## Heart health: Improved services and better outcomes for Victorians





Department of Health & Human Services

Heart health: Improved services and better outcomes for Victorians

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### **Executive summary**

*Heart health: improved services and better outcomes for Victorians (Heart health)* builds on Victoria's existing system of cardiac care and the impressive advances made in recent decades to treat heart disease. It provides a five-year plan and key strategic directions that aim to improve prevention efforts and enhance cardiac services based on evidence of best practice.

While more people are surviving acute cardiac events, the prevalence of heart disease in the Victorian community is still growing. This is a consequence of an ageing population and the increasing incidence of obesity and diabetes. *Heart health* acknowledges these challenges, and that some Victorians are at a higher risk of developing heart disease or of having poorer outcomes.

In order to continue to improve cardiac survival rates and achieve the best possible patient outcomes for all Victorians regardless of where they live, *Heart health* prioritises and guides the planning of cardiac services across the full continuum from prevention to end-of-life care.

The plan is based on four strategic directions. These begin with a clear emphasis on the importance of healthy living, identifying risk factors and preventing disease. Direction 1 builds on significant investment across Victoria in relevant education and prevention initiatives, including tobacco control and obesity. It also complements the focus of the *Victorian Public Health and Wellbeing Plan 2011–2015*<sup>7</sup> to engage communities and strengthen systems for health protection and promotion. For those with early signs of disease, this direction focuses on greater health literacy and self-management, as well as improved assessment and early management of risk factors in primary care to reduce disease progression.

Direction 2 provides a focus on maximising the system response to time-critical events, with faster access to cardiac care, including specialist advice as required. This direction also recognises that surviving an acute event can be dependent on a rapid and effective response from both members of the community and the health system to reduce death and improve patient outcomes.

Accessing best practice care when it is needed and in the most appropriate setting is the focus of direction 3. Cardiac services should be based on evidence of best practice and provided as close as possible to where people live, with highly specialist services accessible to all. The care needs of people who have experienced an acute cardiac event, undergone a cardiac procedure, or who have a chronic heart condition go beyond episodic hospital-based interventions. They need a combination of targeted rehabilitation services, information and ongoing supports to improve their quality of life. To provide this, care needs to be consistent, coordinated and tailored to the individual needs of people with heart disease.

Finally, direction 4 aims to strengthen system performance to ensure there is seamless transition between all stages of the care continuum and health service providers. Clinical leadership, performance monitoring, and strengthening of the cardiac workforce will drive continuous improvement across cardiac services and the health system, in turn delivering the best possible health outcomes.

### Vision

Improved care and better outcomes for Victorians with, or at risk of, heart disease.

### Strategic directions

The four strategic *Heart health* directions are the pillars that will guide the development of cardiac services across Victoria and across the full continuum from prevention to end-of-life care.

Figure 1 provides a summary of the four strategic directions, with the priority actions defined for each. The target groups, priority settings for action and engagement and important partnerships are also described.

#### Figure 1: Heart health summary



Governance, monitoring and evaluation

To improve the health system's response to increasing demand for better management of both cardiac conditions and cerebrovascular disease, which includes stroke, the Victorian Government has committed an additional \$21.9 million in funding over four years from 2013–14 to 2016–17 to improve cardiac and stroke services.

Taking a system-wide approach, the strategic directions outlined will guide the effective and sustainable evolution of cardiac services, incorporating this additional commitment. Working together, the Victorian Government, health services, the Victorian Cardiac Clinical Network, the Heart Foundation of Australia and clinicians across the state can improve the heart health of all Victorians.



### Introduction

An acute cardiac event such as a heart attack, is a medical emergency that can pose an immediate risk to a person's life or long-term health. While major advances in diagnostics, therapeutic agents, emergency management and treatments have improved survival rates, coronary heart disease (CHD) remains the single leading underlying cause of death across Victoria and the nation as a whole.<sup>2,3</sup> Almost 7,300 Victorians died from heart disease in 2011, with heart attacks claiming approximately 2,280 lives.<sup>2</sup>

As a leading cause of death and a major contributor to the health burden of Victorians, heart disease is one of the greatest cost burdens on the healthcare system. In 2011–12 the Victorian Government spent in the order of \$400 million on acute care for cardiac patients alone, with millions more spent on emergency care and related services and treatment. Medications to manage risk factors for heart disease are some of the most commonly used medicines in Australia. These include medicines to reduce blood cholesterol and lower blood pressure.<sup>3</sup>

The prevalence of heart disease in our community is unfortunately growing, mainly as a result of the increasing proportion of people aged 65 or older and the increasing incidence of obesity and diabetes. While more people are surviving acute events, they are also living longer with ongoing chronic heart conditions.<sup>4</sup> It is estimated that more than 300,000 adult Victorians<sup>a</sup> are living with heart disease, reducing their quality of life and increasing their risk of a further life-threatening cardiac event or stroke.

The Victorian Government's priorities for health reform have been detailed in the Victorian Health *Priorities Framework 2012–2022: Metropolitan Health Plan<sup>5</sup>* and the *Rural and Regional Health Plan.*<sup>6</sup> These documents recognise that heart disease is expected to rise by 36 per cent over the next decade, so there is a critical need to respond in order to improve the health and wellbeing of Victorians, and reduce growing demand and cost pressures on the health system. People with heart disease were identified as a priority population group in these health plans, requiring a statewide plan to guide the systematic improvement of care.

*Heart health: improved services and better outcomes for Victorians (Heart health)* provides this focus. It takes a whole-of-system approach and will involve all sectors of health and wellbeing services, including primary care, acute and subacute services and important stakeholder organisations such as the Heart Foundation of Australia (Heart Foundation). *Heart health* also provides a platform for delivering the cardiac service-related priorities of the 2013–14 Victorian Government investment of \$21.9 million over four years to improve access to lifesaving treatment for heart attack and stroke, especially in rural and regional Victoria.

This plan and its strategic directions have been developed with input and advice from the Victorian Cardiac Clinical Network (VCCN), which has drawn on the knowledge and experience of clinicians, patients and key stakeholders.

Detailed analysis of relevant morbidity data and health service activity data describes the current status of heart disease in Victoria and the existing service response. This highlights the need to reduce the impact of heart disease on the healthcare system by improving the way cardiac services are provided. Details are provided in Appendices 1 and 2.

<sup>&</sup>lt;sup>a</sup> Estimate based on Department of Health 2012, *Victorian Population Health Survey 2010*, State Government of Victoria, Melbourne, prevalence of ever having been told by a doctor that a person (aged 45+) had heart disease multiplied by Victorian 2011 estimated resident population for each age group (aged 45+) and gender.



### Background

#### Heart disease

Heart disease is a collective term for acute and chronic diseases affecting the function of the heart, or the arteries that supply the heart with oxygen and nutrients. Heart disease includes heart failure, rheumatic heart disease, arrhythmias, other conduction disorders, congenital heart conditions and CHD, which is also known as coronary artery disease or ischaemic heart disease.

CHD is the most common form of heart disease, and the most common cause of acute myocardial infarction (heart attack), chronic congestive heart failure and sudden cardiac death.<sup>7</sup> The two types of acute myocardial infarction, ST elevation myocardial infarction (STEMI) and non-ST elevation myocardial infarction (non-STEMI), along with unstable angina are grouped together and known more simply as acute coronary syndromes (ACS).

Arrhythmias and conduction disorders are also a significant health issue as they can predispose people to sudden cardiac arrest and death, heart failure and strokes. For example, atrial fibrillation, one of the most common cardiac arrhythmias, is estimated to increase the risk of stroke by a factor of five and increases the severity, morbidity and mortality of a stroke.<sup>8</sup>

Appendix 1 provides further detail on definitions of heart disease and risk factors.

#### Heart disease in Australia

Heart disease is a substantial burden on the health of Victorians and the Australian population as a whole.

In Australia:

- CHD was the single leading underlying cause of death during 2011, and has been the leading cause of death in the country since 2000.<sup>2</sup>
- CHD was also found to contribute to 37,647 or 25.6 per cent of all deaths as either an underlying
  or multiple cause, and heart failure contributed to 21,249 or 14.5 per cent of all deaths.<sup>2</sup>
- Each year there are approximately 55,000 heart attacks in Australia, which is 151 reported heart attacks a day, or one heart attack every 10 minutes.<sup>9</sup>
- It has been estimated that if you are male, 40 and live in Australia, your chance of having a heart attack by the age of 70 is one in two, compared with one in three for females. For women who smoke, however, the chance of having a heart attack increases to the same level as men.<sup>10</sup>

Over the past century the age profile of the population has shifted as people live longer, with an increasing proportion of the population now aged 65 or older. This means people have longer periods of exposure to risk factors for heart disease and other chronic diseases. In the past, few interventions were available to manage a person with heart disease or experiencing a major acute cardiac event, so mortality from CHD grew steadily from the early part of the 20th century.

In the late 1960s and early 1970s advances in the management of risk factors and acute cardiac events, improved cardiac diagnostics, and the development of complex interventions resulted in improved survival from CHD (Figure 2).



#### Figure 2: Coronary heart disease deaths and population in Australia, 1940-2011

Sources: Australian Bureau of Statistics <sup>2, 11, 12</sup> and Australian Institute of Health and Welfare<sup>13</sup>

The introduction of invasive cardiac catheter-based diagnostics led to the development of non-surgical catheter-based therapies such as percutaneous coronary intervention (PCI). Improvements in non-invasive techniques such as echocardiography have enabled the function of the heart to be studied; developments in cardiac computed tomography (CT) have delivered precise three-dimensional images of the heart, without the need to insert a catheter. Cardiac surgery has also become less invasive as techniques have improved, leading to reduced complications and lengths of hospitalisation.

Comprehensive therapeutic regimens and rehabilitation programs following an acute event such as a heart attack have aided recovery and reduced the likelihood of a subsequent event or complication. Cardiac transplants and artificial cardiac pumps used as a bridge to transplants provide additional options for some people with end-stage heart disease.

### Heart disease in Victoria

- An estimated 300,000 adult Victorians are living with heart disease.
- In 2011, heart disease and related conditions were the underlying causes of death for more than 7,290 Victorians,<sup>2</sup> which equates to 20 per cent of all deaths.
- Heart diseases killed 20 Victorians each day, with heart attacks claiming six lives each day in 2011.<sup>2</sup>
- CHD was responsible for more than three times the deaths of Victorian women than breast cancer in 2011.<sup>2</sup>
- Although there has been a significant decline in avoidable mortality due to CHD since 1997, it remains the leading cause of avoidable mortality.<sup>14</sup>
- The cost of heart disease on the healthcare system as a whole is significant.

Many Victorians are at risk of developing chronic health conditions such as heart disease due to lifestyle factors. A recent population survey<sup>15</sup> of the health and lifestyles of Victorian adults revealed that there remains a large proportion of the community with lifestyle risk factors that put them at higher risk of heart disease. For example, half the people surveyed did not meet the recommended minimum daily intake of fruit, 92 per cent did not eat enough vegetables, 40 per cent did not undertake sufficient daily physical activity to meet national guidelines and nearly 14 per cent were daily smokers.

The 2012 Victorian Health Monitor<sup>16</sup> identified the prevalence of heart disease biomedical risk factors in the community. This showed that 38.1 per cent of adults are overweight, 24.5 per cent obese, 25.1 per cent have high blood pressure, 56.8 per cent have abnormal levels of blood cholesterol and 4.6 per cent have diabetes. The prevalence of multiple risk factors is also significant. For example, the prevalence of abnormal levels of blood cholesterol is higher in people who are physically inactive, obese or smoke and people with high blood pressure.

Some Victorians are at increased risk of developing heart disease or poorer outcomes due to the complex interplay between prevalence of risk factors, socioeconomic circumstances, education (and health literacy), cultural backgrounds and available local access to healthcare. For example, 46 per cent of people who live in the most disadvantaged areas report having four or more risk factors compared with 27 per cent of people living in the least disadvantaged areas.<sup>3</sup>

Figures 3 and 4 are extracted from the Victorian Heart Maps,<sup>17</sup> developed by the Heart Foundation in partnership with the VCCN. These show the standard morbidity ratio for STEMI and heart failure by Victorian local government area (LGA). Figure 3 demonstrates that there is a higher incidence of heart attack for Victorians living in many rural areas. Figure 4 shows the rate of heart failure is also higher in some rural and outer metropolitan areas.



#### Figure 3: Standard morbidity ratio for STEMI by LGA, 2007–08 to 2011–12



#### Figure 4: Standard morbidity ratio for heart failure by LGA, 2007–08 to 2011–12

Source: Victorian Heart Maps 2013, Heart Foundation (Victoria)

Aboriginal and Torres Strait Islander Victorians have a substantially higher prevalence of heart disease at 8.1 per cent, compared with non-Aboriginal and Torres Strait Islander people at 6.5 per cent.<sup>18</sup> There are also a greater number of hospital admissions for ambulatory care sensitive conditions among people of low socioeconomic status and Aboriginal and Torres Strait Islander people, and a greater rate of avoidable mortality among low socioeconomic and rural/regional Victorians.<sup>19</sup> Between 2002 and 2006 the standardised mortality rate ratio for potentially avoidable CHD for Department of Health & Human Services's rural regions were higher compared to Victoria as a whole. The rate for Barwon South Western, Gippsland, Grampians and Loddon Mallee were significantly higher than the rate for Victoria.

This demonstrates that for Victoria to achieve significant improvements in morbidity and mortality from heart disease, the greatest gains can be made through improvements in rural and regional areas.

#### Cardiac care in Victoria

Cardiac care across the disease continuum is provided in a range of settings, with all parts of the Victorian health system playing a part in providing services to improve outcomes for people at risk or with established heart disease. Roles vary across settings and include: managing the risk factors of early heart disease in primary care; emergency management of acute events in the pre-hospital environment, emergency and acute hospital settings; ongoing management of the effects of chronic disease; and supporting end-of-life care in both hospital settings and primary care.

#### **Primary care**

In primary care, services are focused on early detection and intervention and managing the risk factors of early disease to promote heart health and healthy living. Primary care, including general practice and community health services, also play important roles in supporting recovery and ongoing chronic disease management.

Circulatory conditions are one of the higher volume conditions managed by general practitioners (GPs) across Australia, with the percentage of GP encounters for circulatory conditions increasing with patient age.

There is a significant opportunity to consider how risk is assessed and managed in general practice, moving from a single risk factor approach to one that addresses the interplay of risk factors, and risk stratification for cardiovascular disease (CVD), from low to high. The National Vascular Disease Prevention Alliance *Guidelines for the management of absolute cardiovascular disease risk 2012*<sup>20</sup> will inform and guide implementation of this approach.

#### **Pre-hospital care**

Managing an acute cardiac event may begin in the community, with coordinated action by the public, Ambulance Victoria and/or other community service providers being critical to the survival and outcomes for people experiencing such events.

Members of the community can play a significant part in the survival of a person experiencing a heart attack or cardiac arrest by calling for an ambulance and/or actively assisting by providing cardiopulmonary resuscitation (CPR). Victoria has a high rate of bystander CPR, which contributes to the high survival rates from cardiac arrest.<sup>21</sup> Publicly accessible automated external defibrillators (AEDs) have been installed in many locations throughout the state, so ready access to these life-saving devices also improves the chances of survival.

Ambulance Victoria is an essential part of Victoria's emergency response system, providing prehospital care and transport. The provision and coverage of MICA services has been expanded across Victoria with new MICA Single Responder Units established in Warrnambool, Horsham, Mildura, Shepparton, Wangaratta, Wodonga, Sale, Bairnsdale, Wonthaggi and Swan Hill.

Suspected cardiac arrest, chest pain and patients experiencing heart problems totalled 59,423 in the 2012–13 calendar year or 11.2 per cent of Ambulance Victoria's total emergency workload.<sup>b</sup> The Metropolitan Fire Brigade and Country Fire Authority also attended 4,079 emergency medical responses in 2012–13.

Ambulance Victoria also operates Adult Retrieval Victoria (ARV), which is responsible for coordinating inter-hospital transfers of critically ill and time-critical adult patients to specialist services. These patients require specialist intervention and access to critical care beds, the majority of which are in the metropolitan area. In 2012–13, cardiac patients comprised the single largest clinical case type for ARV with 1,021 cases or 26 per cent of total cases.<sup>22</sup>

<sup>&</sup>lt;sup>b</sup> Based on final primary assessments: acute coronary syndrome, acute myocardial infarction, acute pulmonary oedema, angina, arrhythmia, confirmed cardiac arrest, cardiac failure, deceased, hypertension, hypotension, implantable defibrillator problem, pacemaker problem, chest/ischaemic pain, palpitations.

#### Acute hospital care

All Victorian public hospitals play an important role in providing care to adults with heart disease, including emergency care, inpatient, outpatient, rehabilitation services and palliative care. The level and complexity of cardiac care ranges from supporting independent self-managed care at home to specialist acute services providing the full range of cardiac care and therapy for the most complex of cardiac conditions.

Small metropolitan campuses and rural health services generally provide initial resuscitation and stabilisation of emergency cardiac presentations prior to transfer to a more specialist service. They also have a strong role in follow-up care and ongoing patient support.

Outer metropolitan and some regional hospitals provide emergency cardiac care and a range of invasive and non-invasive diagnostic and intervention services, including angiography, PCI provided at 13 public sites and coronary care services for cardiac patients with a medium level of complexity and risk.

Highly complex and specialist cardiac care is provided in the large metropolitan services of The Alfred, Austin Hospital, Monash Medical Centre (MMC), The Royal Melbourne Hospital (RMH), St Vincent's Hospital and at Barwon Health in Geelong. While specific services vary between agencies, together these centres provide a range of complex cardiac services including complex electrophysiology and cardiac surgery such as coronary artery bypass grafts (CABG).

The private hospital sector offers the full range of inpatient adult cardiac services, and is a major provider of cardiac surgery in Victoria, with cardiac surgery offered at Cabrini Hospital – Malvern, Epworth Eastern, Epworth Richmond, Jessie McPherson Private Hospital, Knox Private Hospital, Melbourne Private Hospital, St Vincent's Private Hospital, and Warringal Private Hospital.

Victoria has three Nationally Funded Centres for specialist paediatric cardiac services. The Royal Children's Hospital (RCH) is the only provider of paediatric heart transplants and one of two providers of hypoplastic left heart syndrome surgery in Australia. The Alfred, in conjunction with RCH, is the national provider of paediatric lung and heart-lung transplants. The Alfred is also the provider of adult heart and heart-lung transplants for Victoria.

The RCH and MMC provide specialist paediatric services for the care of babies and children with congenital heart disease. The RCH also undertakes paediatric cardiac surgery for children from throughout Victoria, as well as the Northern Territory, South Australia, Tasmania and Western Australia. Adult congenital heart disease services are delivered by MMC and the RMH.

Coordination between health services is important, particularly between services at different levels of capability within geographical areas or regions. Use of agreed common practices and protocols is essential to optimising patient outcomes and ensuring a streamlined and coordinated system of care.

The government has supported the Central Hume Primary Care Partnerships, Ovens and King Community Health Service and the Heart Foundation develop a local CVD risk screening approach, using the guidelines and calculator for the assessment and treatment of absolute CVD risk. The project aimed to improve community screening, care planning and follow-up for people at risk of CVD.

The project involved community health nurses undertaking screening in Myrtleford and Wangaratta, with over 150 people screened during a six month period in 2012. Following the successful project the approach to screening and managing absolute CVD risk has been adopted across the community health program.<sup>23</sup>

#### Recovery and rehabilitation care

Cardiac rehabilitation maximises recovery from cardiac events and procedures, and minimises the risk of subsequent cardiac events. Cardiac rehabilitation services are provided by public hospitals, community health services and private hospitals in metropolitan and rural areas, through approximately 148 programs.

In addition, there are more than 60 programs, including Hospital Admission Risk Program (HARP) clinics, specifically tailored to the long-term needs of people with chronic heart failure.

A challenge for these services is the low level of participation by patients that could benefit from the services offered. This is addressed in direction 3.

#### Cardiac service activity

#### **Emergency presentations**

Heart conditions or suspected heart conditions were responsible for 104,033 presentations or seven per cent of all public hospital emergency department presentations in 2012–13. This activity represents only those presentations that occurred in public emergency departments, and there would be additional cardiac-related presentations to urgent care services in smaller rural health services and private emergency departments.

Over the period from 2003–04 to 2012–13, the total number of emergency department presentations for people with a primary cardiac or chest pain diagnosis grew by 62 per cent. The majority of the growth was for chest pain, arrhythmia and other conduction disorders, heart failure and ACS.

#### Inpatient separations

Over the same period from 2003–04 to 2012–13, cardiac inpatient separations increased by 8 per cent. Arrhythmias and conduction disorders experienced the greatest growth (6,910), followed by other cardiac disorders (4,670) and heart failure (2,690), whereas separations for ACS decreased by 6,620 (Figure 5).



#### Figure 5: Public and private cardiac separations by disease group, 2003–04 to 2012–13

2003-04 2004-05 2005-06 2006-07 2007-08 2008-09 2009-10 2010-11 2011-12 2012-13

Source: Department of Health Victoria, Victorian Admitted Episode Dataset 2003-04 to 2012-13

During 2012–13 approximately 75,180 public and private hospital separations and 333,390 inpatient bed days were for patients with a principal cardiac diagnosis, including 1,444 paediatric separations. Private hospitals accounted for 27,570 separations or 37 per cent of the total cardiac inpatient activity.

Demand for cardiac services goes beyond those patients admitted for a principal cardiac condition, with a further 54,350 separations and 470,840 inpatient days attributed to patients who were admitted for a condition other than cardiac but had a cardiac complication or associated condition.<sup>c</sup> This additional activity represents one in five separations and one in three bed days for all acute multiday inpatient activity undertaken in Victorian public and private hospitals.

Cardiac patients have one of the highest rates of readmission and re-presentations to emergency departments of all acute patients. In 2011–12 there were more than 35,000 unplanned readmissions utilising 265,000 bed days, and 17,200 presentations to emergency departments for cardiac patients within 12 months of their initial admission.<sup>d</sup> Patients with heart failure had the highest level of unplanned readmissions compared with other cardiac patients.

More detail on cardiac service activity is provided in Appendix 2.

<sup>&</sup>lt;sup>c</sup> Victorian Admitted Episode Dataset 2012–13. Separations with a principal diagnosis other than cardiac but with a primary cardiac diagnosis tdiag2-40, or cardiac complication, associated condition or undergone a cardiac procedure or investigation.

<sup>&</sup>lt;sup>d</sup> Victorian Admitted Episode Dataset and Victoria Emergency Minimum Dataset (VEMD) linked datasets 2011–12. VEMD presentations whose discharge destination from the emergency department is home (not subsequently admitted) and their emergency department visit is not planned.

#### Policy context

#### Victorian Health Priorities Framework 2012–2022

The Victorian Government's *Health Priorities Framework 2012–2022* articulates the government's vision, principles and priorities for planning the Victorian health system over the next decade. The framework's aim is that by 2022 Victorians will be as healthy as they can be, empowered to take responsibility for managing their health, make informed choices about the most appropriate healthcare for their needs, and have the best health outcomes possible.

The framework also recognises that inappropriate use of high-cost acute hospital services needs to be replaced with greater use of primary and community health services, and better self-management through action to support increased health literacy.

The importance and role of statewide clinical networks in achieving the Government's vision is affirmed in the Framework. Clinical networks are integral mechanisms for engaging with clinicians, health services and the Department of Health & Human Services to inform, drive and promote quality improvement, innovation and research.

*Heart health* provides a further step in the realisation of the framework and delivers on key priorities by supporting ongoing development of services that are clinically appropriate, cost-effective, productive and sustainable.

#### Victorian Public Health and Wellbeing Plan 2011–2015

Consistent with the vision for a health system that supports people to be as healthy as they can be, the *Victorian Public Health and Wellbeing Plan 2011–2015*<sup>1</sup> outlines the government's commitment and approach to promoting and protecting the health of Victorians through engaging communities, strengthening systems for health protection and promotion, and enhancing preventive healthcare. The plan includes a number of proposed actions targeting the risk factors for chronic diseases including heart disease, early detection of disease and early intervention. Action areas with specific relevance to heart disease include:

- tailoring early detection and intervention programs to meet the needs of low-income and other high-risk populations
- supporting the routine use of evidence-based screening tools (such as the CVD absolute risk assessment approach) within community health, and developing care pathways for people identified as being at risk
- providing individual, tailored support for people at risk of type 2 diabetes and heart disease through programs such as the Life! Helping you prevent diabetes, heart disease and stroke
- supporting community health services and other primary healthcare providers to provide high-quality screening and early intervention services.

#### National health policy and reform

A number of national policy documents have been developed to provide direction for system and service delivery improvement relevant to cardiac services, so have been considered in the development of this plan. Key national policies include the following.

- The National chronic disease strategy<sup>24</sup> (NCDS) articulates an overarching framework for improving chronic disease prevention and care in Australia. Key principles of the NCDS include prevention across the continuum of care, early detection, early treatment and care and self-management.
- The National service improvement framework for heart, stroke and vascular disease<sup>25</sup> (NSIF) is one of five national service improvement frameworks which support the implementation of the NCDS. The NSIF outlines opportunities for improving prevention and care, reflecting the phases of the patient journey reducing risk, finding disease early, managing acute conditions, long-term care and care in the advanced stages of the disease.
- The National women's health policy<sup>26</sup> and National male health policy<sup>27</sup> recognise that CVD, including heart disease, is a key health issue and that gender plays a role as a determinant of health and wellbeing. The plans share the common goals of: optimising health and outcomes; improved health at different life stages; health equity with a focus on populations at the highest risk; illness and disease prevention; and building a strong evidence base on gender health issues to inform service and policy development.
- The Australian safety and quality goals for health care<sup>28</sup> set out important safety and quality challenges that could benefit from a more coordinated approach to improvement over the next five years. One of the identified goals is that people receive appropriate evidence-based care, with ACS being one of the initial priority groups. Following on from this recommendation, the Acute coronary syndrome action guide<sup>29</sup> was developed, identifying possible actions required across the pre-hospital, hospital and secondary prevention continuum to provide appropriate care and achieve good outcomes for people with ACS.

### Factors driving change

The Victorian healthcare system provides a high standard of care to people with heart disease and related conditions. The improvements in survival from heart diseases that have already occurred demonstrate the value of the care provided and the proactive adoption of advances in medicine and treatment techniques by health and emergency services.

However, in order to sustain and continue to improve cardiac survival rates and achieve the best possible patient outcomes for all Victorians regardless of where they live, key service objectives must still be addressed.

The specific factors that will drive change are identified to prioritise action for individuals, for health services and for the health system.

#### Factors driving change for individuals

- Community literacy should be strengthened to increase understanding of health risks, which would help to prevent heart disease and improve quality of life.
- Lifestyle modification programs that reduce risk factors for heart disease as well as associated chronic diseases such as diabetes and renal disease should be promoted.
- Early detection of disease must be improved to better identify people at risk of developing heart disease, and avoid or slow disease progression.
- Consistent access to care within recommended timelines would improve chances of surviving an acute cardiac event and achieve the best possible long-term outcomes.
- Better support for people following their acute episode of care would assist them to independently
  manage their ongoing healthcare needs.
- Improved community knowledge of the warning signs of heart attack and the importance of responding quickly by calling triple zero will save lives and reduce heart muscle damage, resulting in better long-term outcomes.

#### Factors driving change for health services

- Patient pathways and models of care need to be consistent, based on evidence of best practice and incorporate the full cardiac care continuum.
- Access to time-critical and specialist care must be improved, particularly in rural and outer metropolitan areas, to see real improvement in patient outcomes across Victoria.
- Coordinated care must be person centred and patient goals articulated within a comprehensive care plan.
- Specialist infrastructure should be appropriately located to ensure it is utilised efficiently.

#### Factors driving change for the system

- All health services, including Ambulance Victoria, must be supported to respond efficiently and effectively to growing demand for cardiac services.
- The role of all health service providers within a coordinated system of care needs to be clearly defined, with roles and relationships established in accordance with an agreed capability framework.
- Access to all care options needs to be coordinated and efficient to improve patient referral pathways and patient outcomes.
- All health services and primary care providers should be providing best practice care, in accordance with evidence-based clinical guidelines.

Efficiency and cost-effectiveness of care and accountability of health services are integral to achieving the government's vision for a Victorian healthcare system that is productive and sustainable. To respond to these drivers a series of actions have been identified and form the basis of the four strategic directions.

### Strategic directions

Four strategic directions are identified to deliver improved services and better outcomes for Victorians with, or at risk of, heart disease. They prioritise action to: strengthen community health literacy; promote healthy living; improve early detection and intervention; enable faster access to emergency and time-critical services; and improve a range of services for people with heart disease.

These directions have been informed by knowledge and evidence from a range of sources, including the VCCN and other key stakeholders. They will guide service and system improvement in cardiac care over the coming years.

Within each direction there are a number of priorities or actions to be targeted. These are specific areas in which the government, in partnership with health services, the VCCN and the community, will work to improve cardiac care and patient outcomes.

Direction	Priorities
1. Promote healthy living and improve detection of the early stages of heart disease	Promote healthy living by improving community literacy about heart health Support lifestyle programs to prevent the onset of heart disease Improve early detection of heart disease Improve management of early heart disease
2. Better, faster access to time critical cardiac care	Raise community awareness about early warning signs of heart attack and the importance of early response Support rapid access to early defibrillation for people experiencing cardiac arrest Build better early diagnostic capability Strengthen local decision making with specialist advice Ensure timely access to reperfusion therapy
3. Improve services for people with heart disease	Improve access to specialist catheterisation and cardiac surgery Improve access, quality and consistency of cardiac rehabilitation Improve care planning and management of people living with chronic heart failure Improve access and transition to best practice end-of-life care
4. Strengthen system performance	Improve system coordination and collaboration Support clinical leadership and service quality Improve performance monitoring Support the cardiac workforce

# Direction 1: Promote healthy living and improve detection of the early stages of heart disease

#### Priorities

Promote healthy living by improving community literacy about heart health Support lifestyle programs to prevent the onset of heart disease Improve early detection of heart disease Improve management of early heart disease

## 1.1 Promote healthy living by improving community literacy about heart health

The government is committed to keeping Victorians as healthy as they can be and building a prevention system that is coordinated, responsive, sustainable, and complements the healthcare system.

Investment has been directed to a range of prevention initiatives targeting specific areas such as tobacco control, obesity, physical activity, sexual health, heart disease, type 2 diabetes, cancer screening and skin cancer prevention.

Much of the burden caused by heart disease is preventable through healthy lifestyle choices and behaviours. Many of the risk factors and lifestyle choices that contribute to the development of heart disease are shared with a range of other chronic conditions such as diabetes, which in turn increase the risk of developing heart disease.

The Victorian Government is partnering with communities, workplaces, schools and local and Commonwealth governments in implementing key prevention and population health initiatives led by Healthy Together Victoria,<sup>30</sup> which includes the Victorian Healthy Eating Enterprise.<sup>31, 32</sup> Healthy Together Victoria focuses on addressing the underlying causes of poor health in a range of settings in order to strengthen Victoria's prevention system. Healthy Together Victoria is encouraging healthy eating and physical activity, and reducing smoking and harmful alcohol use.

In addition to these initiatives there is a variety of information available to enable Victorians to understand their risk of heart disease, improve health literacy and take action to reduce risk and better manage their own health.

The Heart Foundation has a major role in promoting healthy lifestyles and reducing the burden of heart disease, and provides an extensive range of information through its website and health information service. The Heart Foundation also undertakes: a wide range of health promotion activities; education and support; research; and service improvement activities including developing evidence-based guidelines to fulfil its objective of reducing premature death and suffering from heart, stroke and blood vessel disease.<sup>33</sup>

The Heart Foundation leads many successful and highly visible public education campaigns.

The 'Heart Foundation Tick' labelling of food products provides an easy way to help people make healthier dietary choices. There are now more than 1,900 items displaying the Heart Foundation Tick. A national survey found that 84 per cent of respondents agreed a product with the Tick represented a healthier option compared with other foods, and more than 20 per cent had been encouraged to buy a product for the first time because it displayed the Heart Foundation Tick.<sup>34</sup>

'Go Red for Women' encourages women to make healthier choices and reduce their risk of heart disease, recognising that heart disease is the single leading cause of death of Victorian women.

The Heart Foundation is working towards creating opportunities to increase the level of physical activity where people live and work. Through a wide range of programs including Jump Rope for Heart, Heart Foundation Walking, Workplace Wellness programs and Heartmoves, plus a focus on creating supportive environments for behaviour change, the Heart Foundation is influencing Victorians to adopt healthy lifestyles and make healthy choices.

The Better Health Channel<sup>35</sup> also provides Victorians with easy access to a source of reliable health information, including the *10 tips for a healthier heart* such as how to improve diet and incorporate exercise into a daily routine.

Heart disease affects some members of the Victorian community to a greater extent than others. Residents of rural and regional Victoria, Aboriginal and Torres Strait Islander people, people of culturally and linguistically diverse backgrounds and those with low socioeconomic status are at greater risk of developing heart disease and generally have poorer outcomes.

Koolin balit – Victorian Government strategic directions for Aboriginal health 2012–2022<sup>36</sup> outlines the Victorian Government's strategic directions for Aboriginal health in Victoria over the next 10 years. It acknowledges the role that smoking tobacco and obesity have in increasing the risk of heart diseases, and that as a community Aboriginal people in Victoria have higher exposure to these risk factors than the population as a whole, and therefore have poorer health outcomes.

In Victoria 30 per cent of Aboriginal adults were current smokers in 2008 compared with 19 per cent for non-Aboriginal adults; and 53 per cent of Aboriginal adults were overweight or obese.<sup>18</sup>

*Koolin balit* aims to reduce the number of Aboriginal adults who are exposed to such risk factors through strategic enablers including supporting strong Aboriginal organisations and enhancing cultural responsiveness. The Victorian Government has committed \$67 million over four years, which will support the strategic directions of *Koolin balit*.

## 1.2 Support lifestyle programs to prevent the onset of heart disease

Supporting initiatives to reduce the risk of many chronic diseases, while also building capacity and empowering people to manage their own health, will drive a reduction in heart disease over time.

Known modifiable risk factors for heart disease include:

- smoking both active smoking and being exposed to second-hand smoke (passive smoking)
- high blood cholesterol
- high blood pressure
- diabetes
- · being overweight
- being physically inactive
- depression, social isolation and lack of quality support.

Lifestyle modification programs address these known modifiable risk factors, and are one way to encourage healthy behaviours and a more active lifestyle to reduce the likelihood of serious chronic conditions, including heart disease. Key to the success of these programs is ongoing support from trained health professionals, such as dieticians and exercise physiologists. Often lifestyle modification programs will be delivered through group-based courses or individual coaching sessions. More recently and more frequently individual programs are supported through innovative technology including smartphone applications or tele-coaching.

The Victorian Government is investing \$22.2 million over four years in the Life! Helping you prevent diabetes, heart disease and stroke.<sup>37</sup> The program supports people at high risk of heart disease, stroke or type 2 diabetes to modify their lifestyle to prevent the onset of disease.

By providing lifestyle modification, coaching and support, the Life! program helps people reach their goals for a healthier life.

In addition to lifestyle modification programs the *Victorian Public Health and Wellbeing Plan 2011–2015*<sup>1</sup> includes a number of proposed actions targeting the risk factors for heart disease, including the provision of individual, tailored support to low-income and other high risk populations. The *Victorian Public Health and Wellbeing Plan* also acknowledges that to respond to modifiable risk factors people rely on an effective primary and community healthcare system. Public community health services will often provide intensive early intervention to people at risk of chronic disease and deliver innovative models of care to engage people in health-promoting behaviours.

The Victorian Government, through Healthy Together Victoria, is working across health, planning, community development, and Commonwealth and local government to support the creation of environments and opportunities that encourage positive lifestyle change, through supporting physical activity initiatives. Such an initiative is the Premier's Active Families Challenge which encourages Victorians to do 30 minutes of physical activity per day for 30 days over a six-week period. In 2013, 80,000 Victorians registered for this challenge.

### 1.3 Improve early detection of heart disease

In many cases, early detection of heart disease provides the opportunity for highly targeted intervention to slow disease progression, reducing the likelihood of a major cardiac event.

In addition to modifiable risk factors for heart disease listed above, there are two non-modifiable risk factors, they are increasing age and a family history of heart disease. An estimated 29,000° Victorians may be carrying one of the known genetic mutations affecting the heart. Second trimester and newborn screening are routinely available to all expectant mothers and babies in Victoria for selected genetic conditions. The inherited genetic predisposition to heart disease is not well known and often only detected after a major cardiac event. Many inherited predispositions to heart disease, in particular sudden cardiac death, can now be detected through genetic testing.

Guidelines for genetic testing have been developed by Cardiac Society of Australia and New Zealand (CSANZ),<sup>38</sup> and a voluntary National Genetic Heart Disease Registry has been established to gather information on families with hereditary heart disease to provide a better understanding of these conditions. Advances in detection through sequencing of human genetic material are now possible, enabling exploration of the cause of disease at the molecular level and early and better targeted treatment specifically tailored to an individual. The era of personalised medicine will increase demand for improved access and referral pathways for genetic testing and counselling.

Screening an individual's risk of heart disease can be complex in the presence of more than one risk factor. The Australian guidelines for the assessment and management of absolute CVD risk include a risk calculator<sup>20</sup> that considers the impact of multiple factors on a person's individual risk of a cardiovascular event within a five-year period. It is recommended that every Victorian over the age of 45 years (35 for Aboriginal people) should have an absolute risk assessment undertaken in primary care to determine their risk of heart attack and stroke. Management can then be directed based on the identified level of risk. The greater a person's absolute risk of CVD, the more benefit is to be gained through intervention and the more intensive the intervention should be.

The availability of Medicare Benefit Schedule (MBS) items for health assessment screening in primary care, and introducing screening in community and workplace settings will offer Victorians a chance to better understand their risk level, detect early disease and make positive changes to their lifestyle. Workplaces are a priority setting for action as part of the *Victorian Public Health and Wellbeing Plan.*<sup>1</sup>

'Comprehensive and integrated action is the means to prevent and control CVDs. Comprehensive action requires combining approaches that seek to reduce the risks throughout the entire population with strategies that target individuals at high risk or with established disease.'

World Health Organization<sup>39</sup>

Estimate based on UK rate reported in *Heart to Heart: Inherited Cardiovascular Conditions Services – A Needs Assessment and Service Review.* Burton H, Alberg C, Stewart A. PHG Foundation (2009), and Victorian estimated resident population 2011.

#### 1.4 Improve management of early heart disease

To meet the anticipated growth in demand from people living with chronic diseases there needs to be a greater focus on empowering people to take an active role in their own self-management. Greater health literacy and self-management will prevent or slow disease progression, and avoid unnecessary complications and hospital admissions.

Public health initiatives such as smoking cessation programs and development of effective medications for long-term control of biomedical risk factors have made a significant impact on many lifestyle risk factors for heart disease. The combination of improvements in lifestyle behaviours, effective drug control and cardiac service advancements have seen Australia experience one of the greatest declines in age-adjusted CHD death rates among Organisation for Economic Co-operation and Development countries.<sup>40</sup>

Further improvements in the mortality rates can be expected with continued advances in therapies and care. This includes advances in pharmaceuticals, such as the manufacture of a low-cost 'polypill', which brings together effective doses of multiple risk-lowering drugs, is expected to increase compliance and is a cost-effective preventive intervention.<sup>41</sup>

The Department of Health & Human Services utilises the Wagner model<sup>42</sup> for improving chronic care as the model to inform and guide the service system redesign required to support people with chronic disease. The model identifies the essential elements of a healthcare agency or system that encourages high-quality chronic disease care. These include an appropriately organised delivery system linked with complementary community resources, self-management support, delivery system design, decision support and clinical information systems.

As its ultimate goal, the chronic care model envisions an informed, activated client interaction with a prepared, proactive practice team, resulting in high-quality, satisfying encounters and improved outcomes.

Primary care practitioners including GPs and allied health practitioners have key roles in the screening, detection and management of heart disease, particularly at the early stages. The MBS items related to chronic disease management facilitate improved healthcare provision for people with heart and other diseases by funding private allied health input into the management plan. This supports stronger working partnerships between GPs, Primary Health Networks, other private primary health providers and state-funded services, such as community health services. Wider use of these MBS items and closer links between services will support people diagnosed with heart disease to better manage their health and avoid disease progression.

#### Direction 1: Promote healthy living and improve detection of the early stages of heart disease

Priority	Actions	Impacts
Promote healthy living by improving community literacy about heart health	<ul> <li>Support community programs and opportunities in different settings (such as workplaces, schools, community, early childhood centres) to address the determinants of health and build knowledge, skills and opportunities to lead a healthy lifestyle</li> <li>Support evidence-based campaigns and approaches that promote healthy living such as tobacco control, healthy weight, good nutrition, physical activity, mental health</li> <li>Work collaboratively with health promotion and illness prevention programs in primary and community-based services to: <ul> <li>strengthen heart health messages within existing programs</li> <li>support provision of current information about risks of cardiac disease</li> </ul> </li> </ul>	Health literacy is improved as people receive information appropriate to their needs People use information to make more informed decisions about their heart health
Support lifestyle programs to prevent the onset of heart disease	<ul> <li>Support primary and community health programs and the piloting of new and innovative models of lifestyle modification programs, including through the use of e-health, smartphone applications, or tele- coaching</li> </ul>	People at risk of heart disease adopt positive lifestyle changes
Improve early detection of heart disease	<ul> <li>Increase use of the absolute CVD risk assessment guidelines and tool in primary and community health settings</li> <li>Work with GPs, Primary Health Networks, Primary Care Partnerships (PCPs), the Victorian Aboriginal Community Controlled Health Organisation (VACCHO) and other stakeholders to improve patient review and monitoring of risk factors as part of routine primary health encounters. This will increase development and use of: <ul> <li>standard CVD absolute risk assessment tool</li> <li>standardised consumer education resources</li> <li>culturally and linguistically appropriate resources</li> </ul> </li> <li>Enhance access to cardiac genetic testing and counselling services for families at high risk of an inherited cardiac disorder</li> <li>Support effective translation of research into clinical practice, particularly in the area of genetic testing to enhance targeting of those at increased risk and facilitate access to personalised medicine therapies</li> </ul>	Victorians at high risk of developing heart disease or with the early stages of heart disease are identified GPs regularly monitor biomedical markers and risk factors for signs of early disease Ongoing active management is based on level of risk Victorians at high risk of an inherited cardiac disorder are identified and receive counselling and targeted management The incidence of heart disease in the Victorian population is reduced with early intervention and management

Priority	Actions	Impacts
Improve management of early heart disease	<ul> <li>Promote regular assessment and care planning by GPs and primary care providers of consumer's lifestyle, biomedical and psychosocial risk factors for heart disease</li> <li>Improve ongoing management of those at risk or with early heart disease, including pharmacological management, self-management support and referral to appropriate lifestyle services (such as QUIT, exercise programs, specialist multidisciplinary providers); working with community health service providers and stakeholders</li> <li>Promote the use of MBS items that support planned and integrated care for those with chronic heart conditions by working with the Commonwealth Government, PCPs, Primary Health Networks, GPs, VACCHO and other stakeholders</li> </ul>	Victorians at high risk of heart disease are supported in managing their health, slowing disease progression and avoiding an acute cardiac event

# Direction 2: Better, faster access to time critical cardiac care

#### Priorities

Raise community awareness about early warning signs of heart attack and the importance of early response

Support rapid access to early defibrillation for people experiencing cardiac arrest

Build better early diagnostic capability

Strengthen local decision making with specialist advice

Ensure timely access to reperfusion therapy

Many heart diseases and conditions can precipitate a life-threatening emergency, so timely access to best practice care is vital to ensure survival and best possible outcomes. Surviving such an acute event can be dependent on a rapid and effective response from both community members, Ambulance Victoria and the health system.

The greater the delay in obtaining medical care the greater the risk to life and damage to the heart muscle, with the potential to develop life-threatening chronic heart failure. The time to treatment is crucial to restoring blood flow to the heart. Table 1 describes the likely outcomes when time to treatment varies.

Time to treatment	Likely outcome from treatment
< 1 hour*	Aborted heart attack or only little heart muscle damage
1–2 hours*	Minor heart muscle damage only
2–4 hours	Some heart muscle damage with moderate heart muscle salvage
4–6 hours	Significant heart muscle damage with only minor heart muscle salvage
6–12 hours	No heart muscle salvage (permanent loss) with only infarct healing benefit
> 12 hours	Significant heart muscle damage; treatment unlikely to be of any benefit

#### Table 1: Likely heart attack (STEMI) outcomes by time to treatment

\* Recommended time to treatment from the onset of symptoms for best possible health outcome.

The first step in the response to a life-threatening event is patient action, with the time taken to recognise the warning signs of heart attack and call triple zero critical to total response time and the capacity of the system to reduce total ischaemic time. The benefit of early treatment starts from symptom onset so the community needs to know when to take appropriate action.

People living in rural and regional Victoria are often further away from time-critical hospital treatment, which can contribute to poorer outcomes than their metropolitan counterparts. To ensure all Victorians experiencing a cardiac emergency receive appropriate treatment (no matter where they live), care needs to be responsive and based on agreed best practice guidelines.

To achieve this, Victoria needs collaborative systems of care to ensure all patients have access to the services they need within appropriate timelines, with access to specialist services and facilities when required. The guiding principles for developing these systems are equity of access, equity of care and evidence-based care, while also recognising patient preferences.<sup>43</sup>

To improve access to time-critical care a range of strategic system improvements will be supported:

- use of community education and engagement to reduce patient delay in responding to the warning signs of heart attack – educating the community on the benefits of calling an ambulance when experiencing warning signs will ensure more people benefit from pre-hospital care and treatment
- strengthening the capacity of the public to respond to cardiac emergencies through training and improving access to defibrillators in the community
- rapid access to early diagnosis with 12-lead electrocardiogram (ECG) and early notification of emergency services, together with improved point-of-care testing in smaller health services and improved diagnostic capability in regional centres
- strengthening local decision making through developing a statewide system of specialist advice to local clinicians, particularly during time-critical events
- improved access to time-critical reperfusion therapy, with pre-hospital administration of thrombolytic drugs for patients experiencing heart attacks where timely access to health service-delivered reperfusion therapy is not available.

By investing in these system improvements access to appropriate care will be enhanced to benefit all Victorians.

## 2.1 Raise community awareness about early warning signs of heart attack and the importance of early response

It is well documented that lives can be saved, and damage to the heart minimised, by reducing the time it takes to re-establish blood flow to the heart muscle following a heart attack, as described in Table 1 above.

One of the significant contributors to treatment delay is the time it takes to recognise the warning signs of heart attack and take action by calling an ambulance. More than half of heart attack deaths occur before the person reaches hospital, with about 25 per cent dying within one hour of the onset of their first symptom.<sup>44</sup>

Recent Heart Foundation data shows that the median delay time for patients who present with ACS is between two and three hours. Critically, 28 per cent of patients present after eight hours of the onset of symptoms, and 32 per cent do not use an ambulance.<sup>45</sup> Patients who present with chest pain have an even longer delay, with a median time of five hours.<sup>46</sup>

There is a need to enhance community knowledge on some of the less well known warning signs of heart attack such as jaw pain, neck pain, nausea and dizziness. People who do not experience crushing chest pain are likely to dismiss other warning signs and delay seeking treatment. In addition people don't always understand the time-critical nature of heart attack and the importance of calling an ambulance as the entry point into the treatment pathway. Providing community education on the warning signs of heart attack and the importance of acting quickly by calling an ambulance is essential in reducing patient delay. The focus on reducing total ischaemic time should include a consideration of patient delay in order to drive improvements in survival rates and a reduction in disability from heart attack.
The Heart Foundation's *Will you recognise your heart attack*? education campaign aims to improve the outcomes of people experiencing a heart attack by educating the community on the what to look out for, including the atypical symptoms usually experienced by women, thereby reducing a person's delay in seeking urgent medical care.

# 2.2 Support rapid access to early defibrillation for people experiencing cardiac arrest

The value and rate of pre-ambulance CPR provision is high in Victoria, reflecting the training and education programs provided through Victoria's *Pre-ambulance basic life support strategy* and private providers including St John Ambulance and the Australian Red Cross.

Ambulance Victoria is committed to continuing its work with the public to improve the community's capability and preparedness to manage emergencies. This includes school programs and other targeted education about CPR skills to enhance community resilience and maximise health outcomes.

More than 850,000 Victorians have received CPR education and training as part of Victoria's Pre-ambulance basic life support strategy.

Victoria has one of the highest rates of bystander CPR in the world at 67 per cent<sup>f</sup> for adults receiving a resuscitation attempt by emergency medical services, contributing to the state's high survival rate from cardiac arrest.<sup>21</sup>

AEDs provide a portable capacity for community members to diagnose potentially life-threatening cardiac arrhythmias and treat them through defibrillation. More than 1,100 publicly accessible AEDs are available in community centres, shopping centres, sporting/recreational facilities, tourist spots and major transport hubs across Victoria. Ambulance Victoria has installed many AEDs through the *Pre-ambulance basic life support strategy*, and others are available due to support by private businesses and organisations.

The AEDs can be registered with Ambulance Victoria so that in the event of a cardiac arrest the person calling triple zero can be guided to the nearest device.

In 2012 the VicHealth Active Grants program provided funding to 64 sporting clubs around the state to purchase defibrillators to respond to on-field emergencies.

<sup>f</sup> Excludes events witnessed by Emergency Medical Service personnel.

# 2.3 Build better early diagnostic capability

Pre-hospital ECGs, with the capacity to transmit the results to the receiving hospital before the patient arrives, allows time for the hospital's emergency capability to be activated. This has been shown to result in significantly shorter door-to-reperfusion times and a higher proportion of patients receiving reperfusion within the recommended timelines.<sup>47</sup>

In Victoria all Mobile Intensive Care Ambulance (MICA) units are equipped with 12-lead ECG diagnostic capability and the capacity to transmit ECG results as part of pre-hospital notification. Evaluation of the effectiveness of pre-hospital early diagnosis and notification at selected health services is showing success in meeting benchmarks for providing reperfusion therapy by PCI within the Heart Foundation and CSANZ recommended best practice timeframes.<sup>48</sup> The new MICA Single Responder Units established in Warrnambool, Horsham, Mildura, Shepparton, Wangaratta, Wodonga, Sale, Bairnsdale, Wonthaggi and Swan Hill will further improve capacity.

By enhancing 12-Lead ECG diagnostic capacity in other strategic rural localities along with implementing pre-notification protocols, more people experiencing a STEMI will have access to time critical cardiac care within evidence-based timelines.

The government, through the VCCN, has supported a trial of 12-lead ECG diagnostics and pre-hospital notification in MICA ambulances to hasten time-critical care for people experiencing a STEMI. The trial found that of those patients who proceeded to PCI, 83 per cent received the intervention within best practice timeframes, exceeding the recommended benchmark level of 75 per cent.<sup>48</sup>

A 51 year old woman experienced a cardiac arrest while playing sport at a stadium in a small country town. Bystanders commenced CPR and the Public Access Defibrillator located at the stadium was retrieved and connected to the patient while an ambulance was called.

The defibrillator analysed the patient's condition and two shocks were delivered after which the patient regained a pulse. Meanwhile local Advanced Life Support ambulances and one of the new MICA SRU responded. The MICA SRU performed Rapid Sequence Intubation and commenced therapeutic hypothermia (cooling of the patient to protect the brain), specialist care only provided by MICA crews. The patient was transported by ambulance helicopter, to a specialist cardiac hospital in Melbourne for intensive care and treatment. The patient responded to treatment and was awake and well within a week.

The response by the community, multiple ambulance paramedics and community officers, and the public hospital system is an example of the strong Chain of Survival<sup>49</sup> in rural Victoria.

Timely and accurate diagnosis to appropriately stratify risk and determine treatment options requires: consistent application of triage and assessment protocols; agreed clinical pathways, and diagnostic capability with equipment such as 12-lead ECGs and point-of-care biomarker (troponin) testing. Access to specialist cardiology advice may also be required, particularly for more complex cases.

The availability of point-of-care troponin (POCT) testing decreases the turnaround time for cardiac biomarker assay results in an emergency department or urgent care setting and eliminates the need to immediately transfer blood for testing to a central laboratory.<sup>50</sup> This diagnostic tool is particularly relevant in improving response times for cardiac emergencies in smaller health services without on-site or 24/7 pathology services, or where a pathology service is unable to ensure a troponin result within 60 minutes.

Health services in Victoria's south-west have completed a pilot project to improve the risk stratification and care of people presenting to rural emergency departments and urgent care centres with cardiac symptoms. The project successfully increased compliance with the Heart Foundation and CSANZ risk stratification guidelines for cardiac patients by introducing POCT testing, developing evidence-based clinical pathways to suit local circumstances and capabilities, updating nurse triaging skills and establishing easy access to expert cardiology advice from Barwon Health, on the diagnosis and management of cardiac patients.

In addition to point-of-care testing, comprehensive cardiac diagnostic services need to be strengthened and improved in regional areas. New diagnostic technologies such as echocardiography and cardiac CT, together with enhanced training of cardiac technicians, and supported through telemedicine models of care, will increase capability in these areas.

Over time diagnostic capability and capacity will be developed in areas that currently offer limited cardiac services but have the critical mass to support efficient and high-quality service provision, such as regional centres in the Gippsland and Hume regions.

# 2.4 Strengthen local decision making with specialist advice

People with cardiac conditions need specialist expertise and care. This cardiac expertise is available in specialist cardiac centres and larger health services. For health services without cardiac specialists, this level of expert input and advice needs to be readily accessible to assist local clinicians in providing appropriate patient care, particularly during time-critical events.

A system of improved access to specialist advice from cardiologists, via telehealth, will be developed. This will strengthen local decision making and enhance patient access to up-to-date, evidence-based clinical care. It will also improve triage, referral pathways and care coordination, and streamline access to specialist cardiac interventional services, including surgery, if this is required.

The system will complement regional partnerships already established, be available to rural and regional health services and to GPs for time-critical care, and support decision making regarding managing people with heart disease. It is not intended to substitute for appropriate patient referral to a cardiology specialist for advice and management.

# 2.5 Ensure timely access to reperfusion therapy

Reperfusion therapy includes both PCI and administration of clot-dissolving thrombolytic drugs. To restore blood flow to the heart and reduce the risk of permanent damage to the heart muscle, time to treatment is crucial. The benefits of reperfusion therapy are greatest and the risks minimised if treatment is given as close as possible to the onset of symptoms. Appropriately identifying cardiac emergencies using rapid diagnosis supported by specialist clinical advice for decision making and streamlined transfer to a PCI capable facility (if this can be achieved within recommended timeframes) improves patient outcomes. The Heart Foundation and CSANZ guidelines<sup>51</sup> provide the clinical standards for evidence-based management of ACS and are summarised in Figure 6.

These guidelines identify time, both to presentation and reperfusion, as the major factor in determining the most appropriate treatment option. The guidelines indicate that, unless contraindicated, reperfusion with thrombolytic drugs should occur if there are potential delays to PCI beyond the timeframes indicated. This may be the case for patients in some rural or outer metropolitan areas that are a considerable distance from a hospital capable of providing PCI. In these cases early diagnosis with 12-lead ECG and administration of thrombolytic drugs in the pre-hospital or hospital environment will be the optimal form of treatment.

#### Figure 6: Reperfusion therapy treatment algorithm<sup>9</sup>



\* Ideally, where thrombolysis is the preferred intervention it should be administered within 30 minutes of presentation. In circumstances where the delay to hospital for thrombolytic therapy is significant (more than 30 minutes), pre-hospital thrombolysis should be considered.<sup>43</sup>

In May 2013 the government announced support for Ambulance Victoria to take a lead role in providing reperfusion therapy in the pre-hospital environment. This will involve MICA ambulances having the capability to provide thrombolysis in regional and rural Victoria. This initiative will commence in the Gippsland region in 2014 before being expanded to other rural regions, and involve tailored approaches to meet the circumstances of local areas within each region.

A similar model using pre-hospital thrombolysis has been successfully implemented in rural Queensland and parts of New South Wales.

<sup>9</sup> Adapted from Guidelines for the management of acute coronary syndromes<sup>51</sup>

A system of pre-hospital thrombolysis administered by ambulance paramedics was implemented in the Hunter New England and Mid North Coast of New South Wales as well as communities close to the Australian Capital Territory.

The system involves paramedics working closely with cardiologists to deliver pre-hospital thrombolysis to patients with life-threatening signs and symptoms of STEMI before they reach hospital. Paramedics transmit 12-lead ECGs to a cardiologist for interpretation, and the paramedic administers the thrombolysis where STEMI is confirmed.

To November 2012 more than 120 remote and rural patients received pre-hospital thrombolysis under the program, with a median time of less than 20 minutes from first medical contact to thrombolysis administration. More than 75 per cent of patients receive thrombolysis within two hours of symptom onset.<sup>52</sup>

#### Direction 2: Better, faster access to time critical cardiac care

Priority	Actions	Impacts
Raise community awareness about early warning signs of heart attack and the importance of early response	• Support opportunities for community education about early warning signs of heart attack and the importance of early response by calling triple zero	People experiencing a heart attack will recognise the serious nature of the event and immediately seek medical care
Support rapid access to early defibrillation for people experiencing cardiac arrest	<ul> <li>Improve access to community- installed AEDs by encouraging private companies, organisations and large retail or commercial centres to ensure equipment is available, maintained appropriately and registered with Ambulance Victoria</li> <li>Encourage middle sized shopping centres to install AEDs and register them with Ambulance Victoria</li> <li>Increase community awareness and understanding about responding early to cardiac arrest, including use of community-based AEDs</li> </ul>	Increase in bystander CPR and use of community-based AEDs People experiencing cardiac arrest in the community will have greater chance of surviving to hospital
Build better early diagnostic capability	<ul> <li>Enhance pre-hospital 12-Lead ECG diagnostic capability in strategic rural localities</li> <li>Develop capability in rural health services for early cardiac diagnosis and risk stratification through utilisation of POCT testing and defibrillators/AEDs</li> <li>Enhance non-invasive cardiac diagnostic services in Hume and Gippsland regions</li> </ul>	People experiencing a cardiac emergency or with a suspected cardiac condition will have timely local access to more efficient diagnostic services
Strengthen local decision making with specialist advice	<ul> <li>Establish a system for statewide access to specialist cardiology advice</li> </ul>	Local clinicians, particularly those in rural Victoria, will be supported by cardiology specialists to improve local decision making and patient management Rapid response to heart attack and ongoing care and management of people with heart disease will be improved

# Direction 3: Improve services for people with heart disease

## Priorities

Improve access to specialist catheterisation and cardiac surgery Improve access, quality and consistency of cardiac rehabilitation Improve care planning and management of people living with chronic heart failure

Improve access and transition to best practice end-of-life care

# 3.1 Improve access to specialist catheterisation and cardiac surgery

#### Cardiac catheterisation

Cardiac catheterisation services are available at 13 public hospitals and 18 private hospitals across the state. A number of tests and procedures are performed in a catheterisation laboratory (cath lab), including angiograms, angioplasty, stenting, electrophysiology studies (EPS) and inserting internal pacemakers or implantable cardioverter-defibrillators.

The volume of all services provided in cath labs has been steadily increasing over the past 10 years, with the number of angiograms and PCIs performed growing by 61 per cent and 19 per cent respectively. Other types of catheterisation procedures have increased even more, with services such as EPS and the insertion of devices growing by 70 per cent.

The CSANZ guidelines<sup>53</sup> on coronary angiography and PCI provides recommendations about workforce credentials and experience, volume of procedures at clinician and site level, and protocols to be in place to ensure services are provided safely and effectively. The guidelines also prescribe the need for formal relationships and transfer protocols between PCI services without onsite surgical services and a cardiac surgery provider.

Cardiac catheterisation services are provided across the metropolitan area and in some regional areas. Initial service enhancement will support existing services with increasing demand to expand capacity, and regional services to further develop their availability into 24/7 services.

Development of new cardiac services will be incremental, with any potential expansion of cardiac catheterisation services informed by analysis of emerging new technologies and clinical practice, detailed planning based on demand, and the capacity to achieve a balance of volume, safety, quality and service efficiency.

In the short term, development of a cardiac service capability framework will identify minimum-level infrastructure, workforce, support services, experience and expertise requirements for providing safe and high-quality cardiac services, including catheterisation services. This will help to guide planning for future expansion or enhancements of services at the local level.

In December 2013, Peninsula Health extended the availability of the emergency cardiac angiography service at Frankston Hospital to 24 hours a day, seven days a week.

The extended availability allows for greater access to this key cardiac service by the local community, closer to where they live. Now, only patients who present to Frankston Hospital with conditions requiring more specialised services are transferred to one of the major cardiac centres.

#### Comprehensive cardiac catheterisation and cardiac surgery

Six public cardiac centres in metropolitan Melbourne and Geelong provide specialised statewide services including comprehensive cardiac catheterisation services, for example transcatheter aortic valve implantation, and cardiac surgery. Appendix 2 provides details.

CABG and valve replacements are the most common cardiac surgical procedures performed. Key indications for CABG are: where PCI is unsuccessful or not appropriate; in severe disease affecting multiple arteries; or where left ventricular function or life-threatening heart damage is evident.

Technological advances are extending the life of patients with heart disease and increasing demand for complex cardiac surgery, especially among those with heart failure. Advances in technology may shift some procedures into the cath lab, but demand for surgical services is expected to persist.

The specialist cardiac centres provide complex care for all Victorians, but access to these services varies across geographic areas. To improve timely access for patients ARV developed the *Cardiac defined transfer guideline*,<sup>54</sup> which was implemented in January 2013. This functions in a similar way to the critical care inter-hospital transfer system and allows ARV to nominate an appropriately capable hospital to receive the patient, particularly during times of peak demand.

There are instances where patients requiring transfer for cardiac catheterisation or surgery, particularly in regional and outer metropolitan areas, wait longer than ideal. Longer pre-surgery length of stay can increase the risk of poorer post-surgical outcomes including increased mortality, prolonged overall hospitalisation and higher rates of hospital-acquired infections.

To address this, efficient systems are required to ensure all Victorians requiring specialist cardiac care are able to access services within appropriate timeframes, regardless of where they live. This may be achieved through a statewide approach to streamlining access which would better coordinate the management and prioritisation of patients waiting for urgent specialist cardiac care.

An area-based approach to triage and referral was implemented in southeast Queensland for ACS patients requiring invasive cardiac procedures. The system resulted in improved patient access.

A web-based electronic referral system was established in Queensland linking two tertiary health services to rural and remote health services. The system aimed to facilitate access to invasive services and improve time to triage and treatment, and clinical decision making for patients with ACS.

The system categorised patients according to their thrombolysis in myocardial infarction (TIMI) risk score and utilised an agreed evidence-based referral pathway, allowing prioritisation and scheduling of patients across the two tertiary facilities.

The system improved the response time and target time to transfer, equity of access to tertiary services, patient outcomes and adherence to best practice guidelines.<sup>55, 56</sup>

The VCCN will develop a streamlined ACS pathway in consultation with relevant stakeholders. A key component of this pathway will be coordination and timely inter-hospital transfer of patients that reflects the critical needs and risks associated with the patient's condition. Along with the development of clinical urgency categorisation and prioritisation, this will provide a much-needed centralised approach to coordination, which underpins improved access to timely evidence-based care.

#### **Emerging cardiac surgical services**

Heart disease and cardiac care are rich fields for research and development. There are already many emerging techniques and discoveries in the cardiac field that have the potential to dramatically change the way services are provided and improve health outcomes. Cardiac care is constantly evolving, and new techniques, models of care and the growing demand for cardiac services will all impact on how health infrastructure and technology are used.

A recent review of new and emerging cardiac technologies in Australian and New Zealand<sup>57</sup> commissioned by the Health Policy Advisory Committee on Technology (HealthPACT) describes the most promising cardiac technologies and their potential to influence the demand for and delivery of cardiovascular services in Australia over the next decade. Important developments include the following.

- Continued refinement of the new technique of renal artery denervation will for the first time provide a practical option for treating drug-resistant hypertension.
- Continued improvements in CT coronary angiography will accentuate its role in diagnosis and early detection of CHD, providing the opportunity to improve patient management and reduce the need for invasive procedures.
- Continued improvements in implantable cardiac devices such as monitoring devices, pacemakers and defibrillators will further enhance options for treating cardiac arrhythmias and cardiac failure.
- Improved PCI techniques, such as using radial artery access as opposed to femoral artery, will result in improved efficiencies in PCI, including shorter hospital stays and fewer complications.
- Increased use of techniques such as fractional flow reserve to measure coronary physiology will allow better identification of patients likely to benefit from PCI.
- Continued improvements in invasive catheter-based techniques for treating valvular heart disease such as transcatheter aortic-valve replacement for patients with severe aortic stenosis will provide options for patients who are not suitable candidates for more invasive open heart surgery.
- There are more surgical options for babies born with hypoplastic left heart syndrome and other congenital heart defects.

Minimally invasive procedures are promising and are currently being assessed in clinical trials. For example, suture-less and percutaneous-delivered heart valves can provide tremendous patient benefits, and greater efficiencies by freeing up hospital beds due to reduced length of stay. These procedures, including the new and emerging implantable devices, are costly and currently there is limited long-term clinical and cost-effectiveness data. In addition, there are significant capital and infrastructure requirements to support these new technologies.

Ensuring health resources are utilised to their full advantage requires robust assessment and planning of new technologies and clinical practice to ensure that clinically- and cost-effective technology is appropriately embedded into the Victorian health system. Mechanisms to inform this deliberation and decision making include: horizon scanning of new and emerging technologies and clinical practices (such as through HealthPACT), independent expert advice (such as the Victorian Policy Advisory Committee on Technology), national and international health technology agency evidence assessments and using technology road maps.

# 3.2 Improving access, quality and consistency of cardiac rehabilitation

Effective recovery and transition from hospital to the community after an acute cardiac event or procedure depends on effective planning and rehabilitation. This includes providing information and advice about medications and how to avoid complications, as well as referral to evidence-based programs to facilitate recovery, avoid disease progression and readmission and maximise quality of life.

The Heart Foundation and the Australian Cardiac Rehabilitation Association's *Recommended framework for cardiac rehabilitation*<sup>58</sup> is the accepted best practice underpinning the design and delivery of cardiac rehabilitation services. The guidelines recommend that inpatient rehabilitation should begin as soon as possible after admission to hospital with supportive counselling, the development of a mobilisation program and discharge planning. The framework also recommends that Victorians who have had an ACS admission or presentation, undergone a cardiac procedure or had cardiac surgery should be referred to a comprehensive program of rehabilitation and support.

Patients, families and carers are able to access extensive information from the Heart Foundation, including the comprehensive patient information booklet *My heart, my life: a manual for patients with coronary heart disease.*<sup>59</sup> This information and advice should be incorporated into the discharge plan and provided to patients and primary healthcare providers to facilitate continuity of care.

Cardiac rehabilitation programs are recognised as being able to maximise recovery and minimise the risk of a person experiencing a repeat cardiac event. Despite this, many services are underutilised, due to both lack of referral and limited participation. People do not participate for a number of reasons such as inflexible timing, programs not being sufficiently tailored to meet particular needs, language barriers and a lack of understanding of the benefits.

To improve referral to cardiac rehabilitation, the VCCN is working to streamline clinical pathways and improve discharge planning. Services are also encouraged to use the *Victorian Service coordination tool templates* for referral to ensure consistent quality and provide common standards to improve interoperability between information and communication technology (ICT) systems.

The VCCN, in conjunction with the Victorian Cardiac Rehabilitation Association, has developed a recommended referral form for cardiac rehabilitation patients. The form communicates a patient's clinical history to the rehabilitation service in an efficient and effective way. Uptake of the referral form, together with the use of the web-based Victorian cardiac rehabilitation directory, assists health practitioners in identifying local rehabilitation service providers, thereby increasing opportunities for people to access a wider range of services.

The standardised cardiac rehabilitation referral form is available on the website: http://docs.health.vic.gov.au/docs/doc/Cardiac-Rehabilitation-Referral-form

The rehabilitation programs must be patient-centred and flexible enough to meet people's needs, circumstances and health literacy levels. They must be provided in a range of settings, target harder to engage or reach populations such as culturally and linguistically diverse and Aboriginal and Torres Strait Islander populations and involve Aboriginal and multicultural health workers. Patient information must also be available in languages other than English.<sup>60</sup>

To respond to these needs, more flexible models of providing rehabilitation, including telephone and internet-based options, will be developed to provide an improved suite of rehabilitation and support services in community-based health facilities.

The government, through the VCCN and the department's Aboriginal Health Branch, supported a project undertaken by St Vincent's Centre for Nursing Research and the Australian Catholic University to strengthen cardiac care for Aboriginal and Torres Strait Islander patients with ACS. The Aboriginal hospital liaison officer (AHLO) and cardiac nurse at St Vincent's Hospital worked together to provide improved care coordination, increasing clinical engagement and providing a culturally safe model of cardiac rehabilitation.

The project improved referral to and attendance at cardiac rehabilitation and follow-up with patients and their primary care providers. Sixty per cent of the patients seen by the AHLO and the cardiac nurse attended cardiac rehabilitation, a rate higher than reported rates of attendance for the wider community.<sup>61</sup>

# 3.3 Improve care planning and management of people living with chronic heart failure

People with heart failure are often older and have comorbidities that make their care more complex and increases the length of time required to care for their needs while in hospital. People with heart failure also have high rates of readmission to hospital and re-presentation to emergency departments.

Multidisciplinary heart failure management programs led by specially trained heart failure nurses and with ready access to clinicians trained in heart failure management have been shown to reduce the rates of hospitalisation and death.<sup>62, 63</sup> Victorians living with moderate or severe heart failure should have access to these programs to support them to take a more active role in managing their own health. Yet despite evidence of efficacy, only a small proportion of people with heart failure participate in these programs, for similar reasons to those limiting attendance at rehabilitation programs.

To improve access and participation, models of care must address service barriers, maximise available resources and increase self-management capacity. Opportunities to redesign programs or establish new models of care will target interventions and enhance support for patients in the home environment, including using telehealth and other technologies allowing patients to be monitored remotely.

Collaboration between patients, GPs, community service providers and hospital staff is essential to ensure a multidisciplinary approach to heart failure care is maintained and avoidable use of hospital services is minimised.

The Heart Foundation's Multidisciplinary care for people with chronic heart failure: principles and recommendations for best practice<sup>64</sup> defines the minimum standards for health services that contribute to best practice multidisciplinary care for heart failure.

Effective multidisciplinary care models should include: biomedical care (clinical and functional status); self-care education and support; psychosocial care and palliative care and are tailored and flexible to meet individual patient needs and self-management goals.

# 3.4 Improve access and transition to best practice end-of-life care

The health decline of people with chronic heart failure is gradual, usually over many years, punctuated by unpredictable acute deterioration. People with heart failure and their families and carers need care and support over an extended period of time, including the provision of integrated palliative care services.<sup>64</sup>

Palliative care components of an integrated heart failure program are best personalised to the individual's needs and include: the management of symptoms; reassessment of medication regimens; consideration of home oxygen therapy; psychological and social support; compassionate and open communication including discussions about the patient's prognosis; and advance care planning. These services are best delivered through greater integration and coordination between heart failure services and palliative care services. Such an approach would bring together the knowledge and expertise of both fields and integrate palliative care principles into heart failure management programs.

The Victorian palliative care policy *Strengthening palliative care: policy and strategic directions 2011–2015*<sup>65</sup> is extending the skills and knowledge of palliative care clinicians by encouraging workplace-based rotations through chronic disease settings and specialties including heart disease settings.

A reciprocal approach to workplace-based rotations by heart failure clinicians through palliative care settings would support the implementation of a fully integrated model of care and ensure the best possible end-of-life experience for people with heart failure, their families and carers.

<sup>6</sup>A worldwide trend to advance care planning offers a more holistic approach, whereby the person is supported to discuss his or her life goals, values and personal views and choices about his or her preferred outcomes of care with a trained professional, family and close friends. This approach is particularly appropriate when advanced care directives are completed by people who already have a chronic or life-limiting physical or mental illness or injury who know the nature and understand the course of their diagnosed condition and want to record directions about preferred care or appoint a chosen substitute decision-maker, or both.<sup>766</sup>

#### Direction 3: Improve services for people with heart disease

Priority	Actions	Impacts
Improve access to specialist catheterisation and cardiac surgery	<ul> <li>Develop clinical pathways to support consistent patient management based on evidence of best practice that:         <ul> <li>considers clinical urgency, critical needs and patient risk, to prioritise and streamline access</li> <li>includes local and regional protocols for emergency and non-emergency inter- hospital transfers</li> </ul> </li> </ul>	Victorians requiring specialist cardiac services have streamlined and timely access to tertiary cardiac centres and will be managed in accordance with best practice guidelines
	<ul> <li>incorporates formal protocols between catheterisation services without onsite cardiac surgery and cardiac surgical services regarding emergency and urgent patient transfers</li> <li>Undertake detailed planning based on demand, quality and performance measures to inform further specialist</li> </ul>	High-quality and efficient specialist cardiac services in rural Victoria and outer metropolitan areas are planned and developed to be sustainable and to meet local demand
	<ul> <li>cardiac service development in the Hume and Gippsland regions and outer metropolitan areas</li> <li>Ensure effective new technology and clinical practices are appropriately utilised in Victoria</li> </ul>	Cardiac technology is utilised efficiently and new clinically- and cost-effective technology is integrated into the health system
Improve access, quality and consistency of cardiac rehabilitation	<ul> <li>Enhance the suite of cardiac rehabilitation programs provided for patients at different risk levels to maximise utilisation. This may include telehealth opportunities such as remote monitoring and support</li> <li>Strengthen rehabilitation and support services, including community based services</li> <li>Support the provision of early inpatient cardiac rehabilitation and referral to ambulatory cardiac rehabilitation following discharge, within a comprehensive and standardised model of care</li> </ul>	New or redesigned models of rehabilitation will enable flexibility and increase patient participation
Improve care planning and management of people living with chronic heart failure	<ul> <li>Improve models of care for people with chronic heart failure to reduce avoidable readmission to hospital or re-presentation to emergency departments</li> <li>Improve coordination and integration of care to reduce the risk of another life-threatening event and enable people to manage their own condition</li> <li>Improve the transition to and provision of longer term support and care for people with heart failure in the primary care and community setting</li> </ul>	People with heart failure will be better supported in managing their health, slowing progression of their condition, and affording them a better quality of life

Priority	Actions	Impacts
Improve access and transition to best practice end-of-life care	<ul> <li>Strengthen linkages and relationships between heart failure programs and palliative care services</li> </ul>	People with severe heart failure nearing the end of their life will have access to integrated specialist heart failure and palliative care services tailored to their individual care and support needs

# Direction 4: Strengthen system performance

## Priorities

Improve system coordination and collaboration Support clinical leadership and service quality Improve performance monitoring Support the cardiac workforce

The *Guidelines for the management of acute coronary syndromes* (2006), published by CSANZ and the Heart Foundation, state that:

Effective systems of care are required to deliver optimal care for patients with acute coronary syndromes, particularly in rural and remote areas. Systems of care should be regionally based and have formal links with specialist centres for consultation and acute inter-hospital transfer. Systems should include appropriate monitoring, review, feedback and quality improvement components. Clinical decisions about care and transfer should take into account patients cultural and personal beliefs and wishes.<sup>43</sup>

To achieve these aims Victoria's cardiac system must be coordinated and collaborative, within and across services, and supported by strong clinical leadership. It must be focused on delivering quality services. The distribution of services is based on clear roles and relationships, with links and collaborative practice between services to benefit patient outcomes. An effective and efficient system has strong clinical governance with a focus on engagement of, and leadership by, clinicians. It has accountability through health services, system-wide data collection and monitoring of service and system quality.

# 4.1 Improve system coordination and collaboration

Coordination of cardiac care can be improved through greater clarity of health service capability, roles and responsibilities within the system of care for cardiac patients. Coordination would also be improved by an enhanced role for primary and community-based service providers in providing early disease management and ongoing support.

To support the provision of comprehensive, integrated and patient-focused cardiac services across Victoria, a cardiac service capability framework will be developed to provide a standardised approach and consistent understanding of health service capability. This would strengthen relationships between services and referral pathways within regions and with specialist tertiary providers.

Clinical pathways based on service capability and evidence-based best practice will also guide how people move through the care continuum, across health settings and providers, and assist patients in accessing the right level of care as their needs change. Pathways also need to be developed to address the specific needs of adolescents with congenital heart conditions including identifying the right stage to commence transition planning and pathways for transition to adult services.

Closer relationships and linkages between primary, community and acute health providers will support the local provision of sustainable, streamlined service models, and better planning at a regional level.

Service coordination is a key element of the work of Victorian PCPs and Primary Health Networks, which through strong local provider partnerships aim to place patients at the centre of service delivery and ensure they have access to the services they need and opportunities for early intervention, health promotion and coordinated care.

Strong local partnership approaches lead to effective, coordinated, client-centred care. These approaches identify the client's needs beyond their cardiac condition through services knowing what supports are available in the local area and through clear referral pathways and access to the required supports.

ICT also plays an essential part in connecting and coordinating services, increasing access to specialist services and supporting clinical decision making and care planning.

Well-developed service coordination tools already support services to work together. These include common practice standards such as the *Victorian service coordination practice manual 2012*,<sup>67</sup> common screening and referral tools (*Service coordination tool templates*), electronic referral systems and the *Service coordination continuous improvement framework*.<sup>68</sup> These resources are well established in Victoria, contributing to improved communication and coordination between agencies.

ICT has been used to share the cardiology diagnosis and management expertise in Barwon Health with health professionals based at health services in the south-west of the state, as part of a pilot project. This was achieved by providing a telephone advice line and remote interpretation of diagnostic results.

The expertise and advice provided by Barwon Health supported timely and local evidencebased best practice, and the effective use of referral pathways and transfer protocols. Evaluation of the telephone-based advice line identified the value and need for a more widely accessible and ongoing service to support accessible high-quality cardiac care.

Remote specialist advisory capacity and other ICT-based modalities such as telehealth consultations and grand rounds not only benefit patient care but have the added benefit of reducing workforce isolation through supporting and sharing clinical information and practice.

# 4.2 Support clinical leadership and service quality

The VCCN is working with clinicians to promote continuous improvement in cardiac care by supporting the consistent application of evidence-based practice, measuring clinical performance and strengthening relationships and referral pathways between and within health services. Ensuring compliance with evidence-based protocols is also a clinical governance responsibility for hospital boards, managers and clinicians. The VCCN will also play a key leadership role in guiding the implementation of many of the key strategies identified in *Heart health*.

Some specific VCCN projects to date include: establishing the Victorian Cardiac Outcomes Registry (VCOR), a statewide cardiac clinical quality registry for cardiac procedures, treatments and outcomes; strengthening relationships between health services and streamlining referral pathways through developing regional ACS pathways; piloting point-of-care testing for serum troponin in rural emergency services; developing a standardised cardiac rehabilitation referral form; and strengthening cardiac care for Aboriginal and Torres Strait Islander people with ACS.

# 4.3 Improve performance monitoring

Enhanced monitoring of clinical performance will measure the effectiveness of the system in improving health outcomes and experiences for Victorians, improving system efficiency and providing clinically- and cost-effective care. This will include, for example, developing a more comprehensive collection of cardiac treatment and outcomes data through the VCOR and measuring the impact of the actions outlined in *Heart health*, such as the introduction of pre-hospital thrombolysis.

The VCOR has initially focused on PCI procedures, collecting data from all public and private providers in Victoria, and is expanding to outcomes in other areas such as thrombolysis, cardiac implantable electronic devices and anticoagulation therapy for atrial fibrillation. The registry is coordinated by Monash University School of Public Health & Preventive Medicine and has the support of the CSANZ.

Better monitoring of capacity, utilisation and performance of coronary care units (CCU) is also required, similar to existing processes for management of statewide intensive care unit (ICU) capacity. This would support more efficient utilisation of highly specialised resources.

Better linkages between new and existing data collections and registries will further increase the value of the available information and improve the effectiveness of service performance monitoring.

## 4.4 Support the cardiac workforce

A skilled and effective health workforce is vital to delivering quality healthcare for all Victorians.

The Victorian Government has established the *People in Health*<sup>69</sup> initiative, with a focus on supporting and strengthening Victoria's health and mental health workforce, to meet the challenge of an ageing and growing population.

*People in Health* consolidates the government's investment and commitment to ensuring Victoria's health system remains at the forefront of best practice. It includes a record \$238.3 million investment over four years to boost training and development for the future health workforce.

Through *People in Health*, the government will ensure our health professionals continue to receive the best education and training by:

- building strong partnerships across government, the health and education sectors and professional bodies
- funding clinical placements for professional-entry students and investing in successful transition to practice, postgraduate and specialist training
- supporting health professionals (from students to specialists) to access high-quality and innovative training and workforce development opportunities to ensure Victoria continues to provide excellent health services
- targeting areas that require greatest support and funding more workforce development opportunities in rural and regional settings, as well as in the growth areas of Melbourne.

Victoria is generally well supplied with cardiologists and cardiothoracic surgeons, but this specialist workforce is largely concentrated in metropolitan specialist centres. As part of the Strengthen Medical Specialist Training program, which aims to increase accredited specialist training positions in public hospitals, the Victorian Government has supported nine new cardiology training positions (2011 to 2013), including seven in regional hospitals. This investment will help improve the distribution of the cardiac medical workforce across Victoria.

Incremental development and expansion of cardiac services in outer metropolitan and regional areas will require more flexible and innovative methods of care. This will involve collaboration of specialists, cardiac nursing, cardiac technicians and allied health professionals, along with upskilled generalist staff, working together to improve coordination and linkages between services. These relationships, together with technology such as telehealth, will support remote consultations, joint appointments, rotation of staff and enhanced training, ongoing professional development and mentoring.

The Victorian Government has supported more than 120 nurse post graduate training places and over 80 scholarships for students studying critical care including cardiac care during 2013. Improving time-critical responses will require upskilling of nurses and GPs working in urgent care centres in small rural health services. This will be supported through flexible education models, and support from sub-regional and regional health services.

Innovative and flexible workforce models will improve access and support multidisciplinary models of care in cardiac rehabilitation and chronic disease management. Some health services have successfully implemented models that utilise the knowledge and skills of specialist cardiac and heart failure nurses and cardiac technicians to provide a greater level of care to patients. This can maximise the availability of specialist clinical resources.

With the ageing of the population there will be more people living with heart failure in the community and in residential aged care facilities. To support the care of people with heart failure and to improve the transition from heart failure programs to ongoing support, GPs, practice nurses, allied health and residential aged care staff need access to specialist support, opportunities to share and learn new skills and participate in multidisciplinary teams and care plans. Opportunities to access existing accredited and professional development opportunities in goal-directed care planning and service coordination is important.

To help primary and community healthcare practitioners to detect early signs of heart disease and provide ongoing support for people with established heart disease, they need a greater level of information and support. This will be achieved through better service linkages between sectors, improved systems for sharing information, integral involvement in multidisciplinary care and ready access to expert advice.

#### Direction 4: Strengthen system performance

Priority	Actions	Impacts
Improve system coordination and collaboration	<ul> <li>Develop a service capability framework for cardiac services</li> <li>Define and disseminate models of care and clinical pathways based on evidence of best practice, including appropriate management and referral practices, and the use of standard practice and referral tools</li> <li>Develop an integrated statewide service model for congenital heart conditions including a transition pathway for adolescents with congenital heart conditions to adult cardiac services</li> </ul>	Cardiac service capability will be clearly defined and developed in accordance with parameters for high- quality and sustainable services Services for people with heart diseases and conditions will be coordinated, consistent and evidence-based along the care continuum
Support clinical leadership and service quality	• The VCCN to continue to work with health services and provide clinical leadership to enable implementation of best practice, evidence-based cardiac care	Victorian cardiac services are efficient, sustainable and consistent with evidence- based best practice
Improve performance monitoring	<ul> <li>Develop performance indicators to monitor service effectiveness and impact of initiatives</li> <li>Improve monitoring of CCU utilisation and performance</li> <li>Support the continuing development of VCOR</li> </ul>	The quality and performance of cardiac services are continuously improved CCUs are more efficiently utilised and targeted to patients requiring specialist cardiac care
Support the cardiac workforce	<ul> <li>Deliver flexible education and provide support for clinicians working in rural health services, primary and community health providers and residential aged care</li> <li>Support innovative and flexible workforce models</li> <li>Support access to existing accredited professional development opportunities in goal-directed care planning and service coordination</li> <li>Explore opportunities for cardiac and heart failure nursing scholarships</li> </ul>	The cardiac workforce will be effectively and efficiently utilised

# The way forward

*Heart health* has been developed to guide the development of cardiac services across Victoria and across the full continuum from prevention to end-of-life care. The directions and priorities aim to reduce disease progression and develop and enhance services in response to evidence of best practice.

The burden of heart disease on individuals, families, the community and the health system is significant, and tackling this is a complex task. A collaborative approach between government, health services, peak bodies, health professionals and consumer organisations will be required to make a real difference.

The vision of *Heart health* to improve care and outcomes for Victorians with, or at risk of, heart disease will only be realised if the plan for improvement is implemented and supported by all those involved in providing cardiac care. The responsibility for facilitating action is with the Department of Health & Human Services, working in conjunction with numerous groups including the Heart Foundation, Ambulance Victoria, community and primary health services, consumer organisations and a range of healthcare institutions.

The VCCN will have a major role in implementing *Heart health's* strategic directions, with an initial focus on developing patient pathways, driving evidence-based practice, supporting culturally appropriate care, developing systems to monitor clinical performance and reducing unnecessary variation in clinical practice.

*Heart health* describes a five-year plan, with directions and priorities defined for implementation as short or medium term, or ongoing (Table 2). This reflects the iterative and incremental nature of the work to be completed.

The immediate priorities are supported by identified government funding and resourcing. This includes initiatives related to life-saving treatment for heart disease, especially in rural and regional Victoria, reducing readmissions and re-presentations and improving access to specialist cardiology advice.

Other directions are ongoing or have longer term objectives, working with partners in community, primary care and health promotion areas.

Projects identified as short-term will be completed within one to two years. Those identified as medium term can be expected to be completed within five years and those described as ongoing may take in excess of five years and require additional funding.

### Table 2: Heart health implementation plan

Timeframe	Priorities	Lead organisation#	Key stakeholders
Short term	Support rapid access to early defibrillation for people experiencing cardiac arrest	Ambulance Victoria	Ambulance Victoria, Heart Foundation, VicHealth, community groups, private sector
	Strengthen local decision making with specialist advice	Department of Health & Human Services	Health services, VCCN, Victorian Stroke Clinical Network
	Ensure timely access to reperfusion therapy	Ambulance Victoria	Ambulance Victoria, health services, VCCN
	Improve access, quality and consistency of cardiac rehabilitation	VCCN	Health services, Heart Foundation, Australian Cardiac Rehabilitation Association
	Improve care planning and management of people living with chronic heart failure	VCCN	Health services, community and primary health services, Heart Foundation
	Improve system coordination and collaboration	VCCN	Health services, community health providers
	Improve performance monitoring	VCCN	VCOR
Medium term	Build better early diagnostic capability	Department of Health & Human Services	Ambulance Victoria, health services
	Improve access to specialist catheterisation and cardiac surgery	VCCN	Health services, Ambulance Victoria
	Improve access and transition to best practice end-of-life care	Department of Health & Human Services	Health services, Primary Health Networks, palliative care providers
Ongoing	Promote healthy living by improving community literacy about heart health	Department of Health & Human Services	Heart Foundation, health promotion agencies, health services, community and primary health, Primary Health Networks, VACCHO, Commonwealth Government, local government
	Support lifestyle programs to prevent the onset of heart disease	Department of Health & Human Services	Health promotion agencies, health services, community and primary health, Commonwealth Government

Timeframe	Priorities	Lead organisation#	Key stakeholders
	Improve early detection of heart disease	Community health providers	Primary Health Networks, GP practices, VCCN, health services, workplaces, VACCHO
	Improve management of early heart disease	Community health providers	Primary Health Networks, GP practices, VCCN, health services, workplaces, VACCHO
	Raise community awareness about early warning signs of heart attack and the importance of early response	Heart Foundation	VCCN
	Support clinical leadership and service quality	VCCN	Health services
	Support the cardiac workforce	Department of Health & Human Services	Health services, VCCN, professional organisations, Royal Australasian College of Surgeons, Royal Australasian College of Physicians, Victorian Allied Health Leaders Council

# with the Department of Health & Human Services

*Heart health* is a living strategy that will be adapted and modified to reflect new developments and actions as they arise. Progress towards achieving the recommended actions and corresponding impacts will be regularly monitored to ensure all directions remain aligned with evolving best practice, new evidence of service innovation and government priorities. New actions and desired impacts will be defined as work progresses or as research identifies more effective ways to prevent and treat heart disease.

Performance against each of the identified priorities will be measured in an ongoing evaluation process, with a view to identifying further priorities and actions to address heart health.

# Appendix 1: Heart disease in Victoria

## Heart diseases

#### Coronary heart disease

CHD results from fatty deposits, known as atheromatous plaques, accumulating within the walls of the coronary arteries supplying the heart muscle with oxygen and nutrients. This gradual accumulation of fatty deposits can build up to the point where it reduces the blood flow to the heart, producing the signs and symptoms of angina, which is mild heart distress from a lack of oxygen and nutrients. Atheromatous plaques can also lead to blood clots that may suddenly and completely obstruct the flow of blood to the heart muscle, causing the muscle to progressively die. The longer the obstruction continues the greater the damage to the heart muscle. This is a heart attack, of which there are two types, STEMI and non-STEMI.

STEMI is a time-critical emergency, as early intervention can minimise the size and reduce the risk of death or permanent damage to heart muscle. Unstable angina is also treated as a medical emergency, as it may lead to a heart attack. Unstable angina and both types of heart attacks have been grouped together and are known as acute coronary syndromes. Stable angina is a chronic condition that can be managed with medical treatment and/or lifestyle changes.

#### Heart failure

Heart failure, when the heart is no longer able to pump blood effectively around the body, may occur suddenly, though usually develops over time, and is most often the result of disease or damage to the heart, which overloads or impairs its function. These causes include heart attack, high blood pressure, a damaged heart valve or weakened heart muscle due to viral infection.

Chronic heart failure is a complex condition that results in symptoms of breathlessness, fatigue and signs of fluid retention. People with chronic heart failure tend to be older and often with comorbidities such as renal dysfunction and diabetes that require interventions, which in turn increases the risk of treatment-related adverse events.

Heart failure is a significant burden on the community and health system because people with heart failure have frequent hospital presentations and admissions.

#### Arrhythmias and conduction disorders

Arrhythmias and conduction disorders cause disturbances in the heart's rhythm. These disturbances may be irregular or chaotic heart rhythms that inhibit the chambers of the heart from filling and contracting properly.

#### Congenital heart disease

Congenital heart disease, a group of conditions present at birth including abnormalities of the heart, heart valves and blood vessels, is a major cause of death in children. In 2009 nearly 500 babies were born in Victoria with a congenital heart defect which represents 0.68 per cent of all births. Congenital heart disease was responsible for the death of 6.6 per cent (n=30) of all live born children aged less than 18 years who died in 2009.<sup>70</sup>

#### Rheumatic heart disease

Rheumatic heart disease is damage to the heart and/or heart valves resulting from single or multiple attacks of rheumatic fever. Rheumatic heart disease is a chronic condition, though multiple cases and untreated cases of rheumatic fever can potentially lead to chronic heart disease and eventually heart failure. A rare condition in non-Aboriginal populations, the condition remains a significant health issue for remote Aboriginal populations.

## Burden of heart disease

#### Mortality

In 2011 heart disease and related conditions were the underlying cause of death of 7,293 Victorians (21 per cent of total deaths), and heart attacks claimed 2,252 lives.<sup>2</sup> From 2002 to 2011, the death rate from CHD decreased from 132.5 to 93.8 per 100,000 population. However, the death rate from all the other forms of heart disease saw little change over the same period (Figure 7).

#### Figure 7: Cardiac deaths in Victoria per 100,000 population, 2002 to 2011



Source: Australian Bureau of Statistics<sup>2</sup>

In addition to being the single leading underlying cause of death, CHD is also a leading contributing factor in deaths from other causes. From 1997 to 2007, CHD was a leading contributory cause for deaths involving selected chronic diseases in Australia, including 47 per cent of deaths involving diabetes and 39 per cent involving chronic and unspecified kidney failure.<sup>71</sup>

#### Avoidable mortality

Avoidable mortality is a measure of untimely and unnecessary deaths of people under the age of 75 years, from diseases for which there are effective public health and medical interventions. CHD is the leading cause of avoidable mortality, and the avoidable mortality rate for rural Victorians is higher than that of the metropolitan population.<sup>14</sup>

# Figure 8: Standardised mortality rate ratio\* for potentially avoidable coronary heart disease, by region, 2002–06



\* Compared to Victoria, where Victoria = 1.

Error bars represent 95 per cent confidence intervals. Rates standardised to Victorian population in 2011. Interpretation:

- Significantly higher than the rate for Victoria
- Not significantly different from the rate for Victoria
- Significantly lower than the rate for Victoria

Source: Department of Health Victoria, Victorian Health Information Surveillance System

## Risk factors for heart disease

#### Demographic

There is a strong correlation between heart disease and age, with the lifetime prevalence of heart disease increasing significantly from 4.5 per cent for 45–54 year olds to 23.3 per cent for people aged 65 or older.<sup>15</sup> The prevalence of heart disease is higher in males than females and affects men at an earlier age.

The prevalence of lifestyle and biomedical risk factors also increases with age or varies by gender. For example, men are more likely to be daily smokers than women (16.6 per cent compared with women 11.4 per cent). The prevalence of hypertension and dyslipidaemia increases with age and the prevalence of hypertension is higher in men than women (31.4 per cent compared with 19.1 per cent).<sup>16</sup>

#### Lifestyle risk factors

Much of the death, disability and illness caused by heart disease is preventable. Although demographic risk factors cannot be avoided, there are many modifiable risk factors that can be influenced. Many risk factors and poor lifestyle choices that contribute to the development of heart disease, such as smoking, physical inactivity and low fruit and vegetable consumption, are shared with a range of other chronic conditions.





Source: Department of Health Victoria, \* Victorian Population Health Survey<sup>15</sup> # Victorian Health Monitor<sup>16</sup>

#### **Biomedical risk factors**

Biomedical risk factors, which include excess weight, high blood pressure/cholesterol and diabetes, have a direct impact on a person's health and increase their risk of developing heart disease and other chronic diseases.

During 1997–2007 hypertensive diseases were a leading contributor to deaths in Australia involving selected chronic diseases, in particular diabetes (30 per cent), CHD (20 per cent) and chronic and unspecified kidney failure (17 per cent). Diabetes was also a common contributing cause of death in CHD (16 per cent) and chronic and unspecified kidney failure (20 per cent).<sup>71</sup>

Figure 10 shows the prevalence of biomedical risk factors in adult Victorians. Some biomedical risk factors such as high blood pressure, diabetes and high cholesterol, often have no obvious symptoms, and a person may not be aware of an existing or growing risk to their health, until their heart has already suffered damage or a major acute cardiac event occurs.

It is estimated that three in five people with diabetes have vascular disease and that people with diabetes are at least two times more likely to experience a heart attack than people without diabetes.<sup>72</sup> People with diabetes also experience an earlier onset of disease and have more complications. Trends based on self-reported information indicate that diabetes (type 2) is increasing.<sup>73</sup>



#### Figure 10: Prevalence of biomedical risk factors in adult Victorians, 2009–10

Source: Department of Health 2012, Victorian Health Monitor<sup>16</sup>

The Victorian Health Monitor also identified that the prevalence of risk factors increased in combination with other risk factors; for example, the prevalence of dyslipidaemia was higher in people who were physically inactive, smokers, obese and with high blood pressure. The prevalence of obesity was higher in people with high blood pressure (at 40.4 per cent compared with 19.8 per cent) and people with high blood cholesterol (at 30.4 per cent compared with 16.8 per cent).<sup>16</sup>

Recent research has found a relationship between erectile dysfunction and cardiovascular problems, with men over the age of 55 having a 50 per cent higher chance of developing CVD and an even greater risk increase when it occurs in younger men.<sup>74</sup> The need to raise awareness among men and GPs provides another means by which heart disease can be detected early.

#### **Comorbidities**

There is a complex relationship between chronic kidney disease and diabetes, and with heart disease and CVD more broadly. While CVD and chronic kidney disease share many risk factors, shared risk factors alone do not fully explain the high incidence of CVD in people with chronic kidney disease. Research indicates that each disease is a risk factor and complication of the other.

People with chronic kidney disease have a greater risk of cardiac death than those without kidney disease. People on dialysis programs have a CVD risk of up to 20 times greater than the general population and people with diabetic nephropathy on dialysis are about 50 times more likely than the general population to develop CVD. CVD is the most common cause of death in people with chronic kidney disease.<sup>35</sup>

#### Social, economic and cultural status

Aboriginal and Torres Strait Islanders, people of culturally and linguistically diverse backgrounds or low-socioeconomic status, and residents of rural and regional Victoria have an increased risk of developing heart disease and poorer outcomes. This is due to the higher prevalence of modifiable risk factors, lower levels of education or health literacy, genetic predispositions and difficulties in accessing healthcare.

The prevalence of heart disease among Aboriginal and Torres Strait Islander Victorians is considerably higher than non-Aboriginal people.<sup>18</sup> Aboriginal and Torres Strait Islander people, especially in the 35–54 age groups, have more than three times the rate of major coronary events such as heart attack compared with other Australians, and 1.4 times the out-of-hospital death rate from CHD. When in hospital Aboriginal and Torres Strait Islander people experience more than twice the in-hospital CHD death rate and a lower rate of angiography investigations, coronary angioplasty or stent procedures, and coronary bypass surgery.<sup>75</sup>

People of low socioeconomic status or who are Aboriginal and Torres Strait Islander have a greater number of hospital admissions for ambulatory care sensitive conditions. People of low socioeconomic status and rural/regional Victorians have a greater rate of avoidable mortality.<sup>19</sup>

# Appendix 2: Cardiac services

#### **Primary care**

Private and public primary and community health services play a significant role in early disease detection and management, and the care of people with chronic, complex and ongoing care needs. The introduction of a number of health assessment items and chronic disease-related MBS items over the past decade have provided increased opportunities for GPs to identify patients at risk of developing serious and chronic disease. These MBS items also provide the opportunity for GPs, allied health practitioners and mental health providers to be more involved in the management of chronic disease through care planning and team-based care.

Conditions of the circulatory system comprised 9.7 per cent of problems managed by GPs in Victoria between April 2009 and March 2010. Circulatory conditions are one of the higher volume conditions managed by GPs across Australia, and the percentage of GP encounters for circulatory conditions increases with patient age from 11.25 per cent of encounters for 45–64 year olds to 20.91 per cent of encounters with people aged 75 and over.<sup>76</sup>

#### **First responders**

Members of the community can play a significant part in the survival of a person experiencing a heart attack or cardiac arrest. Apart from calling for an ambulance, bystanders and first responders can actively assist in increasing the patient's chances of survival and improving the patient's outcome through providing CPR. In 2012–13, 70 per cent of people who experienced an out-of-hospital cardiac arrest and survived to hospital had received bystander CPR.<sup>h</sup> Of those patients discharged from hospital alive, the vast majority received bystander CPR, or 77.7 per cent.

More than 850,000 Victorians have received CPR education and training as part of *Victoria's Pre-ambulance basic life support strategy* and many more people have received first aid training from private providers including St John Ambulance and the Australian Red Cross. Taking advantage of the proliferation of smartphones in the community, Ambulance Victoria and other organisations have developed smartphone applications to raise awareness of what to do in an emergency and how to respond to a cardiac arrest.

In addition, publicly accessible AEDs have been installed in locations throughout the state and many employers and community groups have installed AEDs in workplaces and sporting grounds, to provide ready access to these life-saving devices. Ambulance Victoria maintains a voluntary registry of the location details of these AEDs, which is a useful resource for triple zero operators to advise callers of the location of a nearby AED in the event of a cardiac arrest.

#### **Ambulance Victoria**

Ambulance Victoria is essential in connecting Victoria's healthcare system, providing prehospital care and transport. As part of Victoria's emergency response system, fire fighters in the Metropolitan Fire Brigade and 10 Country Fire Authority branches in outer metropolitan Melbourne and Shepparton have been trained in administering CPR and defibrillation, through the Emergency Medical Response program. These fire crews are simultaneously dispatched with ambulances in response to cases of suspected cardiac arrest, increasing access to time-critical care.

<sup>h</sup> Excludes events witnessed by Emergency Medical Service personnel.

Suspected cardiac arrest, chest pain and patients experiencing heart problems totalled 59,423 in the 2012–13 calendar year or 11.2 per cent of Ambulance Victoria's total emergency workload.<sup>1</sup> The Metropolitan Fire Brigade and Country Fire Authority also attended 4,079 emergency medical responses in 2012–13.

Ambulance Victoria also operates ARV, which is responsible for coordinating inter-hospital transfers of critically ill and time-critical adult patients, and access to critical care beds.

In 2012–13, cardiac patients comprised the single largest clinical case type for ARV, with 1,021 cases or 26 per cent of total cases.<sup>22</sup> The greatest cardiac transfer demand was from the Gippsland and Hume regions, with 31 and 17 per cent of total ARV cardiac transfers respectively. It should be noted that additional lower acuity inter-hospital cardiac transfers may occur without the involvement of ARV, therefore the total demand for inter-hospital transfers for cardiac patients would be somewhat greater than that indicated in Table 3.

Region	Cardiac cases referred to ARV	Cases transferred facilitated by ARV	Not transferred or unknown transfer
Barwon-South Western	92	82	10
Gippsland	308	267	41
Grampians	111	94	17
Hume	161	145	16
Loddon Mallee	172	142	30
Metropolitan	146	97	49
Interstate/other	31	27	4
Total	1,021	854	167

#### Table 3: ARV cardiac cases by region and transfer status, 2012-13

Source: Adult Retrieval Victoria

Ninety per cent of cardiac cases referred to ARV were referred to facilitate access to a speciality service not provided by the referring hospital.

#### Acute hospital services

#### **Emergency presentations**

Other than chest pain, which may or may not be cardiac in origin, arrhythmias and conduction disorders, followed by heart failure made up the largest volume of cardiac presentations to Victorian public hospital emergency departments in 2012–13 (Table 4).

i Based on final primary assessments: acute coronary syndrome, acute myocardial infarction, acute pulmonary oedema, angina, arrhythmia, confirmed cardiac arrest, cardiac failure, deceased, hypertension, hypotension, implantable defibrillator problem, pacemaker problem, chest/ischaemic pain, palpitations.

# Table 4: Cardiac and suspected cardiac presentations in public hospital emergencydepartments, 2012–13

Primary diagnosis	Presentations	Percentage of presentations	Length of stay in hours
Chest pain	60,912	59%	4.6
Arrhythmia and conduction	19,168	18%	5.6
Heart failure	7,110	7%	8.4
Non-STEMI	6,024	6%	8.0
Unstable angina	5,080	5%	7.9
Angina	2,370	2%	5.5
Other cardiac	1,931	2%	6.3
STEMI	1,364	1%	2.3
Congenital	74	0%	5.4
Total	104,033	100%	5.4

Source: Department of Health Victoria, Victorian Emergency Minimum Dataset 2012–13

People with heart failure often have complex needs and had the longest lengths of stay of cardiac patients in emergency departments at over eight hours, whereas people experiencing a STEMI, had the shortest. Over the past five years the length of stay in emergency departments has been decreasing for all cardiac patients, with the exception of patients with congenital heart conditions, who experienced an 18 per cent increase. STEMI patients, which are among the most time-critical cardiac presentations, experienced an almost 50 per cent decrease in length of stay in emergency departments from 4.4 hours in 2008–09 to 2.3 hours in 2012–13.

In 2012–13, 46 per cent of cardiac presentations were classified as triage category 1 or 2. Of the STEMI presentations, 13 per cent were triaged as category 1 and 75 per cent as category 2 (Figure 11).



#### Figure 11: Cardiac and suspected cardiac presentations by triage category, 2012-13

Source: Department of Health Victoria, Victorian Emergency Minimum Dataset 2012-13

In 2012–13, 26 per cent of emergency department presentations with a STEMI diagnosis self-presented to emergency departments, rather than arriving by emergency transport, lengthening the time to definitive treatment.

Approximately 57 per cent of cardiac presentations in 2012–13 went on to be admitted. ACS and heart failure patients had the highest admission rates at 92 per cent and 86 per cent respectively. Patients with chest pain had the lowest rate of admission at 49 per cent.

#### Inpatient separations

Inpatient cardiac care is provided by almost every hospital in Victoria, but the range and extent of service delivery varies considerably. The highest level of specialist cardiac services are provided by The Alfred, Austin Hospital, The Geelong Hospital, MMC, RMH and St Vincent's Hospital. Cardiac surgery services are also offered at eight metropolitan private hospitals (Figures 19 and 20).

The RCH is the major provider of paediatric cardiac care, with capacity to provide heart transplants. RCH, in conjunction with The Alfred, is the national provider of paediatric heart-lung transplants. The RCH and MMC provides specialist paediatric services for the care of babies and children with congenital heart disease.

Of all the patients admitted for a principal cardiac diagnosis in 2012–13, patients with arrhythmias and conduction disorders, or ACS represented the greatest volume of separations (51 per cent) (Figure 12), whereas patients admitted with heart failure or ACS contributed to the majority of inpatient days (53 per cent) (Figure 13).


#### Figure 12: Cardiac separations in public and private hospitals, by disease group, 2012–13

Source: Department of Health Victoria, Victorian Admitted Episode Dataset 2012-13

#### Figure 13: Cardiac bed days in public and private hospitals, by disease group, 2012–13



Source: Department of Health Victoria, Victorian Admitted Episode Dataset 2012–13

#### Inpatient procedures

In 2012–13, 47,880 inpatient separations had at least one cardiac procedure, including 32,877 angiograms, 9,612 PCI services and 5,397 cardiac surgery separations. On the whole, public and private hospitals had equal volumes of separations with at least one cardiac procedure. However, the mix and volume of specific procedures varied between the sectors. The private sector provided more catheterisation laboratory services, other than PCI services (Figure 14), compared with the public sector, while public hospitals provided the majority of surgical services (Figure 15).





Source: Department of Health Victoria, Victorian Admitted Episode Dataset 2012–13

Figure 15: Cardiac surgery separations by public and private hospital group, 2012–13



Source: Department of Health Victoria, Victorian Admitted Episode Dataset 2012–13

#### Inpatient trends

Over the 10 years from 2003–04 to 2012–13, there has been a 8 per cent increase in overall cardiac separations. Arrhythmias and conduction disorders experienced the greatest growth (6,910), followed by other cardiac disorders (4,670) and heart failure (2,690), whereas separations for ACS decreased by 6,620 (Figure 16). This change in cardiac patient mix impacts on the range of skills and expertise required to manage cardiac inpatients.

#### Figure 16: Public and private cardiac separations by disease group, 2003-04 to 2012-13



2003-04 2004-05 2005-06 2006-07 2007-08 2008-09 2009-10 2010-11 2011-12 2012-13

Source: Department of Health Victoria, Victorian Admitted Episode Dataset 2003–04 to 2012–13

During the same period sameday separations increased by 25 per cent compared with five per cent for multiday separations. The average length of stay for multiday cardiac patients varied little from 5.5 days in 2003–04 to 5.3 days in 2012–13.

Cardiac procedures increased by 45 per cent between 2003–04 and 2012–13, with angiography experiencing the greatest increase in volume (Figure 17).



#### Figure 17: Cardiac procedures, 2003–04 to 2012–13

Source: Department of Health Victoria, Victorian Admitted Episode Dataset 2003-04 to 2012-13

Overall the number of cardiac surgical separations remained relatively unchanged between 2003–04 and 2012–13 (Figure 18). Increases in valve surgery were largely off-set by decreases in the number of patients who had CABG. CABG decreased by 26 per cent despite no apparent change in demand for this surgery.

#### Figure 18: Cardiac surgical separations, 2003–04 to 2012–13



Source: Department of Health Victoria, Victorian Admitted Episode Dataset 2003-04 to 2012-13

#### Cardiac catheterisation

In 2012–13 there were approximately 14,750 separations with an angiogram, 5,050 with PCIs and 16,240 separations that had other catheterisation procedures in Victorian public hospitals. Private hospitals provided for approximately 18,120 separations with angiograms, 4,550 PCIs and 22,050 with other types of catheterisation procedures.

Over the 10 years from 2003–04, the number of angiograms and PCIs performed grew by 45 per cent and eight per cent respectively. This growth represented a growth of four per cent per annum for angiograms and one per cent for PCIs. Other types of catheterisation procedures, which include EPS, pacing and the implementation of devices, grew by 59 per cent or five per cent per annum.

#### Critical care activity

In 2012–13 more than 63,500 CCU days and more than 78,600 ICU days were provided to patients with a heart disease or complication, or who had undergone a cardiac procedure. The public hospital system was the major provider, with 70 per cent of total days.

Measure	Private	Public	Total days	% private	% public
ICU days for patients with a cardiac diagnosis or complication, or undergone a cardiac procedure	15,306	63,336	78,642	19%	81%
All CCU days	28,013	35,498	63,511	44%	56%
Total	43,319	98,833	142,153	30%	70%

#### Table 5: Public and private hospital ICU and CCU days, 2012–13

Source: Department of Health Victoria, Victorian Admitted Episode Dataset 2012–13

CCU days increased by 77 per cent between 2003–04 and 2012–13. The mix of cardiac patients in CCUs also changed over the 10 years. In 2003–04 ACS patients were the highest users of CCUs (55 per cent), followed by patients with arrhythmias and conduction disorders (12 per cent). Heart failure patients utilised only seven per cent of CCU days. In 2012–13 ACS patients were still the highest users of CCUs; however, they represented a smaller proportion (31 per cent), whereas the proportion of CCU time utilised by other types of cardiac patients all experienced small increases. The use of CCUs by patients with a principal diagnosis other than a cardiac condition increased from 19 to 30 per cent over the time.

This change in cardiac patient mix and workload is not unique to Victoria. Changes in CCU patient mix have been observed internationally,<sup>77</sup> and impacts the workforce skills required in CCUs to manage patient needs.

#### Palliative care

In 2012–13, 726 palliative care separations and 7,496 bed days in public hospitals had a cardiac condition, complication or associated condition, representing 10 per cent of all palliative care separations. Between July to December 2012, 213 or 4.3 per cent of palliative care patients in Victoria had a CVD diagnosis compared with 3.9 per cent nationally.<sup>78</sup>

### **Ambulatory services**

Cardiac rehabilitation services are provided by public hospitals, community health services and private hospitals in metropolitan and rural areas, through approximately 148 programs. Cardiac rehabilitation comprises three phases that vary in scope, intensity and service setting.

- Phase 1 is integrated into acute inpatient care and includes: basic information and reassurance; supportive counselling; mobilisation and resumption of activities of daily living; discharge planning; and referral to phase 2 rehabilitation.
- Phase 2 is provided as an outpatient and/or community-based model and incorporates: assessment, review and follow-up; low- or moderate-intensity physical activity; education, discussion and counselling; monitoring and evaluation; and risk factor management.
- Phase 3 comprises ongoing assessment and management, usually through self-management with support from primary and community health service providers.

In addition, there are more than 60 programs, including HARP clinics, specifically tailored to the needs of people with heart failure. These multidisciplinary programs aim to slow the progression of the condition, avoid unnecessary complications and hospital utilisation, and improve the quality of life for people living with chronic heart failure.

There are limitations to the data available for many of the services provided to people with heart disease beyond an emergency presentation or an acute admission, including the availability, completeness and quality of data, the capacity to distinguish patients with heart disease from other patients utilising programs, and transitional data collection arrangements. These limitations are not unique to Victoria, and may impact on effective performance monitoring and the ability of health service providers and policymakers to plan for these components of the service continuum. The VCCN will work with clinicians and other stakeholders to improve activity reporting over time.

Figure 19: Metropolitan specialist cardiac services and population density $^{\star}$ 



\* Population density - 2011 Estimated Resident Population (by SA1), ABS (2012)





\* Population density - 2011 Estimated Resident Population (by SA1), ABS (2012)

## Appendix 3: Abbreviations

ABS	Australian Bureau of Statistics
ACS	acute coronary syndrome
AED	automated external defibrillators
AHLO	Aboriginal hospital liaison officer
AIHW	Australian Institute of Health and Welfare
ARV	Adult Retrieval Victoria
BMI	Body mass index
CABG	coronary artery bypass graft
Cath lab	catheterisation laboratory
CCU	coronary care unit
CHD	coronary heart disease
CPR	cardiopulmonary resuscitation
CSANZ	Cardiac Society of Australia and New Zealand
СТ	computed tomography
CVD	cardiovascular disease
ECG	electrocardiogram
EPS	electrophysiology studies
GP	general practitioner
HARP	Hospital Admission Risk Program
HealthPACT	Health Policy Advisory Committee on Technology
ICU	intensive care unit
LGA	local government area
MBS	Medicare Benefits Schedule
MICA	Mobile Intensive Care Ambulance
MMC	Monash Medical Centre
NCDS	National chronic disease strategy
Non-STEMI	Non-ST elevation myocardial infarction
NSIF	National service improvement framework
PCI	percutaneous coronary intervention
PCPs	Primary Care Partnerships
POCT	point-of-care troponin
RCH	Royal Children's Hospital
RMH	Royal Melbourne Hospital
STEMI	ST elevation myocardial infarction
TIMI	thrombolysis in myocardial infarction
VACCHO	Victorian Aboriginal Community Controlled Health Organisation
VCCN	Victorian Cardiac Clinical Network
	Victorian Cardian Outcomen Pagistry

## Appendix 4: Glossary

Angiography	A diagnostic procedure performed in a catheterisation laboratory using X-ray and contrast dye to identify narrowed or blocked arteries or abnormalities of the heart muscle and heart valves.
Angioplasty	A procedure performed in a cardiac catheterisation laboratory to open blocked or narrowed coronary arteries by placing a balloon inside the artery to restore blood flow and stent implantation to maintain patency.
	Also known as percutaneous coronary intervention.
Cardiac arrest	A sudden loss or cessation of heart function. May or may not be caused by heart disease. When cardiac arrest occurs the circulation may be maintained by CPR. When cardiac arrest is due to ventricular fibrillation the arrest may be reversed through prompt CPR and defibrillation.
Cardiac computed tomography	A diagnostic procedure utilising multiple X-ray images to generate a three-dimensional image of the heart.
Coronary artery bypass graft	A surgical procedure utilising blood vessel grafts to bypass blockages in the coronary arteries and restore adequate blood flow to the heart muscle.
Defibrillation	The administration of a controlled electric shock to restore normal heart rhythm.
Dyslipidaemia	An abnormality, or abnormal amounts of, lipids and lipoproteins in the blood.
Echocardiogram	An image of a beating heart created using ultrasound waves.
Electrocardiogram	A recording of the heart rate and rhythm used to detect abnormalities in the heart muscle such as myocardial infarction.
Electrophysiology study	Invasive (intra-cardiac) and non-invasive recording of spontaneous electrical activity and cardiac responses to programmed electrical stimulation. These studies are performed to assess arrhythmias, elucidate symptoms, evaluate abnormal electrocardiograms, assess risk of developing arrhythmias in the future, and design treatment.
Myocardial infarction	Also referred to as a heart attack. Occurs when a coronary artery becomes blocked, reducing blood flow to the heart and causing heart muscle to die.
Percutaneous coronary intervention	See angioplasty.
Reperfusion	The restoration of blood flow to the heart muscle, which can be achieved by administering drugs to dissolve the blood clot or by physically opening up the artery through percutaneous coronary intervention, usually with a stent.
Stress echocardiogram	An ultrasound image of the heart examining how the heart chambers and valves respond to physical excursion. The test is made up of three echocardiograms taken before, during and after exercise.

# Appendix 5: Investment in cardiac equipment

Table 6 lists over \$15.5 million provided by the Victorian Government specifically to support the provision of cardiac services.

#### Table 6: Investment in cardiac equipment in public hospitals 2010-11 to 2013-14

Equipment	Investment	Health services
Cardiac catheterisation laboratory equipment	\$7,170,000	Barwon Health Bendigo Health Eastern Health Melbourne Health Monash Health
Specialist diagnostic equipment – including ultrasound, echocardiography and electrophysiology testing	\$4,754,744	Alfred Health Austin Health Ballarat Health Services Bendigo Health Central Gippsland Health Service Eastern Health Melbourne Health Monash Health Northern Health Peninsula Health
Heart lung bypass systems	\$1,520,000	Austin Health Melbourne Health
ECG machines and cardiac monitoring equipment	\$1,785,373	Albury Wodonga Health Austin Health Ballarat Health Service Boort District Health Heathcote Health Heywood Rural Health Inglewood & Districts Health Service Kooweerup Regional Health Service Kyabram & Districts Health Service Kyneton District Health Service Latrobe Regional Hospital Monash Health Northeast Health Wangaratta Northern Health Numurkah District Health Service Orbost Regional Hospital Peninsula Health Peter MacCallum Cancer Centre Portland District Health Royal Children's Hospital Royal Women's Hospital Seymour Health West Wimmera Health Service Wimmera Health Care Group Yarram & District Health Service Yarrawonga District Health Service

Equipment	Investment	Health services
Intra-aortic balloon pumps	\$390,000	Austin Health Bendigo Health Eastern Health Northern Health Western Health
Other general equipment – adjustable beds	\$40,500	Monash Health
Total	\$15,660,617	

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