About the Action Plan

Heart disease and stroke are our nation’s biggest killers – ischaemic heart disease kills more Australians than any other condition. Heart disease and stroke affect millions of Australians accounting for a significant burden of premature death, disability and avoidable hospital admissions. Yet, most heart disease and stroke can be prevented or treated.

Following the development of the National Strategic Framework for Chronic Conditions (2017) the Australian Government identified the need to focus attention on a comprehensive and integrated approach to major chronic disease groups. Heart disease and stroke were among those highlighted.

The National Heart Foundation in partnership with the Stroke Foundation has been commissioned by the Australian Government to develop a National Strategic Action Plan for Heart and Stroke (the Action Plan). The Action Plan complements and builds on existing frameworks for heart disease and stroke in Australia. The Action Plan reflects priorities and immediately achievable actions the Australian Government can implement, to reduce the impact of heart disease and stroke on individuals, families, the community and the health care system.

In developing the Action Plan, the National Heart Foundation and Stroke Foundation consulted with community members affected by heart disease and stroke. This included people living with heart disease or stroke, family members and carers, and those working in the heart and stroke field. They also undertook extensive analysis of national and international policy and literature.

Actions were developed taking into account:

- Consumer and stakeholder roundtable consultations;
- An online public survey;
- An analysis of Australian Government policies and strategies, including:
  - National Strategic Framework for Chronic Conditions;
  - National Aboriginal and Torres Strait Islander Health Plan 2013-2023.
- An analysis of gaps in current approaches to heart disease and stroke;
- An analysis of successful programs and initiatives addressing heart disease and stroke in the community and with the potential to be scaled up or rolled out nationally;
- Australian cardiovascular policies and strategies including:
  - Hearts and Minds (2017);
  - The Birch Review of Cardiovascular Disease Programs (2009);
  - Time for Action (2008);
  - The National Service Improvement Framework for Heart, Stroke and Vascular Disease (2004);
- International cardiovascular and non-communicable disease policy approaches, including:
  - WHO Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020; and
WHO Tackling NCDs: Best buys and other recommended interventions for the prevention and control of non-communicable diseases;

- Actions proposed by other organisations charged with developing national action plans for chronic disease;
- Existing strategies such as the National Diabetes Strategy; and

Focus of the Action Plan

Actions within the Action Plan were prioritised based on the following criteria:

- The likelihood that this priority action will address an unmet need or gap in the current approach to the prevention, screening, diagnosis and management of heart disease or stroke;
- The impact this action will have on avoidable hospital admissions or improvements in the effectiveness and efficiency of the health system;
- The likely significance and reach in the population of this action in addressing the burden of disease for heart and stroke;
- The strength of the evidence (nationally or internationally) for this action, and whether it has been shown to be cost-effective; and
- The likelihood that this action can be easily implemented or scaled up nationally.
Acknowledgements

Thank you to the thousands of people living with, or caring for someone living with, heart disease or stroke, as well as to the consumer groups, health professionals, research institutions, peak bodies, different levels of government and other relevant stakeholders and organisations who were part of the Action Plan consultation. Thank you also to the broader Australian community who strive to prevent heart disease and stroke and to support better lives for people with these conditions. This Action Plan will benefit all Australians, now and into the future, through creating a framework for ongoing progress in combating heart disease and stroke.

In addition, we would particularly like to thank the Action Plan Steering Committee. The Committee was an advisory body comprised of some of Australia’s leading thinkers. It was convened to support and guide the development of the Action Plan. Members included:

Professor Emily Banks (Chair) – Australian National University
Adjunct Professor John G Kelly AM – Group CEO National Heart Foundation
Ms Sharon McGowan – Chief Executive Officer Stroke Foundation
Professor Garry Jennings – Chief Medical Advisor National Heart Foundation
Adjunct Associate Professor Jennifer Muller – Stroke Foundation Consumer Representative
Ms Lyndal Ritchie – Heart Foundation Consumer Representative
Professor Leonard Kritharides – President Cardiac Society Australia and New Zealand (CSANZ)
Associate Professor Andrew Wong – Stroke Society Australasia
Professor Alex Brown – South Australian Health and Medical Research Institute (SAHMRI)
Dr Lynelle Moon – Australian Institute Health and Welfare (AIHW)
Professor Bruce Campbell – Stroke Foundation Clinical Council
Ms Jacinta McDonald – Commonwealth Department of Health
### Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>ABS</td>
<td>Australian Bureau of Statistics</td>
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<td>AF</td>
<td>Atrial Fibrillation</td>
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<td>AIHW</td>
<td>Australian Institute of Health and Welfare</td>
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<tr>
<td>CHD</td>
<td>Coronary Heart Disease</td>
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<tr>
<td>CSANZ</td>
<td>Cardiac Society Australia and New Zealand</td>
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<td>CVD</td>
<td>Cardiovascular Disease</td>
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<td>FAO</td>
<td>Food and Agriculture Organisation</td>
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<tr>
<td>GP</td>
<td>General Practitioner</td>
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<td>IHC</td>
<td>Integrated Health Check</td>
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<td>IHD</td>
<td>Ischaemic Heart Disease</td>
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<tr>
<td>MBS</td>
<td>Medical Benefits Scheme</td>
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<td>MRFF</td>
<td>Medical Research Future Fund</td>
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<td>NDIS</td>
<td>National Disability Insurance Scheme</td>
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<td>NHMRC</td>
<td>National Health and Medical Research Council</td>
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<td>NVDPA</td>
<td>National Vascular Disease Prevention Alliance</td>
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<td>QII</td>
<td>Quality Improvement Incentive</td>
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<td>PAD</td>
<td>Peripheral Artery Disease</td>
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<td>RHD</td>
<td>Rheumatic Heart Disease</td>
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<td>SAHMRI</td>
<td>South Australian Health and Medical Research Institute</td>
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<tr>
<td>TIA</td>
<td>Transient Ischaemic Attack</td>
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<tr>
<td>UNSCN</td>
<td>United Nations Steering Committee on Nutrition</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
</tr>
</tbody>
</table>
## Contents

About the Action Plan ........................................................................................................................................... i

Focus of the Action Plan ....................................................................................................................................... ii

Acknowledgements ................................................................................................................................................... iii

Acronyms ................................................................................................................................................................ iv

What is Heart Disease and Stroke ................................................................................................................ 1

The Case for Action ................................................................................................................................................ 2

Statistics .................................................................................................................................................................. 3

Call to Action ......................................................................................................................................................... 4

Partnerships for Delivery ....................................................................................................................................... 4

Foundation for Action ........................................................................................................................................... 5

Highlight on Joining up Data ................................................................................................................................ 6

Goal, Objectives, Priorities ..................................................................................................................................... 7

Summary of Objectives and Actions ....................................................................................................................... 8

Priority 1

Prevention and Early Detection ............................................................................................................................. 10

Actions .................................................................................................................................................................. 11

Priority 2

Diagnosis and Treatment ...................................................................................................................................... 16

Actions .................................................................................................................................................................. 16

Priority 3

Support and Care .................................................................................................................................................... 20

Actions .................................................................................................................................................................. 20

Priority 4

Research.................................................................................................................................................................. 24

Actions .................................................................................................................................................................. 25

Achieving progress .................................................................................................................................................. 27

Next steps ............................................................................................................................................................... 27

References ............................................................................................................................................................... 28
What is Heart Disease and Stroke?

The term heart disease encompasses heart conditions, including, but not limited to:

- Ischaemic heart disease (IHD), which is the cause of most heart attacks, and angina. It is the result of atherosclerosis, a build-up of fatty plaques in the walls of the coronary arteries that, over time, cause blood vessels to become narrowed or blocked;
- Arrhythmias (irregular heart beat), such as atrial fibrillation and flutter, ventricular arrhythmias, and bradyarrhythmias;
- Heart failure; and
- Structural heart disease, encompassing rheumatic heart disease, valvular abnormalities, and congenital abnormalities

Stroke results from the effects of interrupted circulation to the brain. It is due to blockage of blood vessels (ischaemic stroke) or blood leaking from damaged vessels (haemorrhagic stroke). Ischaemic stroke is generally a consequence of either atherosclerosis in the arteries that supply blood to the brain or of clots emanating from the heart, whilst haemorrhagic stroke is most often caused by high blood pressure. When a stroke occurs, the brain does not receive adequate blood supply and damage to the brain can result. Stroke is the leading cause of acquired disability of adults and long-term reduced circulation to the brain is also a cause of dementia.

Risk factors for heart disease and ischaemic stroke have significant overlap and include high blood pressure, high cholesterol, smoking, diabetes, poor diet, and physical inactivity. Atrial fibrillation (AF) is an important risk factor for stroke.

Cardiovascular disease (CVD) is a collective term for diseases that affect the heart and blood vessels. The term commonly includes heart disease, cerebrovascular disease (conditions that affect the blood vessels of the brain and the cerebral circulation including stroke) and peripheral artery disease (PAD) when atherosclerosis occurs in arteries elsewhere in the body such as the legs, potentially causing gangrene. Atherosclerosis is one of the common causes of heart attack, stroke and PAD, and thus interventions and strategies targeted at preventing, detecting, or managing atherosclerosis often produce important outcomes across the spectrum of CVD.

Throughout the Action Plan we refer specifically to heart disease and stroke. However, an effective approach considers these conditions within the context of cardiovascular disease more broadly. There are many interconnecting factors contributing to these conditions, and synergies in tackling them. Hence, this action plan takes a systems approach. We consider the specific and general actions needed to prevent, or improve outcomes for, heart disease and stroke within the context of cardiovascular disease prevention and management. Actions and interventions highlighted in the Action plan will help us to prevent and better manage not only heart disease and stroke but also broader cardiovascular conditions and their associated risk factors.

Heart disease and stroke share many risk factors, and benefit from shared approaches to management and treatment. But there are also some differences. In some cases,
treatments, systems and models of care for each condition are at different stages and a tailored approach is more likely to achieve the objectives laid out in the Action Plan.

While mortality rates have been in decline for several decades, Ischaemic Heart Disease remains the leading cause of death for Australians, with cerebrovascular disease (primarily stroke) the third. As a whole, cardiovascular diseases are responsible for almost 30 per cent of all deaths in Australia and are the leading contributor to the total burden of disease for the nation (12.3 per cent of the total burden). Heart disease and stroke are major causes of avoidable hospital admissions and impose massive social and economic costs on the nation.

The number of people living with heart disease and stroke is set to increase as the population grows and ages. The increasing numbers of Australians who are overweight and obese, have poor nutrition, do too little physical activity, and have high blood cholesterol and high blood pressure will only add to the burden of disease. Around 2.7 million Australians smoke tobacco.

The most disadvantaged Australians are significantly more likely to be affected by heart disease and stroke. Both conditions are disproportionately experienced by:

- Aboriginal and Torres Strait Islander people;
- Culturally and linguistically diverse populations;
- Socioeconomically disadvantaged Australians; and
- People living in rural and remote communities.

**The Case for Action**

For the purposes of depicting the full impact of these conditions on the nation as a whole, many of the following statistics reference CVD.

- **The numbers are large.** More than four million Australians are living with CVD. There are almost 44,000 deaths a year from CVD, many of them preventable.
- **The costs are high.** CVD has the highest level of healthcare expenditure of any disease group in Australia. The costs of CVD amount to over 12% of all health care expenditure.
- **The interventions are effective.** The recommended interventions in this Action Plan are strategic, evidence-based, cost-effective and – most importantly – patient-focused; helping Australians lead long, healthy and productive lives.

Strategic interventions put in place now can reduce premature death and avoidable hospital admissions, alleviate suffering and reduce the cost of heart disease and stroke on individuals, families, communities and the health system.
Heart disease and stroke have a significant impact on Australians and healthcare costs.
Call to Action

Australia has made significant gains over the past decades in reducing morbidity and mortality from heart disease and stroke. However, heart disease continues to be Australia’s biggest killer and together heart disease and stroke are the leading causes of premature death, disability and avoidable hospital admissions.

Heart disease and stroke are largely preventable, and they can be treated.

The development of a National Action Plan for Heart and Stroke demonstrates the Australian Government’s commitment to reducing the impact and cost of these conditions on the Australian population. In line with the National Strategic Framework for Chronic Conditions, a focus on improving chronic disease care and management is essential. This will ensure Australia’s health system can continue to support our ageing population, and address the increasing burden of heart disease, stroke and other chronic conditions.

The Action Plan follows considerable work over several decades by governments, health professionals, researchers, policy makers and the Australian community to address heart disease and stroke. This includes The National Service Improvement Framework (2004), Time for Action (2008) and the Birch Review (2009). These documents, like this Action Plan, identified the need for a national, coordinated and cohesive systems-level approach to the prevention and management of heart disease and stroke for Australia.

The avoidable burden of heart disease and stroke has long been recognised. Now is the time for action.

Partnerships for Delivery
Foundation for Action

Tackling heart disease and stroke is challenging, but it will reap enormous benefits for the Australian population. Combatting these diseases requires consistency and support across several key areas:

- **Governance and leadership** – Leaders across all sectors and levels of government must work with common aims. Partnership with Aboriginal and Torres Strait Islander communities, organisations and leaders is essential. Addressing variations across jurisdictions and identifying who is responsible for implementing change is vital.
- **Ongoing resourcing and sustainable funding**;
- **Workforce support and recognition** – With finite capacity and many competing demands on resources, it will be important to seek support and to prioritise efforts;
- **A consistent approach to health communication and education** – This needs to be promoted by government and medical leaders and practitioners;
- **A nationally consistent and consolidated data platform and approach to data collection and management** – Evidence is essential to decision-making and to track progress;
- **Nationally consistent outcome measures** – This will ensure successful progress towards implementing actions.
Information and evidence are required for Australia to continue to make significant progress in heart disease and stroke prevention, diagnosis, treatment and management. Consistent, high quality, relevant data and data sharing are necessary to ensure that the actions in this plan and their implementation are effective in driving improvements in health outcomes, as well as underpinning accountability.

The Australian health system already collects a range of data around heart and stroke health that are designed for different purposes, including population monitoring of cardiovascular disease by the Australian Institute of Health and Welfare (AIHW). However, it is necessary to acknowledge the complexity of the data environment and its limitations.

Work is required to build a comprehensive National Cardiovascular Disease Data Platform, (inclusive of data on heart disease and stroke), to provide coverage of appropriate outcomes and the necessary level of detail, to maximise the utility of information. Examples of the types of data needed range from population health monitoring to detailed data on quality of acute care, including data on; heart disease and stroke incidence; use of recommended medications for primary and secondary prevention; quality of care; and structure and comprehensive reporting of relevant risk factors.

Many of these data can be derived from existing routine sources and require linkage and appropriate analysis. There are already some promising advancements to better utilise siloed data sources and infrastructure by linking a number of major datasets together. There is now an opportunity to build on the current momentum, ensure consistency at a national level, to assess gaps in the system, scope emerging data opportunities and better integrate the data that already exist. This work would benefit from strong partnerships between jurisdictions, AIHW and other relevant national agencies, clinical experts, researchers and consumers.

A targeted range of data-related actions and interventions have been identified and prioritised through the range of consultation processes for the Action Plan, including the need for monitoring, evaluation and accountability built into all actions. These illustrate the importance and synergistic benefits of improvement and development of an overarching, coherent data system.
Goal
The goal of the National Action Plan for Heart and Stroke is:

“That all Australians live healthier lives through effective prevention, treatment and management of heart disease and stroke”.

Objectives
1. Focus on primary and secondary prevention for a healthier Australia.
2. Provide efficient, effective and appropriate treatment for all Australians.
3. Provide access to support mechanisms for patients, carers and health professionals to provide and receive the best support and care.
4. Ensure a well-funded, collaborative approach to research and its translation into practice.

Priorities
The key actions needed to underpin a comprehensive and holistic approach to the prevention, treatment and management of heart disease and stroke in Australia fall into four priority areas. Each priority area is supported by actions focused on delivering the overall goal and objectives of the Action Plan. Each priority area is of equal importance and not ranked. The four priority areas are:

1. Prevention and Early Detection
2. Diagnosis and Treatment
3. Support and Care
4. Research
## Summary of Objectives and Actions

<table>
<thead>
<tr>
<th>Priority</th>
<th>Objectives</th>
<th>Actions</th>
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<tr>
<td></td>
<td>1.1 Detect and better manage Australians at risk of heart disease and stroke</td>
<td>1.1.1 Update the Absolute Cardiovascular Risk Assessment Guidelines</td>
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<td>1.1.2 Targeted approach to Absolute Cardiovascular Risk Assessment screening and uptake of Integrated Health Checks (IHC)</td>
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<td>1.1.3 Develop comprehensive screening via primary care for Atrial Fibrillation (AF)</td>
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<td>1.1.4 Raise awareness for health checks and screening promotion activities at appropriate ages</td>
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<td>1.1.5 Improve management of people at high risk of, or living with, heart disease and stroke through primary care</td>
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<td>1.1.6 Provide health professionals with appropriate tools and resources to support screening and care</td>
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<td>1.2 Address risk factors for heart disease and stroke to encourage all Australians to live healthier lives</td>
<td>1.2.1 Build on and strengthen existing work to reduce smoking in the community</td>
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<td>1.2.2 Ensure Australians are supported to be physically active</td>
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<td>1.2.3 Promote healthy eating to reduce prevalence of people with obesity</td>
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<td>1.2.4 Conduct population health data collection</td>
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<td>1.3 Increase awareness and understanding of heart disease and stroke within the Australian community</td>
<td>1.3.1 Implement nation-wide, targeted, awareness campaigns</td>
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2. Treatment and Diagnosis

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<tr>
<td></td>
<td>2.1 Provide efficient, effective and appropriate treatment for all Australians</td>
<td>2.1.1 Establish national clinical quality registries for heart and stroke</td>
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<td>2.1.2 Establish a National Cardiovascular Data Platform</td>
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<td>2.1.3 Improve equity in cardiac treatment and care</td>
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<td>2.1.4 Eliminate disparities in hospital treatment for Aboriginal and Torres Strait Islander peoples</td>
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<td>2.1.5 Implement the End Rheumatic Heart Disease (RHD) Roadmap</td>
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<td>2.1.6 Fund specialist outreach services for regional and remote communities, including remote Aboriginal communities</td>
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<td>2.2 Ensure world-class treatment and care is accessible when and where it is needed</td>
<td>2.2.1 Develop a national approach to collection, monitoring and linkage of ‘time to treatment’ data</td>
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<td>2.2.2 Improve the delivery of emergency stroke treatment to regional Australians</td>
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<td>2.2.3 Establish standardised national, pre-hospital, time-critical responses for heart attack and stroke</td>
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<td>2.2.4 Implement a national endovascular clot retrieval and thrombolysis plan</td>
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<td>2.2.5 Improve access to specialised stroke units</td>
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<td>2.2.6 Improve access to Transient Ischaemic Attack (TIA) clinics</td>
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### Summary of Objectives and Actions

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<tr>
<th>Priority</th>
<th>Objectives</th>
<th>Actions</th>
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<tbody>
<tr>
<td>3. Support and Care</td>
<td>3.1 Improve access to high quality rehabilitation services</td>
<td>3.1.1 Develop a national cardiac rehabilitation dataset</td>
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<td>3.1.2 Improve access to best practice cardiac rehabilitation services</td>
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<td>3.1.3 Improve access to best practice stroke rehabilitation services</td>
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<td>3.1.4 Expand telehealth services particularly in rural and remote areas and remote Aboriginal communities</td>
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<td>3.2 Improve the patient and carer journey from hospital to community, through multidisciplinary, coordinated care</td>
<td>3.2.1 Improve transition of care from hospital to the community</td>
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<td>3.2.2 Improve post discharge support services for people with heart disease and stroke, and their carers</td>
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<td>3.3 Support Australians with heart disease and stroke to make the best recovery possible, to be well, to actively engage with the community and to optimally return to education, work or retirement</td>
<td>3.3.1 Ensure access to information for all Australians</td>
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<td>3.3.2 Provide peer and emotional support mechanisms for patients and their carers</td>
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<tr>
<td>4. Research</td>
<td>4.1 Ensure a well-funded, collaborative approach to research, reflective of the burden of heart disease and stroke</td>
<td>4.1.1 Allocate funding for a Medical Research Future Fund (MRFF) mission reflective of heart and stroke burden of disease</td>
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<td>4.1.2 Allocate funding to tackle identified gaps in existing research</td>
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<td>4.2 Develop a platform to rapidly translate research evidence into clinical practice</td>
<td>4.2.1 Improve research translation and availability of evidence through ‘living’, continuously updated clinical guidelines</td>
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<td>4.2.2 Develop a nationally consistent approach to support health professionals in the translation of clinical guidelines</td>
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Priority 1

Prevention and Early Detection

Australia has a golden opportunity to save lives and reduce avoidable hospital admissions through early detection and prevention, and ongoing management of those at high risk of heart disease and stroke. There are two areas that will deliver significant gains in addressing the burden of heart disease and stroke in Australia:

- Primary prevention – using population health measures to promote good health and individualised management and treatment for those at high risk;
- Secondary prevention – better management of people who have had a heart attack or stroke or are living with heart disease (who are at much higher risk of further events or hospitalisation).

Heart disease and stroke are largely preventable. As these conditions share many risk factors, preventative actions will reduce the impact of heart disease, stroke and broader chronic disease – including dementia, diabetes and chronic kidney disease – in the community and health system. Focusing on prevention, while continuing to ensure that chronic conditions, such as heart disease and stroke, are well managed, will provide better health and economic outcomes for Australians\textsuperscript{vi}.

Prevention is not currently a national area of focus, however an investment in prevention today will generate health dividends tomorrow and into the future. Research shows that for every dollar invested there is a return of $14, in addition to the return of the original investment back to the wider health and social economy\textsuperscript{vii}.

Modifiable and non-modifiable risk factors

Modifiable risk factors are those that are generally able to be changed (including blood pressure, cholesterol, diet, physical activity, weight, smoking and alcohol intake). Non-modifiable risk factors are generally beyond the control of an individual, such as family history, age, gender, ethnicity and socioeconomic status.

Maintaining a healthy weight, being physically active and not smoking improves health and reduces the risk of heart disease and stroke as well as related chronic diseases. For people at risk of heart disease and stroke, medical intervention alone is insufficient. Lifestyle and behavioural changes are essential for overall risk management and health improvement. Specifically, this might mean quitting smoking, reducing harmful alcohol consumption, increasing physical activity and reducing body weight. Being overweight or obese is a major modifiable risk factor for a range of chronic diseases including heart disease and stroke, type 2 diabetes, chronic kidney disease, some cancers and osteoarthritis. These issues are becoming increasingly prevalent across the Australian community and together with an ageing population, mean that many people in Australia will spend more of their lives with chronic health conditions.
# PRIORITY 1 – PREVENTION AND EARLY DETECTION

**OBJECTIVE 1.1: Detect and better manage Australians at risk of heart disease and stroke**

<table>
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<tr>
<th>Actions</th>
<th>Implementation</th>
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| **1.1.1 Update the Absolute Cardiovascular Risk Assessment Guidelines** | Being able to accurately identify Australians at risk of a primary heart or stroke event is essential to improve health outcomes, reduce expenditure, and optimise treatment for those at risk. Current guidelines outlining how best to detect and manage CVD risk in primary care were developed by the National Vascular Disease Prevention Alliance (NVDPA) and endorsed by the National Health and Medical Research Council (NHMRC) in 2012.  
• Update the Guidelines for the Management of Absolute Cardiovascular Disease Risk (2012) and the associated website calculator and risk stratification algorithm to ensure accurate identification and management of Australians at risk of a primary heart or stroke event. |
| **1.1.2 Targeted approach to Absolute Cardiovascular Risk Assessment screening and uptake of Integrated Health Checks (IHC)** | Boost uptake of IHC (combining Absolute Cardiovascular Risk Assessment for heart disease and stroke, a type 2 diabetes check and a kidney disease test) for groups and individuals at high risk for heart disease, stroke and chronic disease.  
• Include the IHC in the Quality Improvement Incentive (QII) program.  
• Support creation of a dedicated Medicare Benefits Schedule (MBS) item and/or enhance existing items to explicitly include the IHC  
• Convene an expert advisory panel to make recommendations to the Australian Government on increasing and monitoring uptake of Absolute Cardiovascular Risk Assessments and IHC in primary care. |
| **1.1.3 Develop comprehensive screening via primary care for Atrial Fibrillation (AF)** | AF is the most common heart arrhythmia, its incidence increasing with age, and is associated with significant morbidity and mortality. People with AF are up to five to seven times more likely to experience a stroke. It is estimated up to 30 % of people with AF have not been diagnosed.  
• Implement national comprehensive screening for AF, involving opportunistic point-of-care screening in primary care settings (clinic or community) for people aged 65 years or more. |

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1 Government support for this action announced in February 2019 – implementation details pending
| 1.1.4 Raise awareness for health checks and screening promotion activities at appropriate ages | Australians need to know if they are at increased risk of heart disease and stroke, and what they can do to minimise that risk.
- Improve awareness of required health checks for all Australians through a system of notification and recall. Targeted populations include:
  - Aboriginal and Torres Strait Islander people;
  - Regional and rural Australians;
  - Culturally and linguistically diverse groups; and
  - Other identified vulnerable groups.
- Fund a pilot or scoping study of an ‘immunisation style’ record for adults with the aim of setting up a system of notification and recall for every Australian, listing all the approved checks they need at specified ages. |
| 1.1.5 Improve management of people at high risk, or living with heart disease and stroke through primary care | Better support for Australians to live healthier lives through primary care chronic disease management.
- Introduce blended payments to support better ongoing care of patients living with chronic disease (including people at high risk of developing a chronic condition or having an acute episode, such as a heart attack or stroke).
- Implement measures including specific payments for general practice and allied health services, encouraging better ongoing care of patients with, or at high risk of, heart disease or stroke and related conditions.
- Improve referral pathways to appropriate, evidence-based lifestyle modification programs with a dedicated portal that links health care settings and makes referral easy and simple for patients and practitioners. |
| 1.1.6 Provide health professionals with appropriate tools and resources to support screening and care | Support primary care health professionals to deliver better evidence-based care through quality-improvement programs.
- Promote and provide appropriate education and training, including software, to enable health professionals to use decision support tools that are evidence-based and piloted for use in primary care.
- Campaign in partnership with appropriate industry bodies and services to educate GPs about Absolute Cardiovascular Risk Assessment, building on work previously undertaken under the Primary Care Collaborative Program.
  - Promote a ‘promotion and/or educational tool’;
  - Embed educational materials or jointly branded resources in programs and systems; and
  - Establish a targeted communication campaign. |
OBJECTIVE 1.2: Address risk factors for heart disease and stroke to encourage all Australians to live healthier lives

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| **1.2.1 Build on and strengthen existing work to reduce smoking in the community** | Although Australia is a world leader in tobacco control, and the prevalence of smoking is at an all-time low, 2.7 million Australian adults are current smokers\(^a\). In 2017, tobacco use was responsible for the largest share of the burden of disease in Australia\(^a\). With targeted investment, Australia can reduce smoking rates to 5% or lower.  
  - Invest in a mass media education campaign to further reduce smoking prevalence for the life of the next National Tobacco Strategy.  
    - Employ a population level approach as well as complementary targeted approaches for populations with high smoking rates.  
    - Investment would complement existing funding provided for the Tackling Indigenous Smoking program.  
  - Develop national clinical guidelines and program support to embed a tobacco dependency treatment approach into health services.  
  - Fund a national Quitline service. |
| **1.2.2 Ensure Australians are supported to be physically active** | Physical inactivity is a major health problem and a significant risk factor for heart disease and stroke. All Australians at any age will benefit from being more physically active.  
  - Develop and fund a National Physical Activity Action Plan based on the recommendations outlined in the National Heart Foundation’s *Blueprint for an Active Australia*\(^xii\) and the *WHO Global Action Plan on Physical Activity 2018-2030*\(^xiii\). This would include measures covering:  
    - Healthy built environments;  
    - Program supports;  
    - Settings such as schools, workplaces and local communities; and  
    - Public education. |
| **1.2.3 Promote healthy eating to reduce prevalence of people with obesity** | Obesity is a leading modifiable risk factor for heart disease and stroke. It is an independent risk factor that exacerbates other risk factors for heart disease and stroke, increasing the likelihood of an individual having high blood pressure, high cholesterol and diabetes.  
  - Develop and fund a National Obesity Strategy, based on the recommendations outlined in the *Tipping the Scales: Australian obesity prevention consensus*\(^xiv\).  
  The previous National Nutrition Policy from 1992 urgently needs updating and expanding. |
• Develop and fund a new National Nutrition Policy to align with recommendations from the WHO, the United Nations Steering Committee on Nutrition (UNSCN) and the Food and Agriculture Organisation (FAO):
  – Curb marketing of unhealthy food and beverages to children;
  – Introduce a levy on sugary drinks, and invest funds raised in preventative health measures;
  – Strengthen national food reformulation, including reducing dietary sodium levels as well as portion control measures;
  – Invest in effective education campaigns, including a focus on early years; and
  – Mandate the national Health Star Rating system with enhanced consumer education measures.

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<tr>
<th>1.2.4 Conduct population health data collection</th>
<th>The last Australian Health Biomedical Survey to collect data on risk factors including those relating to heart disease and stroke was conducted by the Australian Bureau of Statistics (ABS) in 2011-2012.</th>
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<td>• Establish ongoing funding to implement a six-year rolling Australian Health Survey, that includes biomedical risk factors.</td>
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<td>• Include 24-hour urinary sodium excretion studies in the biomedical component of the Australian Health Survey.</td>
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**OBJECTIVE 1.3: Increase awareness and understanding of heart disease and stroke within the Australian community**

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| **1.3.1 Implement nation-wide, targeted, awareness campaigns** | When someone suffers a heart attack or stroke, every minute counts. Immediate access to treatment means a greater chance of survival, better outcomes and decreased costs to our health system. Too often, emergency treatment is delayed due to a lack of community awareness about the signs of heart attack or stroke and the appropriate course of action.  
  - Fund a national campaign to raise awareness of heart attack and its warning signs and appropriate action.  
  - Fund a national community education campaign to raise awareness of stroke and the signs of stroke (using the F.A.S.T message).  
  
  Campaigns are scalable and may include:  
  - Public awareness advertising (including television, radio, press, digital and social media);  
  - Consumer resources;  
  - Targeted public relations strategies to maximise free media opportunities;  
  - Community and school outreach talks by trained volunteers; and  
  - Community partnerships.  
  
  - Implement tailored, targeted campaigns to raise awareness of the warning signs of heart attack and F.A.S.T signs of stroke within regional and rural communities and priority populations. These include Aboriginal and Torres Strait Islander people and people of culturally and linguistically diverse backgrounds.  
  - Support a ‘women and heart disease’ campaign, with a focus on driving knowledge to reduce risk, change behaviour and encourage prompt action. |
Priority 2
Diagnosis and Treatment

All Australians need and deserve access to evidence-based care and treatment that is proven to save lives and improve outcomes. Addressing disparities in care among Australians is essential to improving diagnosis and treatment. All Australians should have equal access to efficient, effective and appropriate treatment and care, when and where it is needed. As Australia’s population ages, the number of people living with multiple chronic conditions (multimorbidity) including heart disease and stroke is expected to rise. The complexity of treatment and the involvement of multiple health providers only adds to the challenges we must address. In order to improve service delivery and quality of care, we need to ensure comprehensive measurement and monitoring of data. Better measurement and data collection can save lives and cut costs by informing health services about treatment and care of Australians living with heart disease and stroke and enable ongoing advances in care delivery.

**PRIORITY 2 – DIAGNOSIS AND TREATMENT**

*OBJECTIVE 2.1: Provide efficient, effective and appropriate treatment for all Australians*

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| **2.1.1 Establish national clinical quality registries for heart and stroke** | National clinical quality registries for heart disease and stroke are vital to monitor the quality of heart and stroke care, drive improvements in clinical practice and ultimately improve patient outcomes. The current approach is ad-hoc and inconsistent.  
- Strengthen coordination and integration of cardiac registries, to provide a comprehensive quality, patient-based profile of cardiac care across the nation and across patient experiences.  
- Expand the Australian Stroke Clinical Registry (AuSCR) to be a national clinical quality registry for stroke.  
- Optimise the use of data linkage projects and use of existing data, to monitor population trends, health outcomes and benchmark service outcomes across Australia. |
| **2.1.2 Establish a National Cardiovascular Data Platform** | Consistent, high quality, relevant data and data sharing are necessary in driving improvements in health outcomes, as well as underpinning accountability.  
- Incorporate data on heart disease, stroke, peripheral vascular disease, atrial fibrillation, heart failure and related conditions, including elements relevant to detection, prevention, diagnosis and treatment.  
- Scope existing and emerging data sources relevant to cardiovascular disease.  
- Define measures to be monitored across the risk, incidence, prevention, care and outcome spectrum, including the data-specific actions defined in this plan. This should include variation in these, according to the agreed equity measures in action 2.1.3. |
| 2.1.3 Improve equity across cardiac treatment and care. | • Link and analyse data from the appropriate sources to produce regular and ongoing measures of cardiovascular disease status and progress, ensuring appropriate targeting and accountability of actions.  
• Communicate evidence effectively to heart and stroke stakeholders. |
| 2.1.4 Eliminate disparities in hospital treatment for Aboriginal and Torres Strait Islander people | Disparity exists in cardiac treatment and care, dependent on where a person lives and what services are available for treatment.  
• Define equity standards for cardiac care, including across prevention, acute care and secondary care.  
• Quantify and monitor current variation across these dimensions at the national, jurisdictional and local level, including according to gender, rurality, Aboriginality, socioeconomic status and between culturally and linguistically diverse groups.  
• Support services to respond to their data on equity, including raising awareness and enhancement of continuous quality improvement processes to achieve equity standards. |
| 2.1.5 Implement the End Rheumatic Heart Disease (RHD) Roadmap | A specific focus on Aboriginal and Torres Strait Islander people is required in hospital-based care.  
• Continue to support the Heart Foundation, Aboriginal and Torres Strait Islander health organisations and key partners in reducing disparities in care. The ‘Lighthouse Hospital Project’ has built a solid foundation from which to address the large gaps that exist between treatment and outcomes for Indigenous and non-Indigenous people.  
  – Expand the ‘Lighthouse Hospital Project’ to include a maximum of 20 sites to be funded for Phase 4.  
• Undertake work to identify barriers to accessing to best practice hospital-based stroke care. |
| 2.1.6 Fund specialist outreach services for regional and remote communities, including remote Aboriginal communities | The End RHD Roadmap offers a more comprehensive approach to preventing new cases of RHD, as well as supporting people already living with the disease.  
• Significant long-term investment is required to implement the End RHD Roadmap and eliminate the disease by 2031.  
  – Initial investment to expand the number of communities supported to tackle RHD |

People living in regional and remote areas of Australia often do not receive the same level of treatment and care as those in metropolitan areas.  
• Evaluate existing specialist heart and stroke outreach services and fund and expand programs and services, with additional support through national telehealth services.
**OBJECTIVE 2.2:** Ensure world-class treatment and care is accessible when and where it is needed

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| **2.2.1 Develop a national approach to collection, monitoring and linkage of ‘time to treatment’ data** | Treatment times are critical to improve outcomes for those who experience heart attack and/or stroke. The sooner a person receives treatment, the better the outcome. Better measurement will drive improvements in treatment times.  
- Develop and implement a framework to collect, monitor and record critical ‘time to treatment’ data for emergency heart and stroke care in Australia.  
- Ensure ambulance, emergency and hospital services have the capability and capacity to record and capture this data to enable reporting against these measures.  
- Align data collection with the Acute Coronary Syndromes Clinical Care Standard Indicators and the Acute Stroke Clinical Care Standard Indicators. |
| **2.2.2 Improve the delivery of emergency stroke treatment to regional Australians** | Regional and rural Australians are 19% more likely to experience a stroke than their metropolitan counterparts. Regional and rural Australians are also more likely to die or be left with a significant disability from their stroke because they do not have access to specialist health professionals or services.  
- Establish a national stroke telemedicine model to reduce geographic barriers and ensure world-class, emergency stroke treatment is available to all Australians when and where they need:  
  - Expand and connect scalable state-based stroke telemedicine networks to deliver national coverage;  
  - Establish infrastructure;  
  - Provide implementation support;  
  - Coordinate 24/7 access to neurologists and neuroradiologists. |
| **2.2.3 Establish standardised national, pre-hospital, time-critical responses for heart attack and stroke** | Remove barriers and expedite access to time-critical treatments for heart attack and stroke.  
- Examine options to address perceived and real financial barriers to calling an ambulance for heart attack and stroke patients.  
- Implement nationally consistent competency training for first responders, including information on how to recognise heart attack and stroke in young people and stroke in children.  
- Utilise technology and systems:  
  - Establish pre-hospital notification systems based on proven applications;  
  - Investigate the expansion of ambulances equipped to treat stroke patients and related innovations;  
  - Implement national protocols to ensure ambulance services deliver patients to centres that can provide appropriate cardiac and stroke services. |
| 2.2.4 Implement a national endovascular clot retrieval and thrombolysis plan | A well-organised national system will ensure equitable access to vital life-saving treatments for stroke patients.  
- Establish integrated reperfusion services (endovascular clot retrieval and thrombolysis) in geographical areas of need.  
- Establish national coordination of reperfusion services to ensure jurisdictional boundaries do not limit access to these time-critical treatments.  
- Implement standardised emergency assessment protocols and support systems. |
|---|---|
| 2.2.5 Improve access to specialised stroke units | Given the substantial evidence that organised inpatient stroke units benefit stroke patients, we need to ensure equitable access to consistent quality care in these units.  
- Develop a national accreditation framework based on national standards for stroke unit services.  
- Align accreditation of stroke units with financial incentives, and provide support for stroke units to improve their quality of care where necessary.  
- Ensure stroke units are adequately resourced with appropriate multidisciplinary care teams including stroke care coordinators and allied health staff. |
| 2.2.6 Improve access to Transient Ischaemic Attack (TIA) clinics | A transient ischaemic attack (TIA) happens when the blood supply to the brain is blocked temporarily. The signs are the same as for a stroke, but they disappear within a short time. Specialised clinics are critical in managing people who have experienced TIA. By providing rapid access to investigations and treatment, TIA clinics reduce the risk of stroke and avoidable hospital admissions.  
- Ensure consistent availability of rapid access TIA clinics in geographical areas of need, along with well-established referral pathways. |
Priority 3

Support and Care

Heart disease and stroke have major impacts on the lives of Australians. For many people these impacts limit their quality of life, and for some they last a lifetime. Many people live with changes that affect their physical, social and emotional wellbeing. Some of these impacts not only affect patients but also their families and carers.

People living with heart disease and stroke, and their loved ones, need ongoing support to live well. People living with heart disease and stroke should be at the core of rehabilitation and support programs with initiatives tailored to their needs. Programs must be effective, evidence-based and available when and however they are needed.

All Australians must be empowered to navigate their own health care, to live with the best quality of life possible. This means we must support those people living in communities that are disproportionately affected by heart disease and stroke, including Aboriginal and Torres Strait Islander peoples; people living in remote, rural and regional areas; people who are socioeconomically disadvantaged; and culturally and linguistically diverse groups.

PRIORITY 3 – SUPPORT AND CARE

OBJECTIVE 3.1: Improve access to high quality rehabilitation services

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| **3.1.1 Develop a national cardiac rehabilitation dataset** | Cardiac rehabilitation (along with appropriate secondary prevention measures) is vital to reducing the likelihood of someone having another heart attack or heart event. People are 40 per cent less likely to be readmitted to hospital and 25 per cent less likely to die from another heart attack if they have participated in a cardiac rehabilitation service\(^{vi}\). In order to improve quality of care and service delivery, we need to monitor and record data.  
  - Develop a national agreed set of minimum data to enable cardiac rehabilitation services to collect and measure referral, participation, completion and readmission rates.  
    - Identify opportunities to improve services and monitor progress over time; and  
    - Inform development of best practice and alternative models of service provision. |
| **3.1.2 Improve access to best practice cardiac rehabilitation services** | Access to and completion of cardiac rehabilitation services by heart attack survivors can dramatically reduce the chances of subsequent cardiac events. This saves and improves lives and reduces costs. It is imperative to increase the proportion of eligible patients who participate in cardiac rehabilitation. |
- Scope and fund programs to provide alternative models of care that are flexible and patient centred, allowing patients and carers to access services in the way that best suits them. These may include:
  - Phone-based services, digital platforms and telehealth services; and
  - Tailored solutions to meet the needs of various populations including young people, workers, culturally and linguistically diverse communities, people of lower socioeconomic status, and rural and remote communities.
- Expand provision of culturally appropriate programs for Aboriginal and Torres Strait Islander populations, to ensure services are accessible within:
  - Aboriginal and Torres Strait Islander communities; and/or
  - Mainstream services; and/or
  - Aboriginal specific health services, with options that include alternative models of care.

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<tr>
<th>3.1.3 Improve access to best practice stroke rehabilitation services</th>
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<td>Equitable access to rehabilitation services is crucial to ensure Australians live well after stroke, gain increasing independence and have their emotional and psychological needs met.</td>
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<tr>
<td>- Provide support and resources for health professionals to:</td>
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<td>- Improve uptake of consistent and standardised assessment processes for rehabilitation;</td>
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<td>- Optimise transition from acute to rehabilitation services.</td>
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<td>- Ensure availability and funding of stroke inpatient and community rehabilitation services, including alternative models of rehabilitation such as Early Supported Discharge programs.</td>
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<td>- Pilot and evaluate models that support consistent periodic reviews for stroke survivors in the community. Reviews should be with health professionals and should cover physical, speech, cognitive and emotional aspects of life after stroke, and ensure access to targeted rehabilitation when and where it is most needed.</td>
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<th>3.1.4 Expand telehealth services particularly in rural and remote areas and remote Aboriginal communities</th>
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<td>Ensure all Australians have access to best-practice cardiac and stroke rehabilitation care and allied health specialists close to home.</td>
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<td>- Establish a specialist telehealth rehabilitation network to:</td>
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<td>- Investigate best-practice uses for telehealth in rehabilitation;</td>
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<td>- Link telehealth to use of alternative models of care for provision of cardiac and stroke rehabilitation services; and</td>
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<td>- Utilise telehealth services to support and boost the capacity of health professionals in regional and rural areas through ongoing training, development and collaboration.</td>
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<tr>
<td>- Scope options for expansion and development of digital health approaches, including online and mobile mediums, to support rehabilitation service models of care.</td>
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### OBJECTIVE 3.2: Improve the patient and carer journey from hospital to community, through multidisciplinary, coordinated care

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| **3.2.1 Improve transition of care from hospital to the community** | Ensure all Australians with heart disease and stroke have a well-coordinated and supported discharge from hospital, and a smooth transition into the community.  
- Equip hospital clinicians with the tools and resources they need to provide consistent, detailed care planning and management, including:  
  - Lifestyle modification education and secondary prevention medication;  
  - Routine referral to ongoing rehabilitation services, multidisciplinary chronic disease follow-up and specialist physician review as required;  
  - Routine discharge referral process to primary care-based secondary prevention services; and  
  - Supports and services available in the community.  
- Scope options to expand nurse-led clinics to fill gaps in the transition of care and management for heart disease (particularly heart failure) and stroke patients. |
| **3.2.2 Improve post discharge support services for people with heart disease and stroke, and their carers** | Support Australians with heart disease and stroke to make the best recovery possible, to be well and participate in the community.  
- Support dedicated helplines - Heart Foundation Helpline and StrokeLine.  
- Expand the existing dedicated post-discharge stroke telephone service nationally, connecting survivors and their families with the services and supports they need to live well. Staffed by health professionals, the service will support survivors and their families to:  
  - Connect with a GP to ensure ongoing preventive medication and chronic disease management including lifestyle changes to prevent avoidable hospital admissions and recurrent heart or stroke events;  
  - Connect with mental health services, peer support and specialist services as needed; and  
  - Receive vital education on how to reduce the risk of future heart attacks, strokes and heart disease.  
- Expand availability of peer support for patients and carers. |
**OBJECTIVE 3.3: Support Australians with heart disease and stroke to make the best recovery possible, to be well, to actively engage with the community and to optimally return to education, work or retirement**

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| **3.3.1 Ensure access to information for all Australians** | High quality, relevant information is essential to ensure Australians are well-informed on how to manage their conditions. Information should be available at the right time, where and how it best meets the needs of individuals and their families.  
- Provide tailored resources to support people with heart disease and stroke, and their families, during the recovery and disease management process.  
- Provide targeted resources for priority populations including:  
  - Culturally and linguistically diverse communities;  
  - Aboriginal and Torres Strait Islander people;  
  - Paediatric stroke survivors and their families;  
  - Stroke survivors affected by aphasia and their families.  
- Proactively provide mental health information in conjunction with the dissemination of other resources throughout the recovery and disease management process. |
| **3.3.2 Provide peer and emotional support mechanisms for patients and their carers** | Recovery and ongoing management of heart disease and stroke can be a long and challenging process. Australians should not have to navigate this process alone.  
- Increase access to support and self-management mechanisms through a range of approaches including phone, face-to-face and digital mediums.  
- Expand online and digital peer support portals for people living with heart disease and/or stroke and their families or carers.  
- Offer tailored support for younger stroke survivors focused on empowering them to return to work and community activities, with linkage to the National Disability Insurance Scheme (NDIS) where appropriate. |
Priority 4

Research

Australia is recognised internationally for excellence in heart disease and stroke research, and clinical care.

There is an opportunity to capitalise on this expertise and deliver the next break-through in prevention and/or treatment of heart disease and stroke. This might mean identifying new early markers of disease and opportunities for innovative preventative and therapeutic strategies.

We are also well placed to use Australian innovation to deliver world-leading heart disease and stroke care for all Australians, from prevention and primary care through to the operating theatre, rehabilitation and beyond.

Heart disease and stroke research is an investment in the social and economic well-being of the nation. Many advances in heart disease and stroke derive from health and medical research discoveries. The community benefits directly from the application of evidence-based research in the prevention of these conditions, and in the treatment, care, and management of patients.

The Medical Research Future Fund (MRFF) Act 2015 states that funding priorities must take into account the burden of disease on the Australian community. In 2017, CVD accounted for 12.3 per cent of the total burden of disease in Australia\textsuperscript{xvii}. If we are to address the social and economic costs of heart disease and stroke, it is critical that disbursements from the National Health and Medical Research Council (NHMRC) and MRFF be allocated to reflect Australia’s disease burden.

Research takes time and a great deal of money, but when the break-throughs come, they benefit generations.
PRIORITY 4 – RESEARCH

**Objective 4.1: Ensure a well-funded, collaborative approach to research, reflective of the burden of heart disease and stroke**

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| **4.1.1 Allocate funding for a Medical Research Future Fund (MRFF) mission reflective of heart and stroke burden of disease**<sup>2</sup> | Delivery of health evidence translation is required to strengthen health systems and improve outcomes for Australians with heart disease and stroke.  
- Focusing on the most common causes of premature death from heart disease and stroke, fund a whole-of-nation, whole-of-translational pipeline approach that matches Australian expertise with critical need in the areas of:  
  - Atherosclerosis;  
  - Heart failure;  
  - Cardiac arrhythmias/ sudden cardiac death; and  
  - Stroke.  
- Establish six flagships that will facilitate strategic, nation-wide collaboration in the following areas:  
  - Implementation and Policy;  
  - Clinical Trials;  
  - Smart Data  
  - Bioengineering;  
  - Precision Medicine; and  
  - Drug Discovery.  
- This work would also be supported by capacity building initiatives including a national bioinformatics program, and initiatives to support and encourage commercialisation of discoveries, thus embedding research in our health system and helping us to target unmet special needs. |

| **4.1.2. Allocate funding to tackle identified gaps in existing research** | Significant gaps exist in stroke research, particularly in the areas of recovery and rehabilitation. Funding that supports research could, for example, help us to:  
- Improve our understanding of the natural history of stroke recovery.  
- Develop clear biomarkers of recovery to help identify sub-groups of patients to target, for the development, testing and implementation of novel, effective rehabilitation and therapeutic interventions. |

<sup>2</sup>Government support for this action announced in February 2019 – implementation details pending
### Objective 4.2: Develop a platform to rapidly translate research evidence into clinical practice

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| **4.2.1 Improve research translation and availability of evidence through ‚living‘, continuously updated, clinical guidelines** | Evidence-based clinical practice guidelines are key to establishing effective, high quality, consistent and safe healthcare practices and policies. Living clinical guidelines mark a new era in the ability to support health services and improve outcomes.  
- Support the Australian Living Evidence Consortium to build and evaluate a world-first, online, dynamically updating summary of evidence to guide clinical practice and policy development:  
  - Provide resources to transform existing heart disease guidelines into living guidelines; and  
  - Consider expansion of the current living guidelines pilot for stroke to include paediatric stroke. |
| **4.2.2 Develop a nationally consistent approach to support health professionals in the translation of clinical guidelines** | Embed guidelines into clinical practice to ensure care is based on the best available evidence.  
- Promote accessible guidelines (online) reflective of latest evidence, supported by educational tools and avenues for collaboration.  
- Provide ongoing, data-driven quality improvement programs within hospitals, reflective of best-practice guidelines. |
Achieving progress

The Action Plan requires a coordinated and strategic national response, with engagement and partnership from all sectors, all governments, non-government organisations, private sector and industry, researchers and academics, communities and individuals. To achieve progress, it is essential that the Action Plan is funded and that jurisdictions are supported to implement and promote the actions within the plan.

To ensure the effectiveness of the Action Plan in fulfilling its goal and objectives, the following is proposed:

1. Establish an Implementation Advisory Group to provide expert advice on facilitation and drivers for the implementation of the Action Plan;
2. Conduct a five-year review, with twelve-month and three-year development checks, to assess progress made on each of the priorities.

Expectations for the future

In five-year’s time we would expect to see marked improvements against the objectives of the Action Plan, with indication of progress against the overarching goal.

Next steps

Further work is required to operationalise each of the priorities in the Action Plan. It is proposed an Implementation Advisory Group, comprising of leaders in the heart and stroke field, work together to coordinate efforts and drive the delivery of the Action Plan. The advisory group should be established with experts across the heart disease and stroke space, including in partnership with the National Heart Foundation, Stroke Foundation, state and federal government, and a range of other stakeholders, including consumers. Implementation may include developing an interventional timeline to prioritise actions, identifying the sector area responsible for leading the implementation of each action, key implementation partners and how to progress implementation to achieve the overall objective.
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3 Australian Bureau of Statistics 2018, National Health Survey: First results, 2017-18, Australia, ABS cat. no. 4364.0.55.001, December.
12 National Heart Foundation of Australia, 2014, Blueprint for an active Australia. 2nd edn. Melbourne.
16 De Grutyer et al, Economic and Social Impact of Increasing Uptake of Cardiac Rehabilitation Services- A Cost Benefit Analysis, Heart Lung Circ. 2016 Feb;25(2)175-83.