



Secondary prevention of
**HEART ATTACK
AND STROKE**

Country profile for
the **Netherlands**

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 the Netherlands.

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EXECUTIVE SUMMARY

Heart attack and stroke are a significant societal concern in the Netherlands. There are over 740,000 people living with coronary heart disease (CHD), of which heart attack is the most serious consequence, and more than 216,000 people who have had a stroke, and those numbers are on the rise.¹ In 2016, stroke was the second-leading and CHD the third-leading cause of death.²

The financial cost to society and the healthcare system is substantial. CHD and cerebrovascular disease, which includes stroke, cost the Dutch economy €4.4 billion in 2015.³ The Netherlands also had the highest direct healthcare cost for CHD per capita in the EU at €79, more than double the EU average.³

Central government's commitment to tackling chronic illness has resulted in specific policies aimed at improving the secondary prevention of cardiovascular disease (CVD) and stroke. These developments, which include the implementation of care standards for cardiovascular risk management,⁴ offer promise to reduce repeat events among heart attack and stroke patients. However, little centralised steering for care delivery is reported to occur in the Dutch health system, potentially reducing the impact of those policies on service delivery.⁵

There is also a strong tradition of clinical leadership in the secondary prevention of heart attack and stroke. A range of guidelines have been developed by professional groups to support optimal multidisciplinary care,⁶⁻¹¹ alongside a number of platforms to facilitate their use.^{12,13}

Clinical leadership has contributed to high standards generally seen in the organisation of immediate and follow-up care in heart attack and stroke. Integrated regional care services, underpinned by care agreements, typically provide joined-up care. Multidisciplinary teams are standard in both the acute¹⁴ and rehabilitative stages¹¹ of the patient pathway and provide preventive interventions against recurrence. Nurses often take a central role in cardiovascular risk management.¹⁵

Despite overall high standards of care, gaps exist in the optimum organisation and implementation of preventive measures against a repeat heart attack or stroke. There is some variation in care quality between providers,¹⁶ as well as a lack of adherence to national guidelines.¹⁷ In acute settings, cardiac risk scores to assess a person's risk of another heart attack are not always used.¹⁸

Structured rehabilitation, in particular, is not optimally implemented in clinical practice, despite its proven efficacy in preventing repeat heart attack and stroke.

A lack of cardiac rehabilitation facilities has resulted in an estimated annual unmet need of around 48,000 cardiac patients.¹⁹ The EUROASPIRE III study found that just 54% of patients with CHD were advised to join a cardiac rehabilitation programme.²⁰ Just one in ten people who have a stroke are reported to be eligible for specialist rehabilitation.²¹

Another area of secondary prevention where gaps exist is long-term medical management. Despite clear guidelines, evidence suggests that patients post-heart attack or stroke often do not receive the recommended long-term interventions to prevent recurrence. One study found that 22% of heart attack patients and 53% of stroke patients for whom lipid-lowering medications were recommended did not receive this treatment.¹⁷

Efforts to improve secondary prevention in heart attack and stroke through integrating services appear to have been constrained by restrictions on reimbursement. One expert noted in 2018 that reimbursement had not been available for a new form of outpatient clinic that brings together specialists to treat stroke and a range of CVDs under one roof.²²

Disease management programmes for cardiovascular risk management have not yet seen wide-scale implementation, in part because of a reluctance on the part of health insurers to contract them. Research from 2015 found that the largest health insurer did not contract cardiovascular risk management programmes.²³

There is also a gap in the data on the quality of secondary prevention of heart attack and stroke in primary care. This is significant, as the long-term management of heart attack and stroke to prevent repeat events is increasingly being moved directly into primary care.

Lastly, a number of age-related, gender-related and socioeconomic inequalities in the secondary prevention of heart attack and stroke exist. Belonging to a lower-income quintile, for example, has been found to result in an increased risk of death at 28 days and 1 year after first hospitalisation with a heart attack.²⁴

INTRODUCTION

In the Netherlands, heart attack and stroke are a significant societal concern. Official data sources estimate that over 740,000 people are living with coronary heart disease (CHD), which includes heart attack, and more than 216,000 people have had a stroke – and these numbers are rising.¹

Heart attack and stroke present a significant cost to the public budget. The direct cost of CHD and cerebrovascular disease to the Dutch healthcare system amounts to €2.1 billion per year.³ In 2015, the Netherlands had the highest direct healthcare cost per capita for CHD in the EU at €79, more than double the EU average of €37.³

At the policy level, the central government's commitment to tackling chronic illness has resulted in the development of care standards and disease management programmes that address the secondary prevention of CVD and stroke; however, their initial roll-out was limited. These new models of care offer potential to reduce repeat events among people who have had a heart attack or stroke, two of the leading causes of death in the Netherlands. Their initial roll-out was constrained by a reluctance from health insurers to contract them.²³

This has contributed to continuing variation between providers at all stages of the care chain in the organisation and implementation of preventive measures against repeat heart attack or stroke. Guideline-recommended care is not always being provided,¹⁷ which is putting patients at risk of poor health outcomes.

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 from heart attack and stroke place a significant strain on the Dutch healthcare system, as do indirect costs on the country's society and economy.

In 2015, direct costs (including inpatient and outpatient care) were €1.3 billion for CHD and €0.8 billion for cerebrovascular disease, in total accounting for approximately 3% of Dutch health expenditure.³ Indirect costs (including informal care and loss of productivity) have been estimated at €2.2 billion for CHD and cerebrovascular disease combined.³

Research suggests that for each euro the Netherlands spends on acute care, the setting in which efforts for secondary prevention should commence, it is achieving better outcomes for heart attack and stroke patients compared with other countries.

Analysis of the relationship between hospital expenditure and risk of death at 30 days found that the Netherlands had the best performance in this regard for ischaemic stroke, for both males and females, among 26 Organisation for Economic Co-operation and Development (OECD) countries with comparable data.²⁵ For acute heart attack, it ranked seventh and eighth for females and males, respectively.

Table 1 provides an in-depth look at direct and indirect costs for these diseases, according to data from the European Cardiovascular Disease Statistics 2017.

Table 1. Coronary heart disease and cerebrovascular disease: direct and indirect costs to society in 2015³

	Direct cost		Indirect cost		Total
	Healthcare costs	Productivity losses due to mortality	Productivity losses due to illness	Informal care	
Coronary heart disease	€1,338,702	€403,593	€202,437	€736,061	€2,680,793
Cerebrovascular disease	€843,737	€245,812	€117,157	€542,106	€1,748,812
Combined cost	€2,182,439	€649,405	€319,594	€1,278,167	€4,429,605

Cost in euros in thousands per year.

Epidemiology

The fact that a large number of people in the Netherlands have experienced a heart attack or stroke has created a significant demand for structured secondary prevention. Around 85,000 cases of CHD and 23,000 strokes occur each year and estimates indicate that the prevalence of both CHD and stroke has risen over the past ten years.¹

Heart attack and stroke remain major causes of death, despite the Netherlands having one of the lowest overall mortality rates for CVD in Europe. Every year, more than 17,000 people in the Netherlands die as a result of CHD and more than 12,000 die as a result of stroke (see *Table 2* for a summary of key epidemiological data).¹

The number of people in the Netherlands who have had a heart attack or stroke is growing, which creates a greater demand on the healthcare system to manage those patients effectively in the long term. The prevalence of both CHD and stroke is gradually increasing,¹ with the proportion of CHD hospital admissions for chronic forms of the disease also on the rise.²⁶ The continuing rise in new heart attack and stroke cases can be explained partly by the country's ageing population; 18.2% of the population was aged 65 years and over in 2016, up from 13.6% in 2000.²⁷ While some risk factors, such as alcohol consumption and tobacco use per adult, have decreased, this has occurred alongside growing levels of obesity.²⁸

Table 2. Coronary heart disease and stroke: epidemiological data for the Netherlands (2019)¹

	Coronary heart disease	Stroke
Number of people living with the disease (prevalence)	740,161	216,712
Number of new cases per year (incidence)	85,280	23,174
Deaths	17,642	12,511

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

The central government's commitment to tackling chronic illness has resulted in specific policies aimed at improving secondary prevention for heart attack and stroke.

It has been noted, however, that little centralised steering for care delivery occurs in the Dutch health system, which may reduce the impact of these policies on service delivery.⁵ A care standard specifically for cardiovascular risk management was created in 2013²⁹ by a platform of healthcare professionals and patients, and was updated in 2019.³⁰ This was adopted by the government as the basis for the development of regional disease management plans and 'integrated funding' of care.^{4,31} The care standard addresses a number of risk factors, including cholesterol, weight and physical activity. People with previously diagnosed acute coronary syndrome, such as heart attack, or stroke are classed as 'very high risk' by the standard, which recommends that they receive lifestyle advice and pharmacotherapy, where indicated.³⁰

National policy reforms introduced two further instruments aimed at improving cardiovascular risk management, including for secondary prevention, which were shown to lead to improved outcomes for patients.

The Ministry of Health commissioned the development of disease management programmes (DMPs) to target CVD, including for secondary prevention. The DMPs that targeted cardiovascular risk through both primary and secondary prevention were shown to lead to increases in quality-adjusted life years (QALYs), although the level of success varied significantly.³² In 2010, the government launched a new bundled payment system for cardiovascular risk management, called 'integrated financing' (see *Table 3*). These payment reforms mean that care is coordinated by groups of healthcare providers (called 'care groups'), which negotiate the bundled payment with health insurers. Individual care providers are then subcontracted by the care groups, who are reimbursed for providing a pre-specified care package for cardiovascular risk management with an all-inclusive price per patient per year (with a number of exclusions).³²

Despite the promise of these reforms, the initial implementation of DMPs for cardiovascular risk management was suboptimal as health insurers showed a reluctance to contract them. Research from 2015 found that the largest health insurer did not contract cardiovascular risk-management DMPs, despite many of these programmes having the potential to reduce costs related to both primary and secondary prevention.²³

In wider health policy, secondary prevention does not appear to be a priority. A range of national policies address topics related to CVD prevention,^{33,34} however, their focus is on primary prevention and they do not appear to set any secondary prevention objectives or actions. There is no national plan specifically for stroke,³⁵ nor does there appear to be a national heart attack strategy outlining improvement targets for care. While cross-governmental mechanisms in the Netherlands, known as ‘health in all policies’ (HiAP), are recommended in health policy documents to stimulate cross-governmental action,³⁶ these do not exist for CVD or stroke.

Key national policies guiding the management of heart attack and stroke are summarised in *Table 3*.

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

	Heart attack	Stroke
Key policies	<p>Care standard cardiovascular risk management (2019)³⁰ forms the basis for the development of local/regional disease management plans targeting CVD, including for secondary prevention, as well as ‘integrated financing’ of care.</p> <p>Integrated financing (2010) (Geïntegreerde financiering) is a bundled payment system for cardiovascular risk management. This was introduced by the government to foster the impact of disease management programmes, enhance coordination between providers and improve medical guideline adherence and the quality of patient records.³²</p>	

Guidelines and clinical leadership

Clinical leadership in secondary prevention for heart attack and stroke is strong.

A range of guidelines have been developed to support optimum care (see *Table 4*), alongside a number of tools and platforms to facilitate their use.

Leading stakeholders have worked together to create national multidisciplinary guidelines on cardiovascular risk management to progress optimal and cost-effective primary and secondary prevention, including for heart attack and stroke.

The first multidisciplinary guidelines on cardiovascular risk management were published in 2006, and revised in 2011.⁶ The guidelines were developed by the Medical Council of the Dutch Institute for Healthcare Improvement (Kwaliteitsinstituut voor de Gezondheidszorg, CBO) and the Dutch College of General Practitioners (Nederlands Huisartsen Genootschap, NHG), and conform to the European Society of Cardiology (ESC) guidelines for cardiovascular risk management. Intended for use by general practitioners (GPs), medical specialists and allied health professionals, they integrate separate guidance for primary care and hospital-based practice and have a focus on appropriate preventive medications. They gave rise to an NHG cardiovascular risk-management standard, updated in 2019,⁷ which includes advice on the secondary prevention of CVD. To further optimise the quality of cardiac care and improve collaboration, regional networks of cardiologists, GPs, emergency services and patient representatives have been formed by the Netherlands Society of Cardiology (Nederlandse Vereniging voor Cardiologie, NVVC).³⁷

In heart attack, leading cardiac organisations have collaborated to develop national multidisciplinary guidelines for cardiac rehabilitation to help standardise and optimise care.

The NVVC and the Dutch Heart Foundation published Multidisciplinary Guidelines for Cardiac Rehabilitation in 2004, which were then partially updated with the help of a working group (PAAHR) in 2011.³⁸ The guidelines set out the core components and goals of cardiac rehabilitation and secondary prevention. Their implementation in daily practice is facilitated through a computerised decision support system (see *Case study 1*). In 2011, the NVVC produced practice guidelines for cardiac rehabilitation which set out the safety and quality criteria for this area of care.¹¹

Clinical leadership around secondary prevention is also occurring at the regional level. In 2011, the NVVC set up NVVC Connect, which aims to optimise regional care for heart attack, atrial fibrillation and heart failure by promoting local networks. As part of the project, cardiologists now collaborate with GPs, patient representatives and emergency services³⁹ on heart attack care in all Dutch ambulance regions.⁴⁰

In stroke, optimum care at each stage of the patient pathway is supported by national guidelines and protocols; however, these are not always followed, which contributes to differences in care for secondary prevention.

National guidelines on the diagnostics, treatment and care for stroke patients were published in 2008 by the CBO and the Netherlands Society of Neurology (Nederlandse Vereniging voor Neurologie, NVN), and updated by the NVN in 2017 to bring them up to date on secondary prevention.⁸ Developed for use by all professional groups involved in the care of stroke patients, the guidelines focus on medication-based preventive treatment of further strokes. Clinical practice guidelines covering secondary prevention have also been developed by the individual disciplines involved in stroke care, including GPs⁹ and physiotherapists.¹⁰ The NVN and NHG developed a Dutch Transmural Protocol TIA/CVA in 2004 to improve post-stroke survival and reduce the risk of a repeat event. The protocol states that the neurologist is responsible for starting rehabilitation and secondary prevention in hospital, while the GP continues this treatment after discharge.⁴¹ Despite the existence of clear national guidance, significant variation in care for secondary prevention has been found, including the initiation of secondary prevention medication and the use of non-pharmacological strategies for long-term secondary stroke prevention.

Regional leadership has led to the development of stroke services in many regions which aim to create a continuous care chain from the moment a stroke occurs; however, variation in care arises from the different clinical pathways developed by providers.

Regional stroke services consist of a network of providers working together during the acute, rehabilitation and chronic phases to provide multidisciplinary, coordinated care and support, including for secondary prevention. In 2016, there were roughly 75 stroke services,⁴² which usually involve collaboration between a general hospital, one or more nursing homes, a specialist rehabilitation clinic and community healthcare services. However, the way the pathways are organised differs, which leads to considerable variations in care between different hospitals.⁴³ A lack of clear direction in clinical guidelines on pathway development⁴³ may have contributed to this inconsistency.

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

Heart attack	Stroke
<p>Multidisciplinary guidelines on cardiovascular risk management (2011)⁶ aim to guide optimal and cost-effective primary and secondary prevention of cardiovascular disease (including heart attack) and stroke.</p>	
<p>Cardiovascular risk management standard (2019)⁷ guides general practitioners on the primary and secondary prevention of cardiovascular disease.</p>	
<p>Multidisciplinary guidelines for cardiac rehabilitation (2011)³⁸ set out the core components and goals of cardiac rehabilitation and secondary prevention.</p>	<p>Cerebral infarction and cerebral haemorrhage (2017)⁸ updates earlier guidelines on the secondary prevention of stroke.</p>
<p>Practice guidelines for cardiac rehabilitation (2011)¹¹ set out the safety and quality criteria for cardiac rehabilitation.</p>	<p>Stroke (2014)⁹ guidelines cover stroke care in general practice, including secondary prevention.</p>
<p>KNGF Guideline. Stroke (2017)¹⁰ provides guidance for physiotherapists on secondary prevention during stroke rehabilitation.</p>	

Advocacy and awareness raising

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Patient organisations are very active in promoting care, and patient involvement is becoming increasingly important.

DR AREND MOSTERD

Patient organisations are involved in the official development and scrutiny of policy and guidelines covering secondary prevention after a heart attack or stroke. They are part of the nationwide Platform Vitale Vaten, which was established to help improve cardiovascular risk management in clinical practice, including the development of a 'care standard' complementary to the multidisciplinary clinical guidelines.⁴⁴ Patient organisations are also part of the Health Care Standards Coordination Platform, which advises the Dutch government on the development of care standards for cardiovascular risk management and promotes consistency in their content.¹³

Ensuring availability of comprehensive data

A wide range of outcome, structure and process indicators related to the secondary prevention of heart attack and stroke are collected, helping to ensure political accountability. The breadth of data (see *Table 5*) is highlighted by the Euro Heart Secondary Prevention Index 2017, which awarded the Netherlands a maximum score of 200 for data quality.⁴⁵ National quality measurement is conducted by the Dutch Health and Youth Care Inspectorate (Inspectie Gezondheidszorg en Jeugd, IGJ), which collects outcome, structure and process indicators for heart attack and stroke.^{39,46} Hospitals must report these data to the central IGJ database.⁴⁶ Indicators collected relevant to secondary prevention include 30-day mortality and the percentage of people referred for cardiac rehabilitation.³⁹ To improve transparency, the Dutch government publishes the results on a national website for patients.⁴⁷ Further acute-stage heart attack data relevant to secondary prevention are provided by the Netherlands Heart Registration (Nederlandse Hart Registratie).⁴⁸ Formed in 2017 through the merger of the three national registries, this registry provides national and hospital-level acute-stage data, including 30-day mortality rates, as well as limited long-term follow-up data in the form of one- and three-year mortality rates.

However, there appears to be a gap in the data on the quality of secondary prevention of heart attack and stroke in primary care. Most of the data collected by registries relate to hospital-based care, despite the fact that the long-term care of heart attack and stroke patients has gradually shifted into primary care.

In heart attack, efforts to improve the collection of national data on secondary prevention have encountered barriers. Between 2008 and 2012, all hospitals in the Netherlands joined the National Patient Safety Programme, 'Prevent harm, work safely' (VMS Veiligheidsprogramma 'Voorkom schade, werk veilig'). This included the clinical theme 'Optimal care for acute coronary syndromes'. Five quality indicators were collected, among them the use of validated cardiac risk scores (typically performed before initiating interventions to reduce the risk of repeat events), to decide on which type of treatment to initiate, and the number of acute coronary syndrome patients, including those who had had a heart attack, who had been prescribed the guideline-recommended secondary prevention medication at discharge. However, uploading and collating the results to a national online tool proved to be too large an additional workload for hospitals, resulting in a lack of national data and the online tool being terminated.⁴⁹

In stroke, the collection of national data on secondary prevention has also proven difficult. The main clinical auditing tool for stroke is the Dutch Acute Stroke Audit (DASA,⁵⁰ previously known as the Cerebrovascular Accident Benchmark). In 2016, this registry was adjusted to focus on a narrower set of indicators concentrating on the acute treatment of ischaemic stroke, with few indicators relevant to secondary prevention. The difficulties hospitals faced in collecting data on a wide range of indicators without receiving financial support to aid this process appear to have contributed to this change.⁵¹

Encouragingly, however, efforts are occurring to broaden the data on secondary prevention in stroke. The Stroke Knowledge Network Netherlands (Kennisnetwerk CVA Nederland) has worked in collaboration with the Dutch Institute for Clinical Auditing to implement a database that includes baseline variables and functional outcome three months post-stroke, which may enable evaluation of stroke care for secondary prevention.¹⁶

Table 5. CVD registries in the Netherlands

Registry	Description
Dutch Health and Youth Care Inspectorate (Inspectie Gezondheidszorg en Jeugd, IGJ)⁵²	Collects outcome, structure and process indicators for heart attack and stroke, including the percentage of patients referred for cardiac rehabilitation.
Dutch Acute Stroke Audit (DASA)⁵⁰	Major stroke registry, with a primary focus on acute treatment of stroke.
Stroke Knowledge Network Netherlands database (Kennisnetwerk CVA Nederland)¹⁶	Analyses baseline variables and functional outcome three months post-stroke.
The Netherlands Heart Registration (Nederlandse Hart Registratie, NHR)⁵³	Major cardiovascular quality-of-care registry formed in 2017 to collect data on acute-stage care.

Initiation of secondary prevention in the acute care setting

Improvements have occurred in the survival of patients hospitalised for heart attack or stroke. In the EU, the Netherlands has the lowest 30-day mortality rates after admission for both heart attack and stroke.² In heart attack and stroke patients aged 65 and over, in-hospital mortality was found to have decreased significantly between 2000 and 2009.⁵⁴

However, best practice to prevent repeat heart attacks is not always being followed. International cardiac guidelines recommend a quantitative assessment of a person's risk of a repeat event or death before making the decision to treat them with medication or invasive procedures.⁵⁵ Despite this, a cross-sectional multicentre study found substantial variation between Dutch hospitals in their use of cardiac risk scores. Overall, roughly 40% of patient charts did not have a documented cardiac risk score.¹⁸

Dutch cardiology care providers have recognised the value of monitoring and improving guideline adherence regarding preventive prescribing at hospital discharge, and yet guideline adherence is suboptimal, with substantial variation between hospitals. A multicentre Dutch study found complete adherence to guidelines was 69.1%. Adherence was lowest for angiotensin-converting enzyme (ACE) inhibitors

and highest for acetylsalicylic acid.⁵⁶ Substantial variation in guideline adherence was found between hospitals. While complete guideline adherence was highest in people who had had a heart attack, older people, particularly women, were less likely to receive guideline-recommended secondary prevention medication.⁵⁶

Access to specialist acute stroke care is good, with most hospitals providing stroke unit care provided by multidisciplinary teams. Access to specialist acute stroke care is vital to ensure the early initiation of measures for secondary prevention, with the Dutch national stroke guidelines recommending that stroke patients are treated in a specialist stroke unit or neuro-medium care unit until they are discharged from hospital.⁵⁷ Stroke unit availability is good, with five stroke units available per one million inhabitants, well above the suggested target of three units.⁵⁸ In 2012, it was reported that over two thirds of Dutch hospitals were providing specialist services for stroke patients.⁵⁹ Care is delivered by a multidisciplinary team consisting of a main therapist (normally a neurologist), specially trained nurses, a physician, a physiotherapist, an occupational therapist, a speech therapist and a social worker. In 2011, virtually all stroke units (for which data were available) met these requirements, with 40% also employing a neuropsychologist.¹⁴

While basic stroke rehabilitation in the acute setting is recommended to improve long-term outcomes, care has been suboptimal. Dutch national clinical guidelines specifically recommend implementation of early mobilisation and exercise therapy to help improve patient outcomes. Still, a 2011 countrywide survey of physiotherapists working in Dutch acute stroke units found 71% compliance with the national guideline recommending mobilisation within 24 hours of stroke onset and an average 22 minutes of physiotherapy per day instead of the guideline-recommended minimum of 40 minutes.¹⁴

Securing participation in structured secondary prevention programmes

Cardiac rehabilitation in the Netherlands has been found to lead to a large and statistically significant survival benefit. A study of patients with acute coronary syndrome, including a heart attack, found that patients who received cardiac rehabilitation were less likely to die over the four-year follow-up period.⁶⁰ This benefit was present regardless of the person's age.

Despite the proven benefits of cardiac rehabilitation in preventing repeat events, it is not optimally implemented in clinical practice. A lack of cardiac rehabilitation facilities has resulted in an estimated annual unmet need of around 48,000 cardiac patients.¹⁹ The EUROASPIRE III study found that just 54% of patients with CHD were advised by a health professional to attend a cardiac rehabilitation programme.²⁰ A further study assessing Dutch cardiac rehabilitation uptake found that only 11.7% of patients who were eligible actually received it. Uptake was highest in people who underwent cardiac surgery (58.7%), while it was lowest in people with congestive heart failure or stable angina pectoris (3%). Being female, being older, living a greater distance from the nearest provider of cardiac rehabilitation, and having comorbidities were all found to reduce uptake.⁶¹

When cardiac rehabilitation is delivered, care is shaped by national guidelines and protocols. The 2011 Multidisciplinary Guidelines for Cardiac Rehabilitation form the basis of care. A national expert highlighted that a post-heart attack protocol has been developed for cardiac rehabilitation outpatient clinics outlining best practice: what actions should be taken, how often people should be seen, and whether their care should be taken over by a GP.⁶¹ The individual medical disciplines involved in cardiac rehabilitation have developed their own clinical practice guidelines, including on exercise-based cardiac rehabilitation,⁶² and further developed an electronic decision-support system for multidisciplinary teams.⁶³ Outpatient cardiac rehabilitation is covered by all insurance companies as long as the person has been referred by a cardiologist.⁴

High standards of care are aimed for through individualised rehabilitation programmes facilitated by multidisciplinary teams.

An individualised rehabilitation programme is offered to each patient, with programmes normally lasting for 6–12 weeks and consisting of group-based therapies, with the addition of individual counselling when indicated.⁴ In line with international guidelines, the Dutch guidelines for cardiac rehabilitation state that a needs assessment should be conducted to develop each patient's individualised programme, with goals tailored to the patient's individual wishes.³⁸ Three levels of rehabilitation are available to patients, depending on their individual needs and circumstances. Teams working at each level differ in their make-up, but all teams must include a cardiac rehabilitation coordinator (e.g. a nurse practitioner), a cardiac rehabilitation cardiologist (possibly in combination with a sports physician or rehabilitation physician), a nurse, a dietitian, a physical therapist and a social worker.¹¹

What is of some concern is that despite the existence of national guidelines, therapeutic decisions made during cardiac rehabilitation often do not align with the guidelines, leading to either undertreatment or overtreatment.

Undertreatment has been highlighted as a particular problem for lifestyle-change, relaxation and educational therapies.⁶⁴ Considerable variation has been found, for example, in methods to determine exercise intensity, with recommended assessment methods often not used or standardised.⁶⁵

Specialist outpatient clinics which manage CVD and stroke patients together are being trialled in some regions, but insurance companies do not currently offer reimbursement for these combined efforts.

These clinics represent an important development in multidisciplinary care and offer potential to improve secondary prevention in heart attack and stroke by bringing together different specialists (cardiologists, neurologists etc.) to offer advice to patients before referring them on to primary care. However, national experts have highlighted that any further roll-out of these specialist clinics will be dependent on insurance companies choosing to reimburse them.²²

Access to specialist stroke rehabilitation is limited, despite its proven efficacy in preventing repeat stroke. Just one in ten people who have a stroke are reported to be eligible for specialist rehabilitation.²¹ When patients are referred, significant practice variation in the structure of stroke rehabilitation has been found, despite clear national guidelines. While a standardised model of stroke rehabilitation is offered by the national guidelines for stroke, individual rehabilitation centres vary considerably in how they organise their services, potentially leading to patients experiencing different outcomes. A study investigating four rehabilitation centres found that practice variation occurred in 22 out of 23 elements of stroke rehabilitation, with only patient involvement (the presence and content of strategies to aid patient involvement in their own treatment) organised in the same way. The maximum number of days preceding patient admission set by regional stroke services' agreements ranged from 5 to 14, suggesting variable care efficiency. While patients were referred to the appropriate community care providers by all four rehabilitation centres, two did not have a structured process for tracking the person's ongoing wellbeing.⁶⁶

Increasing primary care capacity for long-term risk management

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Current policy is to reserve space and resources in hospitals for acute care and not for secondary prevention.

DR AREND MOSTERD

The long-term management of heart attack and stroke patients for secondary prevention is increasingly being moved directly into primary care, yet the value of this shift of approach has been brought into question. The Netherlands has seen the long-term care of patients shifting from secondary to primary care, and to lower levels of specialisation, from hospital-based specialists to GPs and from GPs to practice nurses. In heart attack, for example, patients receive continuing care for secondary prevention through frequent checks with a cardiologist and/or cardiac care nurse; however, once they are stable, normally after 6–12 months of hospital-based care,^{22,61} their long-term management is usually transferred to primary care.⁴⁹ A national expert has highlighted concerns that there is a lack of data on the quality of secondary prevention in primary care to support this shift, and noted that guideline updates on secondary prevention can take longer to be incorporated into practice in primary care than in specialist care.²²

Adherence to pharmacotherapy for secondary prevention during long-term management post-heart attack is low, and there are inequalities in access to these medications. A large-scale study of heart attack patients in 2012/13 found that only 49% were adhering to guideline-recommended medications to prevent repeat events 12 months after discharge, defined as use of all five indicated types of medications. Inequalities in access were also found to exist, with adherence lower in females than in males (37–57% vs. 43–61% depending on the type of heart attack).⁶⁷ However, the data do not provide detail on whether the lack of adherence was the result of health

professionals not prescribing the medications or patients discontinuing them. It is likely to be a combination of both factors, with educational interventions needed for both groups. Socioeconomic inequalities in heart attack patients' long-term outcomes also exist; people with a lower income are more likely to die one year after a heart attack than those with higher incomes.²⁴

Financial incentives may offer a way to both monitor and improve secondary prevention in primary care for heart attack and stroke patients, but this would require changes to the current incentivisation system. A national expert noted that while GPs receive financial incentives for prescribing certain medications to prevent the recurrence of heart attack and stroke, they are not financially incentivised for the outcomes of prescribing these medications; a move to outcome-based incentives was thought to provide a better model to improve secondary prevention in primary care.⁶¹



Health professionals may be willing to make changes, but if there is no reimbursement from the health insurance companies any initiatives and projects will most likely be unsuccessful.

DR AREND MOSTERD

Cardiovascular risk management is mainly delivered in general practice, with nurses taking a leading role. Nurse practitioners and advanced practice nurses undertake a substantial part of cardiovascular risk management care in general practice. They lead on monitoring risk factors, patient education and counselling, and are significantly involved in diagnosis, risk assessment, medical treatment, and defining protocol and organisation of cardiovascular care.¹⁵ Nurse practitioners are often supervised by a physician dedicated to cardiovascular risk management.²² Localised studies have shown that nurse-coordinated referral to widely available, community-based lifestyle interventions for people with coronary artery disease – where nurses first explain to patients the concept of cardiovascular risk and the potential impact of the different interventions – can lead to significant improvements in lifestyle-related risk factors.⁶⁸

In stroke, considerable practice variation in long-term secondary prevention has been found, which may contribute to variation in the use of guideline-recommended pharmacotherapy. Despite the long-term management of stroke patients being guided by the Dutch Transmural Protocol TIA/CVA, a survey of neurologists reported that while almost all stroke patients are followed up, the number of appointments and the overall duration of follow-up, the type of health professionals attending the appointments, and treatment target levels for blood pressure and cholesterol varied considerably.¹⁶ Respondents also did not agree on who should be primarily responsible for long-term secondary prevention after stroke, with half choosing the GP and half a hospital-based strategy.¹⁶ This divergence exists despite clear guidelines in the Dutch Transmural Protocol TIA/CVA stating that the neurologist is responsible for beginning secondary prevention in hospital, while the GP takes responsibility for continuing treatment after hospital discharge.⁴¹

Implementation of non-pharmacological strategies for long-term secondary stroke prevention, such as lifestyle changes, also appears to be suboptimal. The majority of respondents to the survey of Dutch neurologists provided information on smoking cessation to their stroke patients; however, there was markedly less focus on additional lifestyle risk factors.¹⁶ These results go against the national cardiovascular risk management guidelines, which state that all patients should be advised on the importance of exercise, healthy eating, limiting alcohol use, maintaining a healthy weight and stress reduction, with achievable goals formulated for each risk factor.⁶

Despite clear guidelines, evidence suggests that people who have experienced a heart attack or stroke often do not receive cholesterol-lowering medications to prevent recurrence. The national clinical practice guidelines for cardiovascular risk management recommend lowering patients' cholesterol levels to prevent a repeat event. However, a population-based prospective cohort study found that 22% of heart attack patients and 53% of stroke patients reported that they did not receive cholesterol-lowering treatment for secondary prevention.¹⁷ Women and older people have been found to be at particular risk of undertreatment.^{17 69}

CASE STUDIES

1.

Improving adherence to cardiac rehabilitation guidelines through the use of an algorithm and computerised decision-support system

The Netherlands Society of Cardiology and Dutch Heart Foundation guidelines for cardiac rehabilitation were published in 2004. Given the guidelines' complexity and multidisciplinary nature, a clinical algorithm (Beslisboom Hartrevalidatie) was developed to help facilitate their implementation in daily practice. The algorithm is made up of a flowchart of questions covering a range of issues (physical, psychological and social), using clinicians' judgement and measurement instruments to set treatment goals and decide on the make-up of each patient's cardiac rehabilitation programme.⁷⁰ The algorithm was updated alongside the 2011 revision of the guidelines to reflect the new content.

The use of the algorithm is facilitated through a computerised cardiac rehabilitation decision-support system (CARDSS). The system actively guides users through the clinical algorithm, prompting for necessary information and calculating scores from questionnaires. A trial in a cohort of 2,787 patients from 21 centres showed that CARDSS increases adherence to guideline-recommended therapeutic decisions, reducing both overtreatment and undertreatment.⁶⁴

Vascular risk management programme⁷¹

2.

This programme investigated whether an internet-based, nurse-led vascular risk factor management programme provided benefits in comparison to usual care in the Dutch context. The focus was on patients with a recent clinical manifestation of a vascular disease (heart attack, stroke or peripheral arterial disease) and at least two treatable risk factors not at recommended levels.

The intervention consisted of a website where patients had access to individualised information on their risk factors, medication use and treatment goals, along with targeted advice from nurses. Patients submitted new measurements every two weeks (blood pressure, weight, smoking status, cholesterol). Prescriptions were sent to patients if changes to medication were needed.

While the programme did not result in quality-adjust life year gains at one year in comparison to usual care, it led to lower costs and had a minor impact on vascular risk factors, in particular cholesterol levels.

OUTLOOK

Repeat heart attack and stroke currently present a considerable risk in the Netherlands as a result of a range of inequalities in the use and availability of guideline-recommended care across the patient pathway. Opportunities exist to improve patient outcomes and potentially reduce costs by addressing these gaps.

Increasing the use of validated scores to assess patients' risk of repeat events offers a significant opportunity to improve care for heart attack patients, as does enhancing access to cardiac rehabilitation, as too few patients are currently referred to this vital intervention. Bringing medication use for long-term risk factors closer to guideline recommendations represents another valuable opportunity to improve patient outcomes.

To take advantage of these solutions, national leadership will be needed to confront a number of barriers to improvement efforts; in particular, the reluctance of insurance companies to contract disease management programmes for cardiovascular risk management. The gap in the data on the quality of secondary prevention in primary care may also need to be addressed.

With concerted action, it is likely not only that heart attack and stroke patient outcomes will be significantly improved, but also that national health expenditure will be reduced.

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:

Netherlands Society of Cardiology (Nederlandse Vereniging voor Cardiologie)

Netherlands Society of Neurology (Nederlandse Vereniging voor Neurologie)

Stroke Knowledge Network Netherlands (Kennisnetwerk CVA Nederland)

Dutch College of General Practitioners (Nederlands Huisartsen Genootschap)

Dutch Heart Foundation (Hartstichting)

Harteraad (patient organisation for people living with cardiovascular diseases)

Netherlands Heart Journal

Nederlands Tijdschrift voor Geneeskunde

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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