be an unmet need for cardiac rehabilitation in Austria.** Despite the proven efficacy of cardiac rehabilitation in preventing repeat events, a lack of facilities has resulted in an estimated annual unmet need of over 27,00 cardiac patients.<sup>8</sup> In 2013/2014, it was estimated that just 40.2% of patients who had had a heart attack received rehabilitation.<sup>9</sup> Cardiologists are reported to often show a reluctance to prescribe cardiac rehabilitation, which may be contributing to these low rates.<sup>7,32</sup> While the benefits of cardiac rehabilitation are often greater when it is initiated promptly,<sup>46</sup> the undersupply of appropriate facilities in Austria is resulting in patients having to wait an average of 36 days before commencing treatment.<sup>10</sup>

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While outpatient rehabilitation was set up more than a decade ago, there are still too few centres available across Austria.

DR PETER SIOSTRZONEK

**A major barrier to the provision of cardiac rehabilitation in Austria is the underdevelopment of the outpatient setting, although availability appears to be improving.** Of the estimated 17,000 patients that undergo cardiac rehabilitation each year, 94% are reported to be inpatients and only 6% are outpatients. This is drastically different to the majority of EU countries, where outpatient cardiac rehabilitation is standard.<sup>10</sup> One national expert has argued that expanding outpatient services is vital to improving uptake of cardiac rehabilitation among younger patients, as this group is often adverse to joining inpatient programmes.<sup>32</sup> Encouragingly, the number of outpatient rehabilitation clinics across Austria is increasing<sup>47 48</sup> as part of the aims of the national Rehabilitation Plan.<sup>9</sup>

**While too few patients receive cardiac rehabilitation in any form, recent data suggest that improvement efforts may be better directed towards cardiac rehabilitation starting immediately after the acute care.** Cardiac rehabilitation can be introduced in three phases. A recent clinical study in Austria found that phase III cardiac rehabilitation, which is initiated 6 to 12 months after the cardiac event, had very little effect on most outcomes for patients with uncontrolled risk factors.<sup>49</sup> This would suggest that improvement efforts may be better directed towards phase II services, which are initiated in the period immediately after acute care.

**Inadequate social security legislation around outpatient cardiac rehabilitation is restricting access to rehabilitation for heart attack patients and slowing the expansion of these services.** Currently, outpatient cardiac rehabilitation is not explicitly regulated by social security legislation and health insurance bodies provide this service on a voluntary basis.<sup>10 22</sup> Most patients therefore have to cover the full cost of their outpatient rehabilitation themselves, which is resulting in a minority of patients having access to these services even if they qualify.<sup>10</sup> This is slowing the expansion of outpatient facilities and their potential to fill the current gap in cardiac rehabilitation.<sup>10 22</sup> This financial barrier is evidenced by the high rates of out-of-pocket payments for outpatient rehabilitation. In 2015, 71% of the cost of inpatient rehabilitation (all forms) was covered by government/ compulsory financing schemes, while in outpatient settings only 42% of the cost was covered, with out-of-pocket payments playing a substantial role (56%).<sup>20</sup>

**Another obstacle to cardiac rehabilitation being taken up more widely is that patients are often not aware they are eligible for this form of treatment.** It has been suggested that referral to cardiac rehabilitation in Austria would be much higher if all cardiac rehabilitation centres and social insurance companies actively promoted this form of care to both patients and the medical professionals.<sup>7</sup>

**In stroke, despite the proven benefits of structured rehabilitation in preventing repeat events, too few patients are being referred to these services.** Analysis of 87,411 patients recorded in the Austrian Stroke Unit Registry between 2005 and 2016 found that only around 40% had been referred for cardiac rehabilitation.<sup>3</sup>

**The lack of rehabilitation referral is likely contributing to high rates of repeat events among stroke patients.** Each year, 20–25% of strokes in Austria are repeat events.<sup>3 4 14</sup> Worryingly, 6% of patients who have survived minor strokes have an ischaemic stroke in the first three months after discharge.<sup>50</sup>

**Stroke patients face significant geographic inequalities in access to rehabilitation services, with urban patients also facing an increased risk of repeat events.** In Austria, stroke patients living in rural areas are more likely to be referred to rehabilitation than their urban counterparts (41.1% vs. 38.1%).<sup>3</sup> Urban stroke patients are also significantly more likely to experience another stroke, with a relative difference between rural and urban areas of 19.91%.<sup>3</sup>

**In regions where the provision of structured rehabilitation services has increased, this was associated with established stroke pathways.** The Tyrol Stroke Pathway,<sup>51</sup> for example, has recently added outpatient rehabilitation to its services to help improve care and prevent repeat events. As a result, the proportion of stroke patients receiving rehabilitation is reported to have substantially increased.<sup>15</sup> Services are delivered through new networks of general practitioners (GPs), neurologists and therapists (see *Case study 2*, p. 25).<sup>14 45</sup>

**Encouragingly, innovative solutions that are being implemented may lead to future improvements in the availability and consistent application of structured interventions for secondary prevention of stroke.** Stroke DMPs are currently being tested which aim to reduce repeat events by addressing the gap between real-life risk factor management and guideline recommendations (see *Case study 1*).<sup>14</sup> Another area where innovation is occurring is telemedicine, used to provide post-clinic, home-based rehabilitation for stroke. REHA 2030, part of an EU-funded joint programme in Austria and Slovenia, is working to create a service model for home-based stroke rehabilitation to address the current undersupply of services.<sup>52</sup>

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

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We discharge patients from hospital with a therapeutic regime for risk factor control, along with an accompanying request that the primary care physician adjust the medication as necessary to achieve optimum control. Then in two years the patient comes back to hospital with another event and you see that they are on exactly the same medication, at exactly the same dosage.

DR ANDREAS ZIRLIK

**In heart attack, there is significant scope for the intensification of treatment to reduce repeat events during long-term management.** Similar to many other European countries, once patients in Austria have left acute care, the use of guideline-recommended medications is suboptimal, putting them at a greater risk of a repeat heart attack. The absence of a national programme to standardise follow-up care for secondary prevention is likely contributing to this drop in care standards.<sup>7</sup> Restricted access to specialist care

is also likely a factor, with a lack of outpatient cardiologists resulting in the long-term management of most patients being taken on by GPs and internists.<sup>32</sup> A registry of patients with CHD (53.3% heart attack) enrolled at 3 months after the initiating event found that the percentage of patients being treated with statins (89.3%), aspirin (86.6%) and beta-blockers (78.8%) did not meet guideline-recommended levels.<sup>12</sup> It is also worrying that use of these medications was found to deteriorate over time, declining by around 10% during the five-year period after the event.<sup>12</sup> This is putting patients at an ever-increasing risk of another heart attack. One way to address this may be through increasing the use of local healthcare networks, where acute cardiac centres meet with their referring physicians and facilitate the creation of shared protocols for optimum risk-factor control.<sup>32</sup>

**Cholesterol management needs to be better monitored, as too few heart attack patients are reaching optimum LDL-C levels.** Despite the fact that most heart attack patients are being prescribed statins as part of their long-term management, many are being put at risk of repeat events by poor medication management by healthcare professionals. The ESC's most recent guidelines on lipid control recommend new LDL-C cholesterol level targets, alongside a clear drug escalation scheme, to help ensure that the targets are reached. However, many GPs are reported to be sceptical about the new targets and instead adhere to the old guidelines.<sup>32</sup> A study of CAD patients found that while over 90% of Austrian patients were treated with some form of lipid-lowering medication, target LDL-C cholesterol levels were only achieved by 24.5%.<sup>12</sup> It has been suggested that the reasoning behind the new ESC guideline targets needs to be better translated to primary care physicians through educational efforts, such as national health professional symposia.<sup>32</sup>

**Currently, despite PCSK9 inhibitors being guideline recommended for secondary prevention, they are not reimbursed in Austria, which is likely restricting patient access.** The ESC has recently updated its guidelines to strongly recommend the use of PCSK9 inhibitors for secondary prevention in very-high risk patients who are not achieving their LDL-C goal on a maximum tolerated dose of statin and ezetimibe.<sup>53</sup> While Austrian social security legislation allows for the reimbursement of these medications, their initial prescription is currently restricted to endocrinologists in several defined centres, with cardiologists unable to prescribe them.<sup>54</sup> In effect, an additional step has been created in the patient pathway before patients are able to access these medications. It has been argued that the current reimbursement policy has been primarily implemented as a cost-containment measure. Despite conversations with both the government and insurance bodies on this issue, the policy is unlikely to change without a price reduction of the drugs.<sup>7</sup>

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Cardiologists are restricted in terms of the risk-reducing medication they can prescribe and this presents a problem.

DR PETER SIOSTRZONEK

**Reimbursement issues are also likely affecting the provision of specialist follow-up care for secondary prevention.** Financial incentives for cardiologists are solely linked to the provision of invasive treatments, such as PCIs, with no incentives for the provision of comprehensive follow-up care, for example for meeting targets around risk-factor control.<sup>32</sup>

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As long as cardiologists earn their money by implanting the valve and there are no financial incentives to conduct follow-up appointments, then it's easy for them to just leave follow-up care to the primary care physician.

PROFESSOR ANDREAS ZIRLIK

**Greater emphasis is needed on patient education around behavioural risk factors.**

Too many patients are continuing their unhealthy behaviours after experiencing a heart attack, despite their actions putting them at an increased risk of a repeat event.<sup>12</sup> Specialist nurses could play a greater role in supporting educational efforts for secondary prevention, relieving the pressure on GPs and outpatient cardiologists.<sup>7</sup> Over a five-year period of the CAD study, it was found that the majority of patients did not achieve their recommended goals for behavioural risk factors.<sup>12</sup> Of the 13.2% of patients who were smokers at baseline, nearly 60% were still smoking after five years, and there was virtually no change in the percentage of patients who were overweight or obese at the start of the study (77.1%) compared with five years later.<sup>12</sup>

**In particular, weight loss among younger adults needs to be addressed with targeted efforts.** A study of younger heart attack patients found that 17% experienced a repeat heart attack during a median follow-up period of just over ten years.<sup>5</sup> Significantly, these patients had a considerably higher body mass index than patients who did not experience a repeat event.<sup>5</sup>

**In stroke, the available data suggest that there is significant scope for the intensification of treatment to reduce secondary events in the post-acute stage.**

A German/Austrian multicentre analysis of stroke secondary prevention treatment goals for patients with type 2 diabetes found that only 65.8% of patients were treated with any form of antihypertensive medication.<sup>23</sup> Statins and angiotensin-converting-enzyme (ACE) inhibitors were each used in under 40% of patients. Another Austrian study found that 79.5% of all stroke and transient ischaemic attack (TIA) patients had at least one inadequately treated risk condition (95.1% when lifestyle risk behaviours were included), with risk factor control even poorer among patients with repeat stroke.<sup>55</sup>

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Secondary prevention of stroke in the acute stage is at high standard, whereas post-discharge treatment is very heterogenous. Many patients will not receive the right treatment or will stop medication and hence not achieve treatment target levels.

PROFESSOR STEFAN KIECHL

**Worryingly, patients face substantial gender inequalities in how medications for secondary prevention are prescribed.** While statins are guideline recommended for the prevention of repeat strokes, women are less likely to receive this therapy than men three months after stroke.<sup>56</sup> Women also appear to be less likely to receive oral anticoagulants, with research showing that while women were found to have a greater need for this therapy than men, there was no difference in the use of oral anticoagulants between the two groups.<sup>56</sup>

**Similar to heart attack, greater emphasis is needed on cholesterol management post-stroke, as too few patients are reaching optimum LDL-C levels.** In patients prescribed statins as part of their long-term treatment, poor medication management by healthcare professionals is increasing the likelihood of repeat events. The German/Austrian study cited earlier found that only 49.8% of statin-treated patients reached the target value for LDL-C.<sup>23</sup>



# CASE STUDIES

1.

## **STROKE-CARD – a disease management programme to reduce the risk of repeat events**

Initiated in 2014, STROKE-CARD<sup>14</sup> is the first post-stroke disease management programme (DMP) developed in Austria. It aims to reduce the percentage of patients who experience repeat events by addressing the gap between real-life risk factor management and the recommendations of international guidelines. The Ministry of Health is considering an application to include the DMP in its service catalogue (Medizinische Einzelleistung). If successful, this would secure reimbursement for the DMP from 2021 onwards.<sup>15</sup>

In addition to usual care, patients receive a three-month outpatient appointment where their risk factors are re-assessed by a multidisciplinary team. A medical report is sent to each person's GP with detailed instructions on how to optimise secondary prevention efforts, including the refinement of rehabilitation and treatment goals. Additional 6-month and 9-month appointments are arranged where needed. Patients are also given access to an interactive, web-based patient portal called 'My Strokecard', which includes a tool to allow them to monitor their own risk factors. The tool automatically generates feedback on whether targets have been achieved for both the patient and the GP.

2.

## **Tyrol Stroke Pathway – standardising a treatment pathway for secondary prevention**

Developed with Reformpool funding,<sup>57</sup> the Tyrol Stroke Pathway has created a structured rescue and treatment chain.<sup>51</sup> This has standardised the treatment pathway for stroke patients,<sup>57</sup> including secondary prevention. The pathway recently added outpatient rehabilitation to its services to help improve care in preventing recurrent events, with services delivered through new networks of GPs, neurologists and therapists.<sup>8</sup> Each patient is reported to receive regular assessments both in the acute hospital and during rehabilitation, with these data stored in a secure electronic platform.<sup>15</sup> Efforts are monitored using quality indicators, one of which is a 3-month review after hospital discharge to check that appropriate secondary prevention interventions are being implemented.<sup>8</sup>

By the end of 2017, outpatient rehabilitation had become a standard part of the pathway in the majority of counties in the Tyrol region.<sup>8</sup> National experts have reported that out-patient rehabilitation has now become the largest rehabilitation sector in Tyrol and the proportion of stroke patients who are receiving rehabilitation has substantially increased.<sup>15</sup> The quality indicators are measured and evaluated in a yearly report. Data do not yet appear to be available on outpatient rehabilitation services,<sup>8</sup> although significant improvements have been recorded during the acute stage.<sup>21</sup>

## OUTLOOK

Many heart attack and stroke patients in Austria face an unnecessarily high risk of repeat events and significant opportunities exist to improve patient outcomes.

The limited roll-out of existing medical models that can reduce repeat events has contributed to a lack of continuity of care after the acute stage. This has led to systemic gaps and inequalities in the availability of structured rehabilitation and long-term management for secondary prevention. The underuse of structured rehabilitation in particular represents a missed opportunity to improve care, with too few existing facilities and too few heart attack and stroke patients being referred. An opportunity to address this gap lies in the expansion of outpatient rehabilitation services, with significant clinical leadership already being shown in this sector. Significant opportunities also exist during long-term management, in particular the benefits that could be gained by bringing medication use in line with the most recent guidelines.

To take advantage of these opportunities, greater national and regional leadership on secondary prevention will likely be required, culminating in formal policy to direct the necessary system-wide changes. To ensure effective health service planning, national data on non-acute services are also needed.

Taking concerted action to address the gaps in secondary prevention of heart attack and stroke can significantly improve patient outcomes and reduce national healthcare spending associated with repeat events.

# 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:

Austrian Society of Cardiology (Österreichische Kardiologische Gesellschaft)

Austrian Stroke Society (Österreichische Schlaganfall-Gesellschaft)

Austrian Neurological Society (Österreichische Gesellschaft für Neurologie)

Working Group for Outpatient Cardiological Prevention and Rehabilitation (AGAKAR)

Journal of Cardiology – Austrian Journal of Cardiology (*Journal für Kardiologie*)

Neurological Journal (*Neurologisch – Österreichische Gesellschaft für Neurologie*)

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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