Context

This data item examines hospitalisations for acute myocardial infarction (MI) in people aged 35–84 years based on their place of residence. MI, commonly known as a heart attack, is caused by a blockage in a blood vessel to the heart. The blockage can develop as a result of a build-up of plaque, a substance mostly made of fat, cholesterol and cellular waste products. The lack of blood flow beyond the blockage causes damage to the heart muscle.¹

Risk factors for MI include²⁻⁴:

- High blood pressure
- High cholesterol
- Diabetes
- Obesity
- Smoking
- Increasing age
- Male gender
- Family history.

The rate of MI is higher among men than among women. In 2012, 63% of acute coronary events (MI and unstable angina – pain arising from reduced blood flow to heart muscle) among Australians aged 25 years and over occurred in men.⁵ The rate of these events increases rapidly with age: the rate among people aged 85 years and over is 6 times as high as the rate among people aged 55–64 years.⁵

Aboriginal and Torres Strait Islander Australians are at higher risk of MI than other Australians as a result of higher rates of risk factors such as smoking, obesity and diabetes, and poorer access to health services.^{6,7} Between 2001–02 and 2009–10, the gap between Aboriginal and Torres Strait Islander and non-Indigenous Australians' rates of mortality due to MI narrowed.⁸ However, for adults aged 25 years and over in 2009–10, the mortality rate due to MI among Aboriginal and Torres Strait Islander Australians was still double the rate for other Australians.⁸

Australia's mortality rate from MI is lower than the average among countries in the Organisation for Economic Co-operation and Development (OECD): 98 versus 117 per 100,000 people in 2013, which may reflect the success of strategies to reduce the rates of MI and deaths following MI.⁹ Between 2007 and 2012, the rate of MI decreased in Australia, from 534 to 406 per 100,000 people.⁵ Increasing use of medications to reduce blood pressure and cholesterol, and reduction in some risk factors, such as smoking, have contributed to this fall.⁵ However, many people at high risk of a cardiovascular event are not receiving recommended blood pressure-lowering and lipid-lowering medication.¹⁰ The rate of daily smoking among people aged 18 years and over in Australia declined from 22% in 1989–90 to 16% in 2011–12, but remains high among Aboriginal and Torres Strait Islander Australians, at 42% in 2011-2013.2,6

The death rate following MI in Australia has declined steadily since 2000, and is now one of the lowest among OECD countries.^{11,12} In Australia in 2013, the death rate after MI was 4.1 per 100 admissions, compared with 7.6 per 100 admissions in the United Kingdom, based on deaths within 30 days in the same hospital as the initial admission for acute MI.^{11,12} A more robust measure based on deaths within 30 days of MI, regardless of where they occur, could not be calculated for Australia because linked data were not available.

Despite the improvements for the Australian population as a whole, substantial disparities still exist in Australia. Mortality due to MI increases with remoteness and with socioeconomic disadvantage, and is higher among Aboriginal and Torres Strait Islander Australians than non-Indigenous Australians.⁸ A recent study of New South Wales data found that the disparity in MI rates between Aboriginal and Torres Strait Islander Australians and other Australians was particularly high in the younger age groups, and was larger in females than in males.¹³ The study also identified significant variation in MI rates by area of residence, both overall and for Aboriginal and Torres Strait Islander Australians, and found that the socioeconomic status of an area accounted for a greater proportion of this variation than its remoteness.¹³

Attempts were made to produce accompanying analyses of variation in use of angiography, percutaneous coronary intervention and coronary artery bypass grafting in people hospitalised with a diagnosis of acute MI. However, these analyses could not be undertaken in a way that would produce reliable results because of difficulties in tracking the care received when patients were transferred between hospitals for management of their MI. Future analyses using data linkage techniques will enable exploration of variation in care for patients with cardiac disease.

About the data

Data are sourced from the National Hospital Morbidity Database, and include both public and private hospitals. Rates are based on the number of hospitalisations for MI per 100,000 people aged 35–84 years in 2014–15.

People admitted to hospital with an MI are sometimes transferred to other hospitals – for example, for care that cannot be provided in the hospital of initial admission. Records for a patient transferred from another hospital are excluded from the rates presented here. However, repeat admissions (other than interhospital transfers) within the year for one person are counted as separate admissions.

The analysis and maps are based on the residential address of the patient and not the location of the hospital. Rates are age and sex standardised to allow comparison between populations with different age and sex structures. Data quality issues – for example, the recognition of Aboriginal and Torres Strait Islander status in datasets – could influence the variation seen.

What do the data show?

Magnitude of variation

In 2014–15, there were 32,388 hospitalisations for acute myocardial infarction, representing 252 hospitalisations per 100,000 people aged 35–84 years (the Australian rate).

The number of hospitalisations for acute myocardial infarction across 315⁺ local areas (Statistical Area 3 – SA3) ranged from 105 to 905 per 100,000 people aged 35–84 years. The rate was **8.6 times as high** in the area with the highest rate compared to the area with the lowest rate. The number of hospitalisations varied across states and territories, from 205 per 100,000 people aged 35–84 years in Western Australia to 509 in the Northern Territory (Figures 2.3–2.6).

After the highest and lowest 10% of results were excluded and 254 SA3s remained, the number of hospitalisations per 100,000 people aged 35–84 years was 2.6 times as high in the area with the highest rate compared to the area with the lowest rate.

Rates by SA3 for two additional years, 2012–13 and 2013–14, are available online at www.safetyandquality.gov.au/atlas.

Analysis by remoteness and socioeconomic status

Rates of hospitalisation for MI were markedly higher in outer regional areas and remote areas than in major cities. Across all areas (major cities, inner and outer regional, and remote), rates increased with socioeconomic disadvantage; the greatest differences in rates according to socioeconomic disadvantage were seen in remote areas and in major cities (Figure 2.7).

Analysis by Aboriginal and Torres Strait Islander status

The rate for Aboriginal and Torres Strait Islander Australians (748 per 100,000 people) was 3.1 times as high as the rate for other Australians (240 per 100,000). This disparity varied by state and territory, and was greatest in Western Australia (rate for Aboriginal and Torres Strait Islander Australians was 3.9 times as high as for other Australians) and the Northern Territory (rate for Aboriginal and Torres Strait Islander Australians was 3.8 times as high as for other Australians) (Figure 2.1).

Figure 2.1: Number of hospitalisations for acute myocardial infarction per 100,000 people aged 35–84 years, age and sex standardised, by state and territory and Indigenous status, 2014–15



The data for Figure 2.1 are available at www.safetyandquality.gov.au/atlas.

† There are 333 SA3s. For this item, data were suppressed for 18 SA3s due to a small number of hospitalisations and/or population in an area. Notes:

Some of the published SA3 rates were considered more volatile than others. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.

Rates are age and sex standardised to the Australian population in 2001.

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator).

Analysis is based on the patient's area of usual residence, not the place of hospitalisation. Data by Indigenous status should be interpreted with caution as hospitalisations for Aboriginal and Torres Strait Islander patients are under-enumerated and there is variation in the under-enumeration among states and territories.

Data for Tas and ACT (Aboriginal and Torres Strait Islander Australians) have been suppressed.

For further detail about the methods used, please refer to the Technical Supplement.

Analysis by patient funding status

Overall, 31% of hospitalisations for MI were for privately funded patients. This proportion varied from 15% in the Northern Territory to 33% in New South Wales (Figure 2.2).

Figure 2.2: Number of hospitalisations for acute myocardial infarction per 100,000 people aged 35–84 years, age and sex standardised, by state and territory and patient funding status, 2014–15



The data for Figure 2.2 are available at www.safetyandquality.gov.au/atlas.

Interpretation

Potential reasons for the variation include differences in:

- Socioeconomic and cultural factors that influence diet and lifestyle
- The prevalence of cardiovascular risk factors, such as high blood pressure, smoking, diabetes, physical inactivity and high cholesterol^{2,14,15}
- Management of cardiovascular risk factors, such as availability or use of programs for smoking cessation and weight management, and medicines such as aspirin and statins
- The prevalence of coronary heart disease and comorbidities
- The quality, efficiency and effectiveness of primary health care received, particularly by Aboriginal and Torres Strait Islander Australians
- Secondary prevention to prevent repeat MI
- Community awareness of the signs and symptoms of MI and its treatment
- Rates of detection (for example, by hospital use of high-sensitivity troponin assays)¹⁶
- Access to specialist care and cardiac outreach programs.

The Northern Territory Integrated Cardiac Network Service was expanded in 2013–14, which may have affected 2014–15 data on MI hospitalisations.

Notes:

Rates are age and sex standardised to the Australian population in 2001.

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator). Analysis is based on the patient's area of usual residence, not the place of hospitalisation.

Hospitalisations for public patients do not incur a charge to the patient or to a third party payer – for example a private health insurance fund. Hospitalisations for private patients do incur a charge to the patient and/or a third-party payer.

For further detail about the methods used, please refer to the Technical Supplement.

Addressing variation

Variation in MI hospitalisations strongly reflects patterns of cardiovascular risk factors.¹⁷ Primary prevention to reduce these risk factors at a population level, as well as preventive therapies for people at high risk, are important strategies for addressing rates of MI.¹⁰ The higher rate of MI hospitalisations among Aboriginal and Torres Strait Islander Australians underscores the importance of improving prevention of coronary heart disease in this group.¹³

Increasing the health literacy of high-risk groups and people's ability to self-manage risk factors is a vital component of any strategy to reduce hospitalisations due to cardiovascular diseases. Individual health literacy is about a person's skills and abilities, and how these are applied to health and health care.¹⁸ It covers a range of skills, behaviours and activities, such as understanding of what foods are required for healthy eating, motivation to participate in a cardiac rehabilitation support group, and capacity to make an appointment to see a clinician.¹⁹

Public health initiatives in some Australian states have shown significant reductions in behavioural risk factors for MI. For example, the NSW Get Healthy Information and Coaching Service is a free telephone-based service that targets Aboriginal and Torres Strait Islander Australians, people at socioeconomic disadvantage, and people in rural, regional and remote areas. Participants lost an average of 3.8 kg, and the percentage undertaking the recommended amount of physical activity increased from 34% to 62% after six months of using the service.²⁰ In rural and remote areas, heart health checks to improve detection of people who are at high risk of MI, and better access to ongoing disease management and risk reduction programs that are well integrated with local services could also help reduce population rates of cardiovascular events.

Despite strong evidence of the benefits of preventive medication for people at high absolute cardiovascular risk, many people are not receiving it.¹⁰ Up to 970,000 Australians (13% of the population aged 45–75 years) have a greater than 15% risk of a cardiovascular event in the next five years, but are not receiving recommended therapy with blood pressure–lowering and lipid-lowering medication.¹⁰ Several factors may be contributing to this problem. Prescribing issues may include clinicians using thresholds for blood pressure and cholesterol levels, rather than absolute cardiovascular risk, as the criteria for treatment.¹⁰ Poor patient adherence is a major barrier; it can result from perceptions of risk, mental health problems, social context and cost.¹⁰

Rapid-access cardiology services are outpatient clinics led by cardiologists that provide rapid assessment and short-term management. Early assessment in rapid-access services appears safe for patients with suspected angina but without high-risk features suggestive of an acute coronary syndrome, and can reduce hospitalisations.²¹ This model has been evaluated in the United Kingdom, and pilot studies in the Australian setting are under way.²¹

The development of a national clinical quality registry, leveraging the increasing use of electronic clinical record systems in the acute hospital sector, would be an important step towards addressing the variation in the care and outcomes of MI. Routine use and review of benchmarked clinical performance and outcomes data through a clinical quality registry would provide a mechanism for feedback to clinicians, and the ability to identify and address deviation from best-practice cardiac care.

Figure 2.3: Number of hospitalisations for acute myocardial infarction per 100,000 people aged 35–84 years, age and sex standardised, by Statistical Area Level 3 (SA3), 2014–15



Notes:

Rates are age and sex standardised to the Australian population in 2001.

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator).

Analysis is based on the patient's area of usual residence, not the place of hospitalisation.

Crosses and asterisks indicate rates that are considered more volatile than other published rates and should be interpreted with caution. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.

For further detail about the methods used, please refer to the Technical Supplement.

Figure 2.4: Number of hospitalisations for acute myocardial infarction per 100,000 people aged 35–84 years, age and sex standardised, by Statistical Area Level 3 (SA3), 2014–15: Australia map



Notes:

Rates are age and sex standardised to the Australian population in 2001.

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator). Analysis is based on the patient's area of usual residence, not the place of hospitalisation.

Hatching indicates a rate that is considered more volatile than other published rates and should be interpreted with caution.

For further detail about the methods used, please refer to the Technical Supplement.

Figure 2.5: Number of hospitalisations for acute myocardial infarction per 100,000 people aged 35–84 years, age and sex standardised, by Statistical Area Level 3 (SA3), 2014–15: capital city area maps



Notes:

Rates are age and sex standardised to the Australian population in 2001.

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator). Analysis is based on the patient's area of usual residence, not the place of hospitalisation.

Hatching indicates a rate that is considered more volatile than other published rates and should be interpreted with caution.

For further detail about the methods used, please refer to the Technical Supplement.

Figure 2.6: Number of hospitalisations for acute myocardial infarction per 100,000 people aged 35–84 years, age and sex standardised, by Statistical Area Level 3 (SA3), state and territory, 2014–15



Notes:

Rates are age and sex standardised to the Australian population in 2001.

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator). Analysis is based on the patient's area of usual residence, not the place of hospitalisation.

Crosses and asterisks indicate rates that are considered more volatile than other published rates and should be interpreted with caution. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.

For further detail about the methods used, please refer to the Technical Supplement.

Figure 2.7: Number of hospitalisations for acute myocardial infarction per 100,000 people aged 35–84 years, age and sex standardised, by Statistical Area Level 3 (SA3), remoteness and socioeconomic status, 2014–15



Notes:

Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator).

Analysis is based on the patient's area of usual residence, not the place of hospitalisation. Crosses indicate rates that are considered more volatile than other published rates and should be interpreted with caution.

For further detail about the methods used, please refer to the Technical Supplement.

Rates are age and sex standardised to the Australian population in 2001.

Resources

- National Heart Foundation of Australia, and Cardiac Society of Australia and New Zealand. Australian clinical guidelines for the management of acute coronary syndromes. NHFA and CSANZ; 2016.
- National Heart Foundation's Australian Heart Maps, and the distribution of risk factors.
- Australian Commission on Safety and Quality in Health Care. Acute coronary syndromes clinical care standard. Sydney: ACSQHC; 2014.
- National Institute for Health and Care Excellence. Acute coronary syndromes in adults. London: NICE; 2014.
- National Institute for Health and Care Excellence: Myocardial infarction: cardiac rehabilitation and prevention of further cardiovascular disease. London: NICE; 2013.
- National Health and Medical Research Council. Recognition and first aid management of heart attack. Canberra: NHMRC; 2012.
- Queensland Cardiac Outcomes Registry. Interventional cardiology: 2015 annual report. Brisbane: QCOR; 2015.
- NSW Ministry of Health. Cardiac monitoring of adult cardiac patients in NSW public hospitals: Sydney: Ministry of Health; 2016. (NSW Health guideline)

Australian initiatives

The information in this chapter will complement work already under way to address the rate of hospitalisation for MI in Australia. An MI is an acute event, whereas management of underlying cardiovascular disease and risk factors for disease is an ongoing issue. Work aimed at decreasing the burden of disease and hospitalisations includes:

- Medicare Benefits Schedule (MBS) items
 relating to chronic disease management an
 Australian Government initiative that helps general
 practitioners to manage the health care of people
 with chronic conditions; it makes MBS rebates
 available for those requiring multidisciplinary,
 team-based care from a general practitioner and
 at least two other healthcare providers
- The Better Cardiac Care for Aboriginal and Torres Strait Islander People project, Australian Health Ministers' Advisory Council
- Essential Service Standards for Equitable National Cardiovascular Care for Aboriginal and Torres Strait Islander People
- The Indigenous Australians' Health Programme, which includes a focus on the prevention, early detection and management of circulatory disease
- MBS incentive payments for general practice health assessments for Aboriginal and Torres Strait Islander patients
- The Lighthouse Hospital Project a joint initiative of the Heart Foundation, and the Australian Healthcare and Hospitals Association; this hospital-based project features the Lighthouse Toolkit, a practical workbook for continuous quality improvement that hospitals can implement to improve cultural competence and healthcare services for Aboriginal and Torres Strait Islander Australians with acute coronary syndromes
- The National Strategic Framework for Chronic Conditions, which addresses primary, secondary and tertiary prevention of chronic conditions; it is anticipated that the framework will be publicly available in 2017.

Many state and territory initiatives are also in place, including:

- Design, service and infrastructure plan for Victoria's cardiac system, Victorian Government
- State Cardiac Reperfusion Strategy, NSW Agency for Clinical Innovation
- For Our People, by Our People, Derbarl Yerrigan Health Service and the National Health Foundation
- The My Heart My Family Our Culture and Pilbara Aboriginal Health programs, Heart Foundation of Western Australia
- The Medical Outreach Indigenous Chronic
 Disease Program, Western Australia
- The Queensland Aboriginal and Torres Strait Islander Cardiac Health Strategy 2014–2017
- The Queensland Cardiac Outcomes Registry
- State and territory cardiac networks.

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- 8. Australia Institute of Health and Welfare. Trends in coronary heart disease mortality: age groups and populations. Canberra: AIHW; 2014. (Cardiovascular Disease Series No. 38; Cat. No. CVD 67.)
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