The Health Policy Partnership

Secondary prevention of

HEART ATTACK AND STROKE

Country profile for

Germany

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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 Germany.

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CONTENTS

EXECUTIVE SUMMARY

Heart attack and stroke are a significant societal concern in Germany. Heart attack is the most serious consequence of coronary heart disease (CHD). More than 3.6 million people are living with CHD and more than 1.3 million have survived a stroke.[1] Their prevalence is also on the rise.[2]

Heart attack and stroke are major cost drivers for German healthcare. Cerebrovascular disease (of which stroke is the most common condition), CHD and other cardiovascular diseases (CVDs) incur the greatest costs among all diseases in the German healthcare system, in 2015 amounting to more than €28 billion (including indirect costs).[3]

Heart attack and stroke patients are at an increased risk of repeat events, but much can be done to lessen this risk. This can be achieved through the appropriate application of measures for secondary prevention, such as structured rehabilitation and the continuing management of cardiovascular risk factors.

Standardised models of follow-up care have been shown to improve health outcomes for heart attack and stroke patients. In spite of this, their roll-out in heart attack care has been suboptimal.[4-6]

Gaps in standardised care are contributing to low availability of secondary prevention measures. In stroke, for example, the majority of stroke units are failing to regularly assess adherence to medications prescribed as part of secondary prevention after hospital discharge.[7]

While cardiac rehabilitation is recognised as a key aspect of follow-up care post-heart attack, its availability needs to be improved. A lack of cardiac rehabilitation centres in Germany has resulted in an estimated annual unmet need of around 286,000 cardiac patients.[8]

In stroke, while structured rehabilitation plays a key role in preventing repeat events, over half of patients have been found to miss out on this intervention during the immediate post-acute period. Furthermore, older age and female gender both negatively affect patients' access.[9]

Significant scope exists for the intensification of treatment to reduce repeat events during patients' long-term management in both heart attack and stroke. Only 24.1% of heart attack patients have been found to receive the guideline-recommended combination of medications one year after the event, with prescription rates steadily decreasing over time.[10] In stroke, evidence suggests that the main preventive medications are only prescribed in around 48–63% of cases.[11]

In heart attack, greater cooperation of general practitioners (GPs) and cardiologists may be needed to improve secondary prevention. Long-term post-heart attack survival has been found to be greatest when patients are receiving both cardiologist and GP care, rather than care from a single discipline.[12] Despite this, relatively few heart attack patients are seen by a cardiologist in an ambulatory (outpatient) setting within the first year (between 22.8%[10] and 51%[13]).

Substantial inequalities exist by location, gender, age and socioeconomic status in how heart attack patients experience care for secondary prevention. Age and gender, for example, appear to impact access to medications. A large-scale study has found that older patients and women were less likely to receive lipid-lowering medications during their follow-up care than younger patients and men.[14]

These gaps and inequalities suggest that greater national and state direction is needed to improve care for the secondary prevention of heart attack and stroke. Germany does not currently have specific targets for the secondary prevention of either condition in its national health policy. It is encouraging, however, that a national CVD strategy currently being developed looks likely to address secondary prevention.[15] There is also limited evidence to suggest that regional policy targets currently address secondary prevention in heart attack or stroke, which is worrying as health policy responsibilities lie predominately with state governments.

INTRODUCTION

In Germany, heart attack and stroke are a significant societal concern. Heart attack is the most serious consequence of coronary heart disease (CHD). Official data sources estimate that more than 3.6 million people are living with CHD and more than 1.3 million are living with the consequences of stroke – and these numbers are rising.[2]

Heart attack and stroke represent a significant cost to the public budget. The cost of CHD and cerebrovascular disease (of which stroke is the most common condition) to the German healthcare system amounts to €10.4 billion per year.[3] Of all diseases, CVD also incurs the greatest costs in the German healthcare system.[16]

At the national policy level, the secondary prevention of heart attack and stroke appears to receive limited strategic attention. Despite this, notable health insurers, professional associations and patient societies are working to advance follow-up care. Various clinical guidelines cover the secondary prevention of heart attack and stroke[17-20] and pilot projects to strengthen comprehensive long-term care have been running in some German regions.[21] However, significant gaps in the provision of secondary prevention are often due to a lack of structured models of follow-up care.[5 14 22] As a result, risk factors among heart attack or stroke patients are often not well controlled,[22 23] putting them at a higher risk of a further cardiovascular event.

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

CHD and cerebrovascular disease generate high costs to Germany's society and economy. Of all diseases, stroke, heart attack and other CVDs incur the greatest costs.[16] In 2015, direct costs (i.e. healthcare expenditure, including inpatient and outpatient care) and indirect costs (i.e. informal care and lost productivity) for all CVD amounted to more than €28 billion; CHD accounts for more than half of these costs (*see Table 1*).[3] In the case of stroke, spending on acute care, rehabilitation and follow-up is among the highest in the German healthcare system.[5]

Table 1. Coronary heart disease and cerebrovascular disease: direct and indirect costs to society in 2015[3]

	Direct cost	Indirect cost			Total
	Healthcare costs	Productivity losses due to mortality	Productivity losses due to illness	Informal care	
Coronary heart disease	€4,776,122	€3,692,822	€1,990,291	€5,282,605	€15,741,840
Cerebrovascular disease	€5,651,062	€1,207,034	€1,017,903	€4,959,773	€12,835,772
Combined cost	€10,427,184	€4,899,856	€3,008,194	€10,242,378	€28,577,612

Cost in thousands per year.

Note that as this country profile is part of a series of 11 European country profiles, a 2015 European statistic was used to ensure comparability across countries. More recent data for Germany are available, however, from the Federal office of Statistics.

Epidemiology

CHD and stroke are the two leading causes of death in Germany, being responsible for over 260,000 deaths each year. CHD is the leading cause of death by a large margin, with more than one in ten deaths attributable to the disease, while stroke is the second-leading cause.[24] Almost 459,000 cases of CHD, including heart attack, and almost 136,000 strokes occur in Germany each year. Every year, around 184,000 people die as a result of CHD and almost 72,000 die as a result of stroke (*see Table 2*).[1] The mortality rate for CHD and the incidence rate for stroke are higher in Germany than in many other western European countries, including France, Italy and Spain.[2]

The number of people who have had a heart attack or stroke is growing. This can partly be explained by demographic change, described as one of the biggest challenges to the German healthcare system.[16] It is associated with an increased demand on the healthcare system to manage these people effectively over the long term.

Table 2. Coronary heart disease and stroke: epidemiological data for Germany (2019)[1]

	Coronary heart disease[a]	Stroke[b]
Number of people living with the disease (prevalence)	3,646,985	1,317,687
Number of new cases per year (incidence)	458,738	135,705
Deaths	184,322	71,654

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

Germany does not currently have specific targets for heart attack or stroke in the national health policy; however, a national CVD strategy is being developed which looks likely to prioritise secondary prevention. A recommendation paper was released in early 2020 which will form the basis of the national cardiovascular strategy (see *Table 3*).[15] Based on input from an expert group representing the government, health professionals, health insurance companies and industry, the paper recommends that effective secondary prevention should be a health priority. Other topics include improving care continuity across the entire patient pathway, increasing patients' health literacy and ability to self-manage, and expanding data collection related to quality of care.[15] It remains to be seen whether adequate investment will back implementation of the strategy's priorities and ensure that it has an impact on clinical practice and patient outcomes.[25]

> A significant discrepancy exists between policy-level acknowledgement of the importance of prevention, and its implementation and reimbursement in clinical practice.
>
> PROFESSOR BERNHARD SCHWAAB

Despite the significant burden that heart attack and stroke place on the healthcare system, other disease areas have received more strategic attention at a national policy level. The German Ministry of Health, for example, launched the National Cancer Plan in 2011, which includes specific targets for areas such as prevention, patient-centred and coordinated care, and monitoring of care and outcomes.[26] Furthermore, unlike

type 2 diabetes and breast cancer, neither CHD nor cerebrovascular disease is mentioned in the national 'health targets', recommendations developed by the Association for Social Security Policy and Research (Gesellschaft für Versicherungswissenschaft und Gestaltung).[27]

Local initiatives to improve secondary prevention have emerged at the regional level. In Schleswig-Holstein, for example, the Working Committee Heart and Circulation (LAG) has launched several initiatives focused on training courses, CVD patient education and running peer-support groups.[28]

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

	Heart attack	Stroke
Key policies	No CVD or heart attack/stroke-specific policy could be found. A national CVD strategy is under development and looks likely to prioritise secondary prevention.[15]	

Guidelines and clinical leadership

Endorsement of clinical guidelines varies among cardiac professionals, potentially complicating care provision for secondary prevention along the patient pathway. The German Medical Association publishes national guidelines for the management of CHD, including recommendations for risk-factor control,[17] and the German Cardiac Society endorses the CVD prevention guidelines published by the European Society of Cardiology (ESC).[29 30] Health professional organisations have also developed specific guidelines for post-acute management of heart attack patients. CVD rehabilitation guidelines from the German Society for the Prevention and Rehabilitation of Cardiovascular Diseases (DGPR) cover risk-factor management, and recommend telerehabilitation as an alternative to ambulatory (outpatient) cardiac rehabilitation and long-term management.[20] Finally, the Institute for Quality and Efficiency in Health Care (IQWiG) is currently preparing guidelines for disease management programmes for CHD patients.[18]

Similarly, different clinical guidelines covering secondary prevention of stroke are endorsed by different health professional groups, potentially complicating the delivery of care. Guidelines for the secondary prevention of ischaemic strokes and transient ischemic attacks (TIAs) were published by the German Neurological Society and the German Stroke Foundation in 2015. They contain recommendations about the pharmacological element of the secondary prevention of stroke.[19] Current guidelines do not discuss lifestyle modification and long-term risk-factor control,[31] but work is in progress to update them.[32] General practitioners (GPs) have their own guidelines for

stroke care, which include secondary prevention.[34] These are reported to be more conservative in their recommendations for risk-factor control,[33 34] which may add to the challenge of fragmented care in Germany. *Table 4* outlines key guidelines that are used for cardiovascular secondary prevention in Germany.

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

Heart attack	Stroke
National guidelines for the management of chronic CHD[17] (2019) include recommendations for risk-factor management	**National Disease Management Guidelines (S3) Secondary prevention of ischaemic strokes and TIAs[19] (2015)**
German guidelines for the rehabilitation of patients with cardiovascular disease[20] (2020) include guidance on structured programmes and risk-factor management	**German College of General Practitioners and Family Physicians' guidelines for stroke[34] (2020)**
Synopsis of guidelines for the disease management programme for CHD[18] (2017)	
The German Cardiac Society endorses ESC clinical guidelines, which place greater emphasis on management of key risk factors to reduce repeat events: • diabetes, pre-diabetes and cardiovascular disease • dyslipidaemias • arterial hypertension[30]	
German College of General Practitioners and Family Physicians' primary care risk advice on cardiovascular prevention[35] (2017)	

Advocacy and awareness raising

In a climate of limited national-level policy initiatives in heart attack and stroke prevention, patient organisations and professional societies are looking to address this gap and support a range of preventive activities.

In CHD, the DGPR has set up 'heart groups' across the country to improve long-term management for CHD patients (see *Case study 1*).[36] These are run with the German Heart Foundation, which also provides extensive information for patients about living with CHD.[37]

In stroke, the German Stroke Foundation provides information and advice to patients and has set up peer-support groups across the country. It has also been leading in developing a new model of care for stroke patients based on quality-assured case management, seen as an important step towards improving patients' long-term management for secondary prevention (see *Case study 2*).[21 38]

> There is a lack of awareness at all levels of society of the importance of CVD prevention, from your neighbour next door to the politicians.
>
> PROFESSOR BERNHARD SCHWAAB

Ensuring availability of comprehensive data

For CHD, a number of registries aim to monitor incidence and evaluate care for patients, with some data collected relevant to secondary prevention. The ACOS (Acute Coronary Syndromes) registry, established in 2000, collects and analyses data on acute care, progression of disease, pharmacotherapy for secondary prevention at discharge and events from one year onwards after a heart attack (see *Table 5* for details).[39] The more recent ALKK-PCI is a multicentre registry for quality control, established by ALKK, a working group of senior hospital cardiologists.[40] Next is 'TROL', a large-scale prospective registry set up in 2003 under the auspices of the DGPR.[41] It has achieved good coverage, with many cardiac rehabilitation centres across the country participating.[42] Furthermore, the German pension insurance collects data on rehabilitation, including for CHD and cerebrovascular disease.[43]

In stroke, the German Neurological Society aims to establish nationwide quality indicators with the German Stroke Registries Working Group; however, data relevant to secondary prevention are limited. Certified stroke units are required to enter patient data into a quality registry, which includes some indicators relevant to secondary prevention; however, this only covers acute care.[33] While some data from regional registries are collated to evaluate variations in treatment,[44] quality indicators to evaluate structure, processes and outcomes of care provision do not appear to be routinely assessed. Fragmented care pathways, with different health specialists being responsible for secondary prevention, hamper data collection. Furthermore, as there is no structured secondary prevention programme in which patients could be registered, their data may not be routinely collected.[11]

Table 5. CVD registries in Germany

Registry	Description
ACOS (Acute Coronary Syndromes) registry[39]	Focuses on acute care, disease progression, pharmacotherapy at discharge and events one year and onwards after a heart attack. Records current treatment of acute coronary syndromes. Participating hospitals are located throughout Germany and include university and community hospitals as well as tertiary care centres.[39]
ALKK-PCI registry (Working Group of Senior Hospital Cardiologists – Percutaneous Coronary Intervention)[40]	Multicentre registry for quality control in hospitals across the country, established by a working group of senior hospital cardiologists (Arbeitsgemeinschaft Leitende Kardiologische Krankenhausarzte, ALKK).
TROL (Transparency Registry to Objectify Guideline-Oriented Risk Factor Management)[42]	Set up in 2003 by the German Society for the Prevention and Rehabilitation of Cardiovascular Diseases.
Stroke treatment variations in Germany – Working Group of German Stroke Registries (ADSR)[44]	More than 300 clinics participate in this project by the ADSR, where data from regional registries are analysed to evaluate acute care provision and early outcomes for patients.

Initiation of secondary prevention in the acute care setting

In both heart attack and stroke, the availability of specialist care has increased, leading to a reduction of in-hospital mortality rates for both conditions. The importance of specialist acute care lies not just in the provision of interventions to stabilise patients, but also in its role as the setting in which secondary prevention efforts should commence.

Germany still lags behind other European countries in terms of mortality post-heart attack, despite promising improvements in acute care. Reductions in in-hospital mortality in recent years have arisen in the main due to improved treatments and the formalisation of 'heart attack networks', established in 2014, supported by a position paper from the German Cardiac Society.[45] The networks aim to foster widespread implementation of structured and coordinated care with the participation of all service providers.[45] Despite these efforts, the mortality rate for CHD is still higher in Germany than in many other western European countries including France, Italy and Spain.[2]

In stroke, and in direct contrast to heart attack, a greater proportion of patients are surviving the acute stage in Germany than in many other countries in the European Union. This can be attributed to Germany having a well-functioning network of hospital stroke units that enable rapid assessment and care in stroke. With 300 certified stroke units across the country, Germany has almost full coverage of units offering multidisciplinary specialist care.[46] Secondary prevention is reported to be streamlined in stroke units, with each patient receiving a treatment plan that defines their individualised strategy for secondary prevention and what form of immediate follow-up care they should receive after discharge.[33]

Nevertheless, gaps in appropriate follow-up care by stroke units impede prevention of repeat events. A survey of 154 stroke unit leads found that the majority of units did not regularly assess post-discharge adherence to medications,[7] a situation potentially exacerbated by a lack of outpatient facilities in many acute care hospitals.[33]

Securing participation in structured secondary prevention programmes

Hospitals are legally obliged to ensure effective discharge management to support transition to follow-up care post-heart attack and stroke. From 2017, hospitals are required to create discharge plans for all patients, including a needs assessment, adequate follow-up medication and referral to long-term care,[47] which they are obliged to facilitate. This is done, for example, by putting each patient in touch with the relevant rehabilitation facility. To ensure rehabilitative and health-promoting aftercare in the post-acute phase, German law also guarantees comprehensive cardiac rehabilitation to all patients who have survived a heart attack.[20]

Cardiac rehabilitation is well established as an element of cardiac care emphasising lifestyle changes, psychological support and recovery. The majority of programmes are offered in an in-patient setting, but the availability of outpatient and remote services is growing: 10% of patients under 65 and 5% of patients over 65 now choose those services. One of the key goals of cardiac rehabilitation is to support people in regaining their independence and productivity after a heart attack. Therefore, the initial cardiac rehabilitation programme is followed on by programmes that focus, for example, on occupational fitness or intensive rehabilitation.[48]

Despite guaranteed access, many heart attack patients are missing out on cardiac rehabilitation, as there are too few centres to meet demand. This has resulted in an estimated annual unmet need of over 286,000 cardiac patients,[8] with evidence suggesting that only about half of CHD patients participate in cardiac rehabilitation.[42 49] It has been noted that referral and uptake rates are also being impacted by a lack of awareness of the benefits of cardiac rehabilitation among both acute care cardiologists and patients.[25]

When cardiac rehabilitation is initiated, patients increasingly have a choice between inpatient, outpatient and remote programmes. Cardiac rehabilitation normally consists of a three-week-long 'Phase II' programme that covers risk-factor education, psychosocial support and physical activity sessions. It has historically been offered in an inpatient setting, but is increasingly being supplemented by outpatient and remote programmes to provide more flexible options.[20]

> The biggest problem in stroke secondary prevention is the patients who are getting "lost" after leaving acute care – none of the conditions that lead to a repeat stroke hurt, so patients don't have an impulse to go to the doctor.
>
> PROFESSOR MATTHIAS ENDRES

In stroke, while comprehensive structured rehabilitation is available after the acute stage, it is worrying that almost half of patients miss out on this important intervention. A large-scale study of data from the Stroke Register Northwest Germany (2010–2011) found that just four out of ten stroke patients received rehabilitation in the immediate post-acute period.[9] It is of concern that older age and female gender were both found to negatively influence a person's likelihood of receiving rehabilitation.[9] When inpatient stroke rehabilitation is delivered, it is reported to include a variety of therapies and psychological support, and typically lasts for four weeks.[33]

Increasing primary care capacity for long-term risk management

> We need well-regulated and defined cardiovascular aftercare, just as you have clear, structured aftercare for cancer patients. It cannot be left to chance or arbitrariness whether a patient is referred to cardiac rehabilitation or receives appropriate follow-up care.
>
> PROFESSOR BERNHARD SCHWAAB

Comprehensive care pathways for heart attack and stroke which optimise follow-up care for secondary prevention do not seem to be fully implemented. There are substantial and well-evidenced gaps in follow-up care, long-term care and risk-factor control.[5 50] A strong separation between outpatient and hospital care, as well as between primary and specialist care, has been noted by experts,[51] with Germany lacking national guidelines for discharge management until 2017.[52] This divide is evident, for instance, in the management of dyslipidaemias (abnormal cholesterol levels), with more aggressive targets for lipid control in the hospital setting than in primary care.[48]

In heart attack, significant scope exists for the intensification of treatment to reduce repeat events during patients' long-term management and redress gender and age inequalities. Similar to many other European countries, once patients in Germany have left acute care, guideline-recommended medications are under-prescribed, putting patients at a greater risk of a repeat event. Only 19.6% of heart attack patients have been found to receive the guideline-recommended combination of beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, statins and antiplatelet medication one year after the event, with prescription rates steadily decreasing over time.[10] Inequalities also exist, with studies noting considerable variation in statin prescription rates for heart attack patients between hospitals as well as between individual physicians.[12] Older patients and women are also less likely to receive lipid-lowering medications during follow-up care than younger patients and men.[14]

When medications are prescribed, it is worrying that many CHD patients stop taking them, thus increasing their risk of recurrent events. A study of CHD patients in the Saxony-Anhalt state, for example, found that adherence to cholesterol-lowering medications fell by 15.7% for statins and 46.6% for ezetimibe after 12 months, with low adherence associated with an increased risk of mortality.[53]

Broadly, risk-factor control for CHD patients still falls below guideline-recommended targets. For example, data from a cross-sectional study in an ambulatory setting showed that guideline-recommended low-density lipoprotein (LDL) cholesterol targets were only achieved in 9.3% of patients with CHD.[54] This failure to support and achieve risk-factor control in the long term has been highlighted repeatedly.[23]

> Reimbursement for the delivery of care does not support the use of preventive measures. Using tools and devices for diagnostics is highly incentivised, but giving advice and education on lifestyle change is not.
>
> PROFESSOR BERNHARD SCHWAAB

The introduction of a CHD disease management programme (DMP) has led to improvements in secondary prevention during patients' long-term care; however, uptake of the programme appears to be suboptimal. Initiated by the Federal Joint Committee (G-BA), the DMP is available for all people eligible under statutory health insurance (majority of the population) and who have CHD, but physician participation and patient enrolment are voluntary.[55] Participants can choose a physician, usually their GP, to coordinate their long-term care, organise regular follow-up and provide support. While an ongoing evaluation suggests DMPs have a positive impact on use of guideline-recommended medication and lead to a reduction in mortality and cost,[4] an ESC survey reports that only 25–50% of participants in cardiac rehabilitation programmes afterwards attend some sort of structured long-term programme.[56] Inequalities in access have also been observed, with women less likely than men to be enrolled.[57] Furthermore, current reimbursement structures may present a disincentive for GPs to implement secondary prevention: unlike countries such as the UK, German GPs have a restricted budget per patient and face penalty payments if they exceed it.[23]

Additionally, insufficient knowledge of current guidelines among healthcare professionals may present a barrier to achieving optimal long-term management for heart attack patients. In particular, GPs may not be adequately prepared to manage their patients' risk factors in the long term to prevent repeat events. A survey of GPs in the Münster region found that almost one third were not aware of current guidelines for secondary prevention, but those who were aware were significantly more likely to prescribe risk-reducing medication.[58] Furthermore, misconceptions among physicians regarding potential side effects may result in reluctance to prescribe certain medications for their CHD patients.[59] To address the gaps in knowledge among physicians, the German Cardiac Society has developed a qualification in 'special cardiovascular prevention' for physicians and aims to support them in implementing cardiovascular disease prevention in practice.[48]

Greater cooperation between GPs and ambulatory care cardiologists may be needed during patients' long-term care. Long-term survival of heart attack patients has been found to be greatest when they were receiving both cardiologist and GP care, rather than care from a single discipline.[12] However, of the 158,494 patients with a new diagnosis of heart attack who received post-heart attack ambulatory care in 2011, only 51% saw a cardiologist within the first year.[13] A further study looking at data from 2013/2014 found the rate to be even lower at just 22.8%.[10]

> We have an issue of continuous care when it comes to the long-term care of stroke patients – once released from hospital, patients are given clear recommendations for secondary prevention, then they may go for rehabilitation but then it's unclear how exactly medical treatment is continued.
>
> PROFESSOR MATTHIAS ENDRES

In stroke, there appear to be significant gaps in long-term secondary prevention due to a lack of clearly defined follow-up care and structured programmes. Gaps in care provision have been noted at the intersection of acute, post-acute and follow-up care,[38] meaning that many patients may not be seen by a neurologist or GP on a regular basis. The lack of appropriate follow-up care means that patients often lack support to optimise and adhere to their medications and to maintain a healthy lifestyle,[6] with national experts calling for greater patient education around these issues.[33] The German Stroke Foundation has called for stroke coordinators to be integrated into the health system to support every stroke patient for at least one year after the event.[6]

The long-term management of patients for the secondary prevention of stroke typically falls within the remit of primary care. GPs are responsible for prescribing risk-factor control medication and take up a coordinator role in patient care. They should be supported by neurologists and cardiologists for treatment of patients beyond day-to-day management.[11] Specialist nurses can also play a significant role. In regions where stroke nurses are involved in follow-up care, the risk of stroke recurrence has been reduced.[5]

However, primary care does not appear to be fully prepared to take on this role, with prescription rates for risk-factor controlling medication in stroke patients falling short of guideline recommendations. Evidence suggests that the main medications are only prescribed in around 48–63% of cases during the first year after stroke[11] and health professionals in follow-up care comply with indications provided at discharge in only half of the cases.[60] While it has been noted that multidisciplinary care is needed to respond to the specific needs of post-stroke patients, rather than the burden falling fully on primary care, neurologists are reported to be rarely involved in stroke patients' long-term management.[33 61]

> To ensure that secondary prevention is taken seriously, you need to have disease management programmes where patients are followed up for 5 years and are required to see a doctor at least twice a year.
>
> PROFESSOR MATTHIAS ENDRES

The lack of a dedicated stroke DMP is acting as a significant barrier to improving care for secondary prevention. The absence of a stroke DMP means that hospitals and primary care physicians are unable to offer stroke patients intensive monitoring of cardiovascular risk factors to reduce the risk of repeat events.[62] An encouraging development is that several studies and projects are underway to generate evidence to support the implementation of long-term DMPs for stroke patients. This includes the ongoing multicentre trial for intensified secondary prevention initiated by the Center for Stroke Research Berlin,[62] and pilot projects working with stroke case managers to coordinate care and support patients (*see Case study 2*).[21 38]

CASE STUDIES

1. Heart groups

The German Society for the Prevention and Rehabilitation of Cardiovascular Diseases (DGPR) has set-up around 8,800 heart groups where cardiac patients receive ongoing education and support to prevent repeat events.

Each group is medically supervised by a doctor who is reported to be responsible for adapting each patient's medication for risk-factor control.[25] Groups have a maximum of 20 participants and meet at least once a week for physical activity, relaxation techniques, advice on maintaining a healthy diet and support to stop smoking.[63] Attendance is reported to be covered by insurance for the first two years after the acute event, then reimbursement is decided on a case-by-case basis.[25] Participants have reported high levels of satisfaction with the service.[64]

2. STROKE OWL – Stroke guides for Ostwestfalen-Lippe

STROKE OWL aims to improve the quality of life for stroke patients and reduce the risk of a further event by following a case management approach.[21] The pilot project was initiated in 2017 by the German Stroke Foundation in the region of Westphalia-Lippe, and its effectiveness will be evaluated against standard care. The project can support up to 2,000 patients.

People who have had a stroke are assigned a guide who devises a care plan, coordinates follow-up care and helps them access the appropriate care and resources. The guides usually have a nursing or therapeutic background and have been trained in case management. Over the course of the first year after the event, the guide is also responsible for supporting the person in controlling their risk factors, including adhering to pharmacological treatment and motivating them to make lifestyle changes. With their remit, the guides are intended to support and complement the GPs' management of stroke patients.

OUTLOOK

In Germany, the underuse of standardised models of follow-up care has contributed to inequalities in the availability of secondary prevention measures, putting heart attack and stroke patients at an unacceptable risk of repeat events. Significant opportunities exist to improve patient outcomes by addressing these gaps.

Increasing access to structured rehabilitation is a major opportunity, as many heart attack and stroke patients currently miss out on these vital services. Significant opportunities also exist during patients' long-term management, in particular the benefits that could be gained by bringing medication use for heart attack and stroke risk-factor control in line with European guidelines. Further improvements could also be achieved by increasing multidisciplinary working during a person's long-term care, with outcomes post-heart attack found to improve when both cardiologists and GPs are involved in a person's ongoing care.

To take advantage of these opportunities, both national and state leadership is needed. It is encouraging that the new national CVD strategy, currently in development, looks likely to address secondary prevention. The next step is to set specific targets for secondary prevention in heart attack and stroke. This would encourage the development of state policy and in turn address the significant differences in care standards that exist between the states.

With concerted action to address the gaps in care for secondary prevention in heart attack and stroke, it is likely that patient outcomes can be significantly improved, bringing with it a reduction to national health expenditure.

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:

Health targets (Gesundheitsziele.de)
Association for Social Security Policy and Research (Gesellschaft für Versicherungswissenschaft und Gestaltung EV, GVG)
Federal Joint Committee (Gemeinsamer Bundesausschuss, G-BA)
German Medical Association (Bundesärztekammer)
German Cardiac Society (Deutsche Gesellschaft für Kardiologie)
Institute for Quality and Efficiency in Health Care (Institut für Qualität und Wirtschaftlichkeit im Gesundheitswesen, IQWiG)
German Society for the Prevention and Rehabilitation of Cardiovascular Diseases (Deutsche Gesellschaft für Prävention und Rehabilitation von Herz-Kreislauferkrankungen, DGPR)
German Neurological Society (Deutsche Gesellschaft für Neurologie)
German Stroke Foundation (Stiftung Deutsche Schlaganfall-Hilfe)
German Heart Foundation (Deutsche Herzstiftung)
National Association of the Statutory Health Insurance and Long-Term Care Insurance Funds (Spitzenverband Bund der Krankenkassen, GKV)
Heart groups (Herzgruppen der DGPR)
Working Group of Senior Hospital Cardiologists (Arbeitsgemeinschaft Leitende Kardiologische Krankenhausärzte, ALKK)

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

REFERENCES

1. Global Burden of Disease Collaborative Network. 2019. Global Burden of Disease Results Tool. Available from: http://ghdx.healthdata.org/gbd-results-tool [Accessed 09/11/20]
2. Global Burden of Disease Collaborative Network. 2019. Global Burden of Disease Results Tool. Prevalence 2016 and 2019. Available from: http://ghdx.healthdata.org/gbd-results-tool [Accessed 06/11/20]
3. Wilkins E, Wilson L, Wickramasinghe K, *et al*. 2017. European Cardiovascular Disease Statistics 2017. Brussels: European Heart Network
4. Schulte T, Mund M, Hofmann L, *et al*. 2016. Pilotstudie zur Evaluation des DMP Koronare Herzkrankheit – Entwicklung einer Methodik und erste Ergebnisse. Z Evid Fortbild Qual Gesundhwes 110-111: 54-59
5. Hempler I, Woitha K, Thielhorn U, *et al*. 2018. Post-stroke care after medical rehabilitation in Germany: a systematic literature review of the current provision of stroke patients. BMC Health Serv Res 18(1): 468
6. Stroke Alliance for Europe. Stroke Survivors' needs in Germany: There is no structured, standardised care management for stroke-patients when they return home. Available from: https://www.safestroke.eu/2019/05/10/stroke-survivors-needs-in-germany-there- is-no-structured-standardised-care-management-for-stroke-patients-when- they-return-home/ [Accessed 19/02/20]
7. Wutzler A, Krogias C, Grau A, *et al*. 2019. Stroke prevention in patients with acute ischemic stroke and atrial fibrillation in Germany - a cross sectional survey. BMC Neurol 19(1): 25-25
8. Abreu A, Pesah E, Supervia M, *et al*. 2019. Cardiac rehabilitation availability and delivery in Europe: How does it differ by region and compare with other high-income countries? Eur J Prev Cardiol 26(11): 1131-46
9. Unrath M, Kalic M, Berger K. 2013. Who receives rehabilitation after stroke?: Data from the quality assurance project "Stroke Register Northwest Germany". Dtsch Arztebl Int 110(7): 101-7
10. Ulrich R, Pischon T, Robra B-P, *et al*. 2020. Health care utilisation and medication one year after myocardial infarction in Germany – a claims data analysis. Int J Cardiol 300: 20-26
11. AQUA – Institut für angewandte Qualitätsförderung und Forschung im Gesundheitswesen GmbH. 2014. Versorgungsqualität bei Schlaganfall Konzeptskizze für ein Qualitätssicherungsverfahren. Goettingen: AQUA
12. Schang L, Koller D, Franke S, *et al*. 2019. Exploring the role of hospitals and office-based physicians in timely provision of statins following acute myocardial infarction: a secondary analysis of a nationwide cohort using cross-classified multilevel models. BMJ Open 9(10): e030272
13. Radzimanowski M, Gallowitz C, Müller-Nordhorn J, *et al*. 2018. Physician specialty and long-term survival after myocardial infarction — A study including all German statutory health insured patients. Int J Cardiol 251: 1-7

14. Huber CA, Meyer MR, Steffel J, *et al*. 2019. Post-myocardial Infarction (MI) Care: Medication Adherence for Secondary Prevention After MI in a Large Real-world Population. Clin Ther 41(1): 107-17

15. Schmidtke C, Stamm-Fibich M, Irlstorfer M, *et al*. 2020. Vorarbeit zur Nationalen HerzKreislauf-Strategie. Handlungsempfehlungen aus den Sitzungen des Expertengesprächs Herz- Kreislauf-Erkrankungen. Berlin: BAG SELBSTHILFE

16. Robert Koch Institute. 2015. Health in Germany. Berlin: Robert Koch Institute

17. Programm für Nationale VersorgungsLeitlinien (NVL). Nationale Versorgungsleitlinien. Available from: https://www.leitlinien.de/nvl/khk [Accessed 03/09/20]

18. Institut für Qualität und Wirtschaftlichkeit im Gesundheitswesen (IQWiG). 2017. Leitliniensynopse für das DMP Koronare Herzkrankheit. Vorbericht (vorläufige Bewertung). Köln: IQWiG

19. Deutschen Gesellschaft für Neurologie (DGN), Deutschen Schlaganfall-Gesellschaft (DSG). 2015. Leitlinienreport S3 Letilinien "Sekundärprophylaxe ischämischer Schlaganfall und transitorische ischämische Attacke". Berlin: DGN & DSG

20. Deutsche Gesellschaft für Prävention und Rehabilitation von Herz- und Kreislauferkrankungen eVD. 2020. S3-Leitlinie zur kardiologischen Rehabilitation (LL-KardReha) im deutschsprachigen Raum Europas Deutschland, Österreich, Schweiz (D-A-CH). Koblenz: AWMF

21. Stiftung Deutsche Schlaganfall-Hilfe. 2018. STROKE OWL Schlaganfall-Lotsen für Ostwestfalen-Lippe. Available from: https://stroke-owl.de/de/ueber-das-projekt/ [Accessed 09/12/20]

22. Deutsches Aerzteblatt. 2018. Sekundärprophylaxe: Den zweiten Schlaganfall verhindern. Available from: https://www.aerzteblatt.de/nachrichten/98775/Sekundaerprophylaxe-Den-zweiten-Schlaganfall-verhindern [Accessed 05/12/20]

23. März W, Dippel F-W, Theobald K, *et al*. 2018. Utilization of lipid-modifying therapy and low-density lipoprotein cholesterol goal attainment in patients at high and very-high cardiovascular risk: Real-world evidence from Germany. Atherosclerosis 268: 99-107

24. Organisation for Economic Co-operation and Development, European Observatory on Health Systems Policies. 2019. Germany: Country Health Profile 2019. Paris: OECD

25. Schwaab B. 2020. Interview with Kirsten Budig and Ed Harding at The Health Policy Partnership [telephone]. 19/08/20

26. Bundesministerium für Gesundheit. 2011. Ziele des National Krebsplans. Available from: https://www.bundesgesundheitsministerium.de/themen/praevention/nationaler-krebsplan/handlungsfelder/ziele-des-nationalen-krebsplans.html [Accessed 02/12/20]

27. Gesundheitsziele.de. Nationale Gesundheitsziele. Available from: https://gesundheitsziele.de/nationale_gz [Accessed 05/01/20]

28. LAG Herz- und Kreislauf. herzintakt. Available from: herzintakt.net [Accessed 05/01/20]

29. Piepoli MF, Hoes AW, Agewall S, *et al*. 2016. 2016 European Guidelines on cardiovascular disease prevention in clinical practice. Eur Heart J 37(29): 2315-81

30. European Society of Cardiology. German Cardiac Society. Available from: https://www.escardio.org/The-ESC/ Member-National-Cardiac- Societies/German-Cardiac-Society [Accessed 18/02/20]

31. Hermann DM. 2010. Vaskuläre Neurologie: zerebrale Ischämien, Hämorrhagien, Gefäßmissbildungen, Vaskulitiden und vaskuläre Demenz. Stuttgart: Thieme

32. AWMF Online. Angemeldetes Leitlinienvorhaben. Sekundärprophylaxe ischämischer Schlaganfall und transitorische ischämische Attacke, Teil 1: Hypertonus, Hypercholesterinämie, Plättchenhemmer und Vorhofflimmern. Available from: https://www.awmf.org/leitlinien/detail/anmeldung/1/ll/030-133.html [Accessed 05/01/20]

33. Endres M. 2020. Interview with Kirsten Budig at The Health Policy Partnership [telephone]. 04/08/20

34. Schwenke FMR. 2020. Leitlinien Schlaganfall. Berlin: Deutsche Gesellschaft für Allgemeinmedizin und Familienmedizin

35. Ludt S, Popert U, Baum E, *et al*. 2017. Hausärztliche Risikoberatung zur kardiovaskulären Prävention. Berlin: Deutsche Gesellschaft für Allgemeinmedizin und Familienmedizin

36. German Society for Prevention and Rehabilitation in Cardiovascular Diseases (DGPR). 2018. Die Herzgruppen Deutschlands. Available from: https://www.dgpr.de/ herzgruppen.html [Accessed 05/01/20]

37. Deutsche Herzstiftung. Leben mit der Krankheit. Available from: https://www.herzstiftung.de/ihre-herzgesundheit/leben-mit-der-krankheit [Accessed 27/11/20]

38. von Manteuffel L. 2014. Case Management: Schlaganfall-Lotsen entlasten Ärzte. Deutsches Aerzteblatt 111(3): 76

39. Bauer T, Koeth O, Junger C, *et al*. 2007. Effect of an invasive strategy on in-hospital outcome in elderly patients with non-ST-elevation myocardial infarction. Eur Heart J 28(23): 2873-8

40. Schwarz AK, Zahn R, Hochadel M, *et al*. 2011. Age-related differences in antithrombotic therapy, success rate and in-hospital mortality in patients undergoing percutaneous coronary intervention: results of the quality control registry of the Arbeitsgemeinschaft Leitende Kardiologische Krankenhausarzte (ALKK). Clin Res Cardiol 100(9): 773-80

41. Gitt A, Jannowitz C, Karoff M, *et al*. 2012. Treatment patterns and risk factor control in patients with and without metabolic syndrome in cardiac rehabilitation. Vasc Health Risk Manag 8: 265-74

42. Reibis R, Völler H, Gitt A, *et al*. 2014. Management of Patients With ST-Segment Elevation or Non-ST-Segment Elevation Acute Coronary Syndromes in Cardiac Rehabilitation Centers. Clin Cardiol 37(4): 213-21

43. Deutsche Rentenversicherung. Forschungsportal der Deutschen Rentenversicherung. Statistiken -Rehabilitation -Leistungen. Available from: http://forschung.deutsche-rentenversicherung.de/ForschPortalWeb/view3sp.jsp?chstatakt_RehabilitationReha-Leistungen=bcb15e1a&open&viewName=statakt_RehabilitationReha-Leistungen&viewCaption=Statistiken%20-%20Rehabilitation%20-%20Leistungen#bcb15e1a [Accessed 04/11/20]

44. Kompetenznetz Schlaganfall. Projekt „Behandlungsvariationen des Schlaganfalls in Deutschland – Die Arbeitsgemeinschaft Deutscher Schlaganfall Register (ADSR)". Available from: http://www.kompetenznetz-schlaganfall.de/174.0.html [Accessed 17/12/20]

45. Maier SKG, Thiele H, Zahn R, *et al*. 2014. Empfehlungen zur Organisation von Herzinfarktnetzwerken. Der Kardiologe 8(1): 36-44

46. Deutsches Ärzteblatt. 2017. Deutschland verfügt über 300 zertifizierte Stroke Units. Available from: https://www.aerzteblatt.de/ nachrichten/73577/Deutschland-verfuegt- ueber-300-zertifizierte-Stroke-Units [Accessed 22/12/20]

47. Aerzteblatt. 2018. Entlassmanagement bereitet Krankenhäusern Probleme. Available from: https://www.aerzteblatt.de/nachrichten/88826/Entlassmanagement-bereitet-Krankenhaeusern-Probleme [Accessed 12/12/20]

48. Gielen S. 2020. Country report Germany – November 2020. Biot: European Association of Preventive Cardiology,

49. Schlitt A, Wischmann P, Wienke A, *et al*. 2015. Rehabilitation in Patients With Coronary Heart Disease. Dtsch Arztebl International 112(31-32): 527-34

50. Health Consumer Powerhouse. 2017. Secondary Prevention Index 2017. Marseillan: Health Consumer Powerhouse

51. Organisation for Economic Co-operation and Development, European Observatory on Health Systems and Policies. 2017. State of Health in the EU. Germany.

52. Bundesgesundheitsministerium. 2017. Entlassungsmanagement. Available from: https://www.bundesgesundheitsministerium.de/service/begriffe-von-a-z/e/entlassmanagement.html [Accessed 13/08/20]

53. Waßmuth S, Rohe K, Noack F, *et al*. 2019. Adherence To Lipid-Lowering Therapy In Patients With Coronary Heart Disease From The State Of Saxony-Anhalt, Germany. Vasc Health Risk Manag 15: 477-83

54. Laufs U, Jannowitz C, Pittrow D. 2017. Atorvastatin-Therapie in der Praxis – LDL- Werte bei Patienten mit sehr hohem kardiovaskulären Risiko. Dtsch Med Wochenschr 142(16): 1249-52

55. Gemeinsamer Bundesausschuss (G-BA). 2020. Richtlinie des Gemeinsamen Bundesausschusses zur Zusammenführung der Anforderungen an strukturierte Behandlungsprogramme nach § 137f Absatz 2 SGB V. Available from: https://www.g-ba.de/downloads/62-492-2277/DMP- A-RL_2020-08-06_iK-2020-10-07.pdf [Accessed 05/12/20]

56. Abreu A, Ruivo J, Perk J. Overview of Cardiac Rehabilitation in ESC member countries (OCRE). Available from: https:// secardiologia.es/images/secciones/riesgo/ encuesta-esc-sobre-rc.pdf [Accessed 17/12/20]

57. Bozorgmehr K, Maier W, Brenner H, *et al*. 2015. Social disparities in Disease Management Programmes for coronary heart disease in Germany: a cross-classified multilevel analysis. J Epidemiol Community Health 69(11): 1091-101

58. Heidrich J, Behrens T, Raspe F, *et al*. 2005. Knowledge and perception of guidelines and secondary prevention of coronary heart disease among general practitioners and internists. Results from a physician survey in Germany. Eur J Cardiovasc Prev Rehabil 12(6): 521-9

59. Laufs U, Karmann B, Pittrow D. 2016. Atorvastatin treatment and LDL cholesterol target attainment in patients at very high cardiovascular risk. Clin Res Cardiol 105(9): 783-90

60. Düchs C, Schupp W, Schmidt R, *et al*. 2012. Schlaganfallpatienten nach stationärer neurologischer Rehabilitation der Phase B und C: Durchführung von Heilmittelbehandlungen und Arztkontakte in einem Langzeitverlauf von 2,5 Jahren nach Entlassung. Phys Med Rehab Kuror 22(03): 125-33

61. Nolte C, Jungehülsing GJ, Rossnagel K, *et al*. 2009. Schlaganfallnachsorge wird von Hausärzten erbracht: Kooperative Strategien für Patienten mit chronischen Defiziten nach Schlaganfall sind nicht die Regel. Nervenheilkunde 28: 135-37

62. Leistner S, Michelson G, Laumeier I, *et al*. 2013. Intensified secondary prevention intending a reduction of recurrent events in TIA and minor stroke patients (INSPiRE-TMS): a protocol for a randomised controlled trial. BMC Neurol 13: 11

63. Bruggemann I, Guha M. 2018. Herzgruppen in Deutschland: Hintergrunde, Rahmenbedingungen und aktuelle Situation. Available from: https://www.dgpr. de/ fileadmin/files/DGPR/DSH_2018_06_ DGPR_ Herzgruppen.pdf [Accessed 01/09/20]

64. Woll C, Wulff H, Wagner P. 2017. Patientenzufriedenheit in ambulanten Herzgruppen. Praevent Rehabil 29(2): 47

FOR MORE INFORMATION, PLEASE CONTACT:

The Health Policy Partnership

68–69 St Martin's Lane, London, WC2N 4JS, United Kingdom
info@hpolicy.com

The Health Policy Partnership

The Health Policy Partnership is a specialist health policy consultancy with longstanding experience in research and the coordination of policy leadership networks.