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Australian Institute of Health and Welfare

infocus

Estimating the incidence of stroke and acute coronary syndrome using the National Integrated Health Services Information Analysis Asset

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Monitoring the incidence of stroke and acute coronary syndrome (ACS) events each year is important for:

- assessing the health and economic burden of these conditions in the Australian population
- health service planning
- evaluating progress in prevention and management.

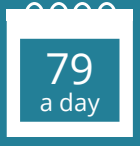
Currently, there is no direct way to count the number of new stroke or ACS events at the national level. Instead, estimates used by the Australian Institute of Health and Welfare (AIHW) are derived using algorithms, based on unlinked national hospitalisation and deaths data. However, the algorithms cannot differentiate between recurrent and new events. This report aims to fill that gap.

For the first time, linked data from the National Integrated Health Services Information Analysis Asset (NIHSI AA) is used to estimate the incidence of stroke and ACS events. It looks at the incidence of new events by age, sex, selected population characteristics, and state and territory, in 2018. It includes data on total (recurrent and new) stroke and ACS events from 2011 to 2018 to examine trends over time.

A comparison of the stroke and ACS events estimated from the algorithms applied to the unlinked hospitalisation and deaths data with estimates from the linked data in the NIHSI AA is also summarised in the report. More information about the validation study undertaken to determine how well the algorithms function is included in *Validating algorithms for incidence of cardiovascular disease: Technical Report* available on the Australian Institute of Health and Welfare website: https://www.aihw.gov.au/reports/heart-stroke-vascular-diseases/incidence-of-stroke-acute-coronary-syndrome/contents/technical-report.

Between 2011 and 2018, the rate of **stroke** (new and recurrent) events estimated from the linked data remained fairly stable, between **153.4** and **149.7** per 100,000 population.

In 2018, there were around **29,000** new stroke events – around **79** events every day.



The rate of **ACS** (new and recurrent) events estimated from the linked data fell steadily between 2011 and 2018 from **471.8** to **336.8** per 100,000 population.

In 2018, there were around **40,200** new ACS events – equivalent to around **110** events every day.

AIHW

Using data linkage to improve national monitoring

The AIHW uses proxy measures that combine counts from routinely available unlinked hospitalisation data from the AIHW National Hospital Morbidity Database and deaths data from the AIHW National Mortality Database to estimate stroke and ACS (recurrent and new) events each year (AIHW 2021). Both stroke and ACS are severe life-threatening events that require hospitalisation and can result in disability or death if time-critical care is not received. On that basis, the majority of people with stroke or ACS will access medical services and be captured in administrative hospitalisation or deaths data. Because the proxy measures are based on unlinked data (data from each source is considered separately), algorithms were developed to account for multiple hospitalisations for a single event and duplicate events across the data sets (Jamrozik et al. 2001; Thrift et al. 2012).

The algorithms were previously validated by comparing estimates obtained using the algorithms applied to unlinked hospitalisation and deaths data with those derived from linked data from New South Wales and Western Australia from 2001 to 2007. Previous validation showed that the assumptions underlying the unlinked algorithms were largely valid and that the unlinked algorithms provide a reasonable measure of total stroke and ACS events (AIHW unpublished; AIHW 2014). However, the algorithms based on unlinked data are not able to differentiate between hospitalisations for the same event, and in-hospital stroke deaths that were excluded from the hospitalisation data are not always counted in the deaths data. They also cannot differentiate between recurrent and new events. These algorithms (applied to the unlinked data) are currently used to estimate stroke and ACS events in Australia and for monitoring trends in various performance reporting frameworks.

Data integration (also known as data linkage) is increasingly being used to fill knowledge gaps across the health information system. Data linkage brings together information from a range of data sources. The NIHSI AA, developed by the AIHW, brings together data from:

- admitted patient care services in public and private hospitals (where available), for participating states and territories
- emergency department services and outpatient services in public hospitals, for participating states and territories
- the Medicare Benefits Schedule
- the Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme
- residential aged care
- the National Death Index (NDI).

This report uses linked admitted patient care (hospitalisation) and NDI (deaths) data from the NIHSI AA between 2011 and 2018 (Box 1). By linking these data, we can follow a person's health experiences over time, differentiate between multiple hospitalisations for the same event, and examine whether the diagnosis coding used in hospital records is the same as the underlying cause of death specified in the death record. This enables us to derive more accurate estimates of the incidence of stroke and ACS events.

Box 1: What data did we use?

Admitted patient care

Admitted patient care data are derived from the National Hospital Morbidity Database. The admitted patient care data in the NIHSI AA version 1.0 includes admitted patient episode-level data for records from all public hospitals in New South Wales, Victoria, Queensland, South Australia, Tasmania and the Australian Capital Territory and records from private hospitals where available from July 2010 to June 2019. Data from Western Australia and Northern Territory are not included in the admitted patient care data set in the NIHSI AA.

Demographic, diagnosis and procedure information as well as admission and separation date fields are included for each hospital separation. These data were used to identify people who had stroke and ACS hospitalisations. Information about the admitted patient care data set is available on the AIHW website at: https://www.aihw.gov.au/about-our-data/our-data-collections/national-hospitals.

National Death Index

The NDI data set includes deaths that occurred between July 2010 and December 2019. It is developed and maintained by the AIHW. Data are sourced from registrars of births, deaths and marriages in each jurisdiction, the National Coronial Information System and the Australian Bureau of Statistics. It includes information on fact of death and, where available, cause of death. While cause of death can be easily attributed in some cases, it can take longer to determine in complex cases (for example, where a coroner is required to formally investigate and determine cause of death, such as death by suicide). Therefore, some death records will have missing cause of death information due to ongoing coroners' investigations.

Data from the NDI were used to identify people who died from stroke and acute coronary heart disease.

Information about the NDI is available on the AIHW website at https://www.aihw.gov.au/about-our-data/our-data-collections/national-death-index.

Stroke

What is stroke?

Stroke occurs when a blood vessel supplying blood to the brain either suddenly becomes blocked (ischaemic stroke) or ruptures and begins to bleed (haemorrhagic stroke). Either may result in part of the brain dying, leading to impairment that can affect a range of activities such as speaking, thinking, movement and communication. Stroke is often fatal.

Stroke is sometimes referred to as cerebrovascular disease, although cerebrovascular disease is a broader category of diseases that includes stroke and other disorders of the blood vessels supplying the brain or its covering membranes. It is the most common form of cerebrovascular disease.

How are stroke events counted using linked data?

The incidence of stroke was estimated by counting non-fatal stroke hospitalisations and fatal stroke events using the linked hospitalisations and deaths data in 2018. A 7-year look-back period (also known as clearance period or washout period) from 2011 to 2017 was used to determine if an individual had a prior stroke hospital stay (based on the principal diagnosis), and to identify new stroke events in 2018. People with a prior stroke hospitalisation were excluded when counting new stroke events in 2018. Stroke events including recurrent and new events were also estimated from 2011 to 2018.

Linked hospital data allows multiple hospital separations belonging to a person to be examined. Box 2 describes how a person may have several hospital separations between their admission and discharge from hospital, and how these separations were combined into one hospital stay for analysis.

Box 2: Defining a hospital stay

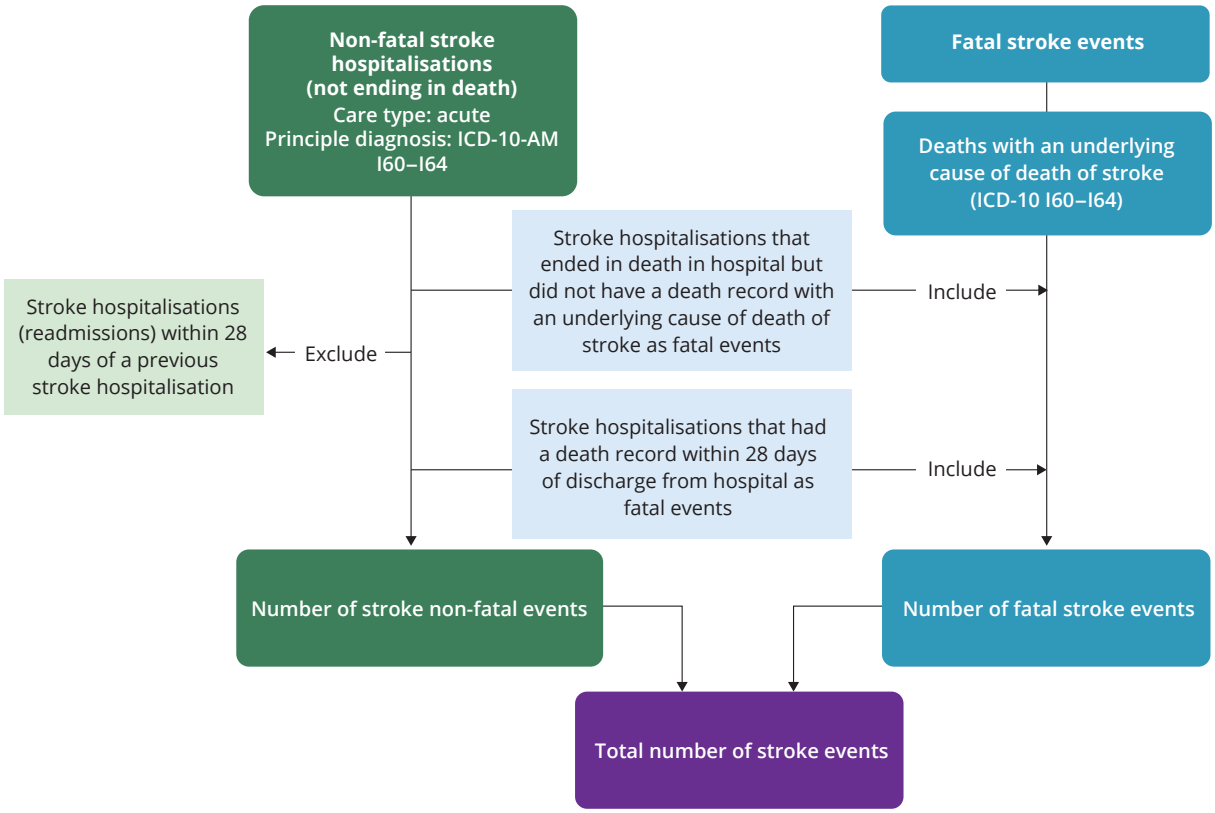
A person may have several hospital separations between their admission and discharge from hospital. Hospital separation is defined as an episode of care for an admitted patient, which can be:

- a total hospital stay (from admission to discharge, transfer or death)
- a portion of a hospital stay beginning and/or ending in a change of care type (for example, from acute care to rehabilitation)
- a portion of a hospital stay beginning and/or ending in a transfer from/to another hospital.

A hospital stay may be made up of one or more contiguous hospital separations. When a patient was discharged from one hospital and directly admitted to another hospital (or the same hospital) within 1 day, it was deemed a transfer and the separate hospital separations were combined into one hospital stay. If a person has a long hospital stay for one treatment, but also several 1-day treatments at another hospital or ward during the same period of time, these separations would also be counted as a single hospital stay.

After combining hospitalisations for a single stroke event into one hospital stay, the hospitalisation and deaths data for a person were examined to identify duplicate events from the linked hospitalisation and deaths data. Figure 1 summarises how an event might be double-counted across the 2 data sets and how multiple hospitalisations over time were differentiated when counting non-fatal stroke hospitalisations and fatal stroke events.

Figure 1: Summary of how stroke events were counted using linked hospital and deaths data in the NIHSI AA



Note: Cause of death was coded using the International Statistical Classification of Diseases and Related Health Conditions, 10th Revision (ICD-10). Hospital diagnoses were coded using a classification modified for Australia (ICD-10-AM).

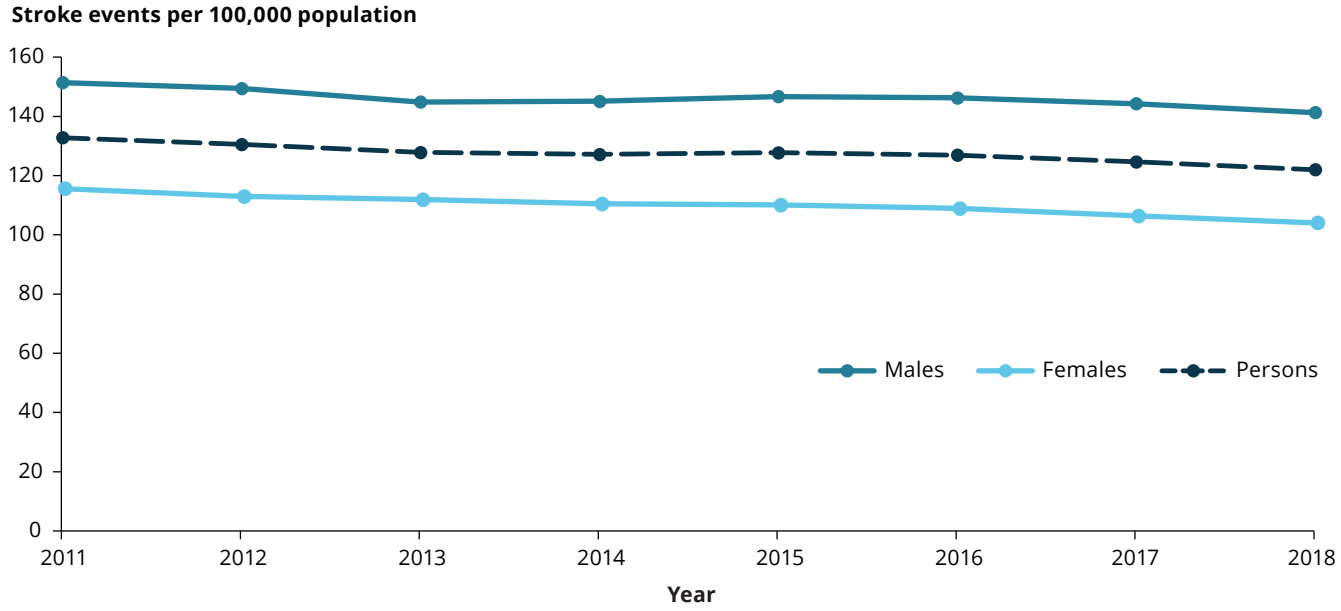
For more information about the NIHSI AA and the methods used in this report, refer to the *Validating algorithms for incidence of cardiovascular disease: Technical Report* available on the AIHW website: https://www.aihw.gov.au/reports/heart-stroke-vascular-diseases/incidence-of-stroke-acute-coronary-syndrome/contents/technical-report.

Stroke events in Australia

Based on the linked hospitalisation and deaths data from the NIHSI AA, there were around 33,100 new and recurrent stroke events in Australia in 2018 – or 91 every day.

Between 2011 and 2018, the rate of stroke events ranged from 149.7 to 153.4 per 100,000 population. After adjusting for age differences, the rate of stroke events remained fairly stable but was consistently higher in males than females (Figure 2).

Figure 2: Stroke (new and recurrent) event rates (age-standardised), by sex, 2011 to 2018



Notes

1. Age-standardised to the 2001 Australian population.
2. Data include stroke hospitalisations that occurred in public hospitals in New South Wales, Victoria, Queensland, South Australia, Tasmania, and the Australian Capital Territory from 2011 to 2018, and private hospitals (where available).
3. Records (hospitalisations and deaths) with usual state of residence in Western Australia and the Northern Territory were excluded from the analysis.

Source: AIHW NIHSI version 1.0.

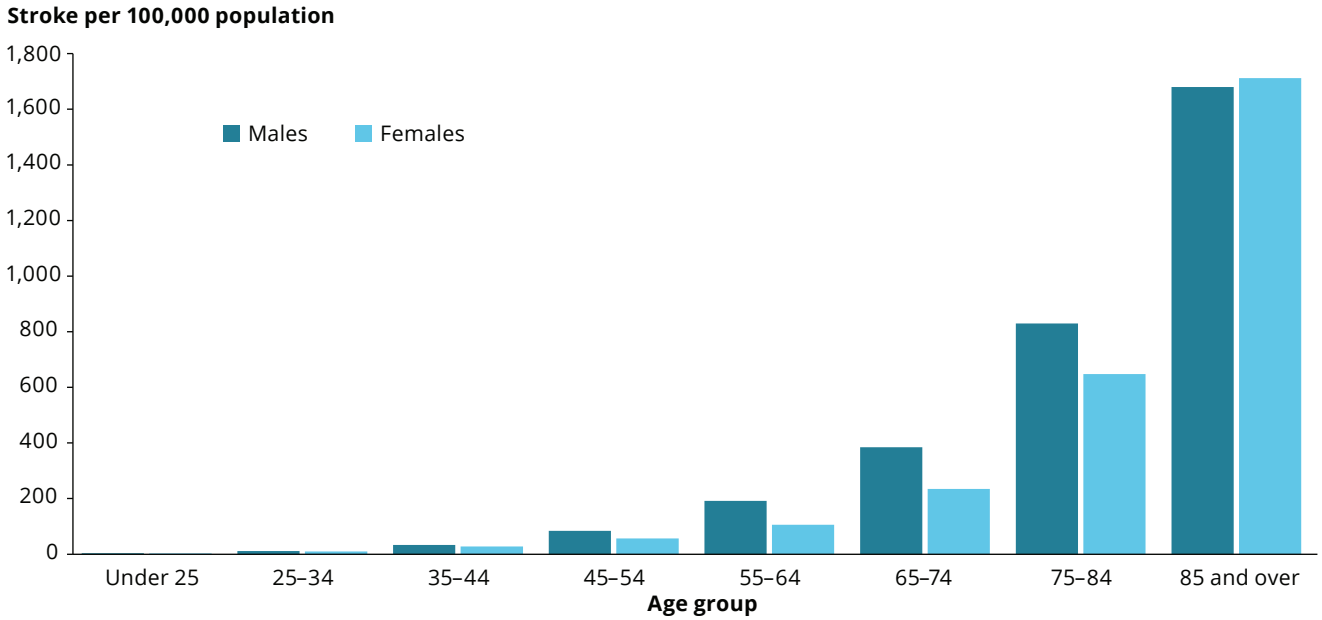
Incidence of stroke in 2018

The incidence of new stroke events by age, sex, selected population characteristics, and state and territory in 2018 are presented below. People with a prior stroke hospitalisation in the look-back period of 2011 to 2017 were excluded when estimating new stroke events.

In 2018, there were almost 29,000 new stroke events in Australia – or 79 every day. The rate of new events was 130.9 per 100,000 population and:

- was higher in males than females after adjusting for age differences
- increased with age, with the rate of the 85 and over age group (1,700.0 per 100,000 population) more than 5 times the rate of the 65–74 age group (308.2 per 100,000 population) (Figure 3).

Figure 3: Incidence of stroke, by sex and age group, 2018



Notes

1. Age-standardised to the 2001 Australian population.
2. Data include stroke hospitalisations that occurred in public hospitals in New South Wales, Victoria, Queensland, South Australia, Tasmania, and the Australian Capital Territory from 2011 to 2018, and private hospitals (where available).
3. Records (hospitalisations and deaths) with usual state of residence in Western Australia and the Northern Territory were excluded from the analysis.

Source: AIHW NIHSI version 1.0.

Stroke subtypes

Of the 29,000 new stroke events in 2018, nearly three-quarters (74%, or 21,300) were not fatal. Of the non-fatal events, the principal diagnosis was:

- ischaemic stroke (70% of events)
- haemorrhagic stroke (21%)
- unspecified stroke (9.1%).

About 7,600 of the new stroke events in 2018 were fatal. Of these, the underlying cause of death was:

- unspecified stroke (37%)
- haemorrhagic stroke (27%)
- ischaemic stroke (12%).

About 1 in 5 (23%) of the fatal events where a stroke hospitalisation ended in death or a stroke hospitalisation with a death recorded within 28 days had the underlying cause of death recorded as something other than stroke (for example, atrial fibrillation and flutter or chronic ischaemic heart disease).

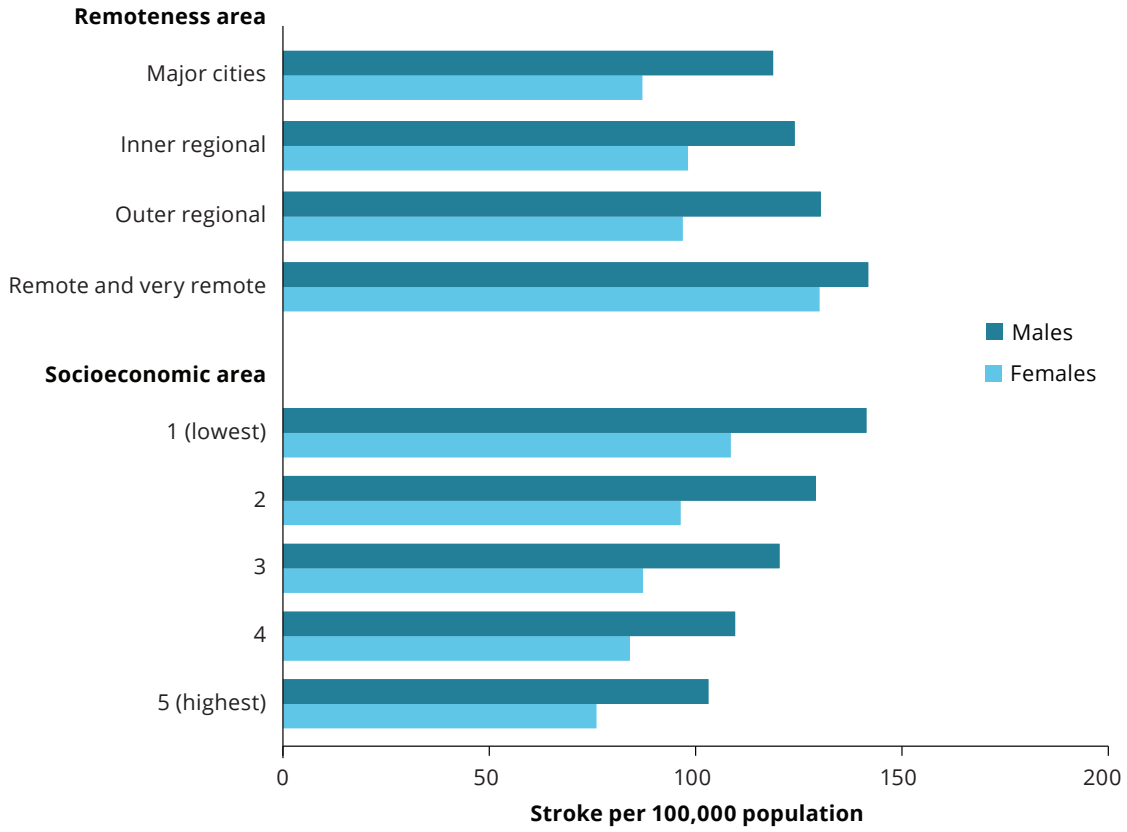
How do rates vary by remoteness and socioeconomic area?

In 2018, the incidence rate of stroke was 158.7 per 100,000 population in the lowest socioeconomic areas and 105.7 per 100,000 population in the highest socioeconomic areas, according to population-based quintiles based on the Index of Relative Socio-economic Disadvantage (IRSD) of the person's Statistical Area Level 2 (SA2) of usual residence.

After adjusting for age differences, in 2018 the incidence rate was 1.4 times as high in the lowest socioeconomic areas as in the highest socioeconomic areas. The age-standardised rate was higher in males than females across all socioeconomic areas (Figure 4).

The incidence rate of stroke was 153.2 per 100,000 population in *Remote and very remote* areas and 117.1 per 100,000 population in *Major cities*. After adjusting for age differences, the incidence rate was higher in *Remote and very remote* areas than in *Major cities*. The age-standardised incidence rate was higher in males than females across all remoteness areas (Figure 4).

Figure 4: Incidence of stroke, by remoteness and socioeconomic area and sex, 2018



Notes

1. Age-standardised to the 2001 Australian population.
2. Data include stroke hospitalisations that occurred in public hospitals in New South Wales, Victoria, Queensland, South Australia, Tasmania, and the Australian Capital Territory from 2011 to 2018, and private hospitals (where available).
3. Records (hospitalisations and deaths) with usual state of residence in Western Australia and the Northern Territory were excluded from the analysis.
4. Socioeconomic areas are classified according to population-based quintiles using the Index of Relative Socio-Economic Disadvantage (IRSD) based on Statistical Area Level 2 (SA2) of usual residence.
5. Remoteness areas are classified according to the Australian Statistical Geography Standard 2016 Remoteness Areas structure based on Statistical Area Level 2 (SA2) of usual residence.

Source: AIHW NIHSI version 1.0.

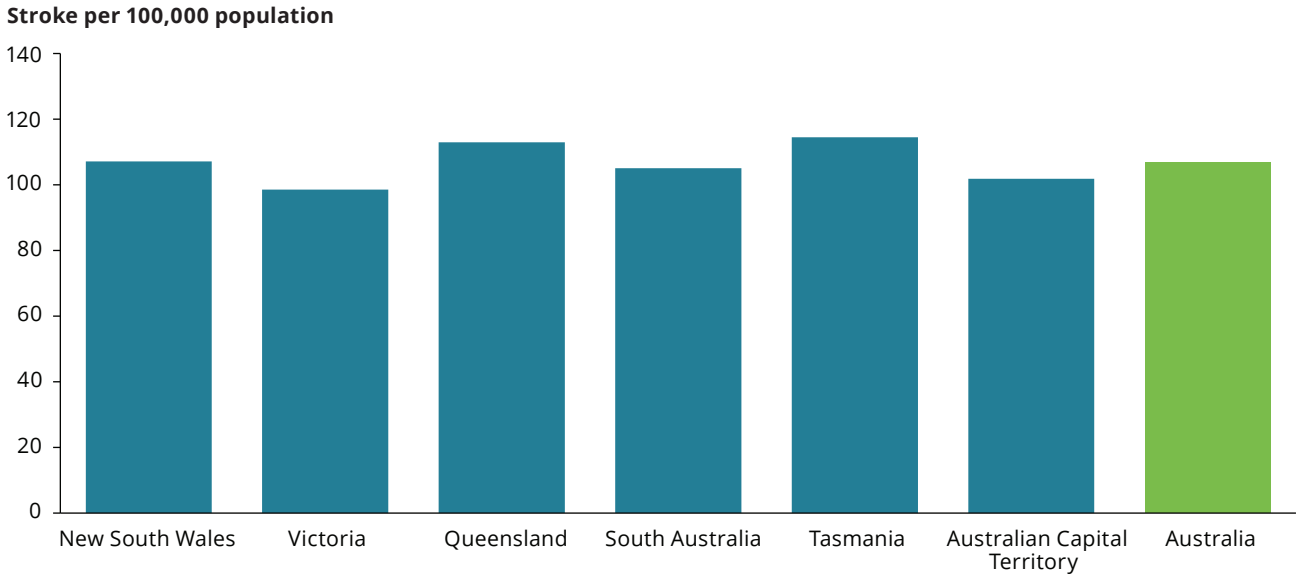
How do rates vary by state and territory?

The admitted patient care (hospitalisation) data in the NIHSI AA version 1.0 does not include hospital data from Western Australia and the Northern Territory. Admitted patient care data from private hospitals were included from some states (where available) in the NIHSI AA.

In 2018, New South Wales accounted for more than one-third (37%) of the 29,000 new stroke events in the linked data. Victoria accounted for 26% of new stroke events, Queensland for 23%, South Australia for 8.8%, Tasmania for 3.0%, and the Australian Capital Territory for 1.5%.

After adjusting for age, the incidence rate was highest in Tasmania and lowest in Victoria (Figure 5). The lack of comprehensive private hospital data, and differing treatment and referral patterns and data recording practices across the states and territories are likely to contribute to the differences in the incidence rates.

Figure 5: Incidence of stroke, by state and territory, 2018



Notes

1. Age-standardised to the 2001 Australian population.
2. Data include stroke hospitalisations that occurred in public hospitals in New South Wales, Victoria, Queensland, South Australia, Tasmania, and the Australian Capital Territory from 2011 to 2018, and private hospitals (where available).
3. Records (hospitalisations and deaths) with usual state of residence in Western Australia and the Northern Territory were excluded from the analysis.

Source: AIHW NIHSI version 1.0.

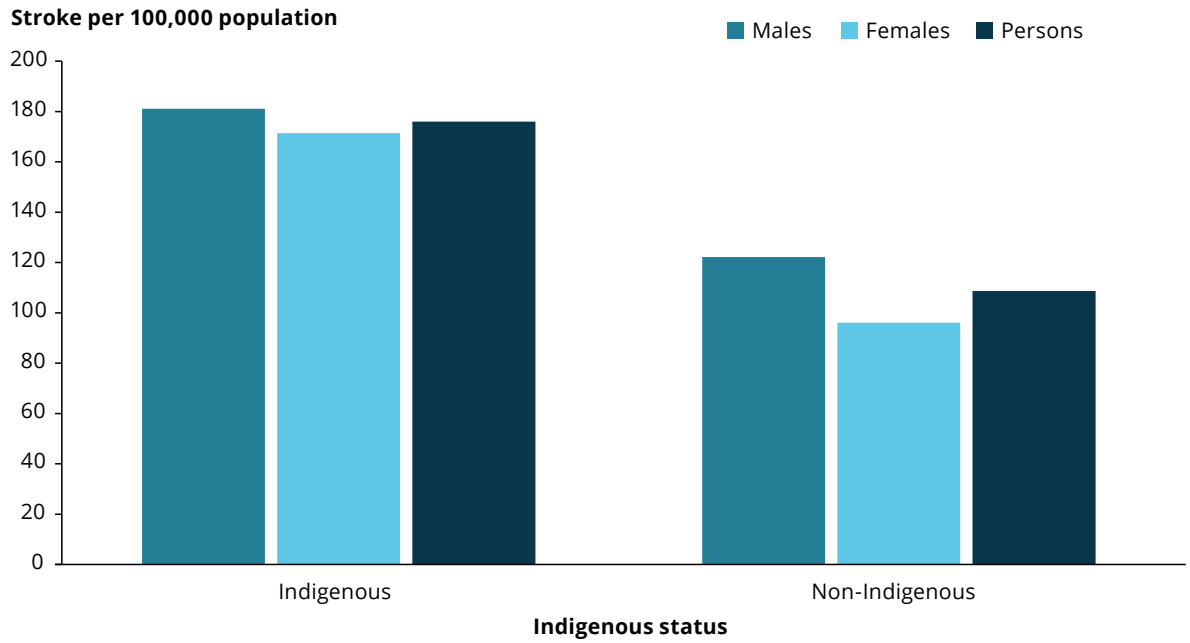
Aboriginal and Torres Strait Islander people

The admitted patient care (hospitalisation) data in the NIHSI AA version 1.0 does not include data from Western Australia and the Northern Territory. This may result in an underestimation of stroke events in the Aboriginal and Torres Strait Islander population.

In 2018, there were about 560 new stroke events among Aboriginal and Torres Strait Islander people – a rate of 86.9 per 100,000 population.

After adjusting for age differences, the incidence rate of stroke among Indigenous Australians was more than 1.6 times as high as among non-Indigenous Australians. The age-standardised incidence rates were 1.8 times as high among Indigenous females as among non-Indigenous females and 1.5 times as high among Indigenous males as among non-Indigenous males (Figure 6).

Figure 6: Incidence of stroke events, by Indigenous status and sex, 2018



Notes

1. Age-standardised to the 2001 Australian population.
2. Data include stroke hospitalisations that occurred in public hospitals in New South Wales, Victoria, Queensland, South Australia, Tasmania, and the Australian Capital Territory from 2011 to 2018, and private hospitals (where available). This is likely to result in an underestimation of the Aboriginal and Torres Strait Islander population.
3. Records (hospitalisations and deaths) with usual state of residence in Western Australia and the Northern Territory were excluded from the analysis.

Source: AIHW NIHSI version 1.0.

How do the linked and unlinked estimates compare?

The validation of the unlinked stroke algorithm is presented in a separate report titled *Validating algorithms for incidence of cardiovascular disease: Technical Report*, available on the AIHW website: https://www.aihw.gov.au/reports/heart-stroke-vascular-diseases/incidence-of-stroke-acute-coronary-syndrome/contents/technical-report.

Over the period 2011–2018, the total number of stroke (recurrent and new) events estimated using the algorithm based on unlinked data was similar to that from linked data (260,800 compared with 261,000). However, compared with estimates from linked data, the estimates based on unlinked data was lower than the number of fatal stroke events (66,500 compared with 80,400). The estimates based on unlinked data was higher than the number of non-fatal stroke events (194,400 compared with 180,600) estimated using the linked data.

The unlinked algorithm provides a reasonable estimate of total stroke events where linked data are not available.

Acute coronary syndrome

What are acute coronary syndrome events?

ACS is a term for heart attack and unstable angina.

- Heart attack – or acute myocardial infarction – is a life-threatening event that occurs when a blood vessel supplying the heart is suddenly blocked, threatening to damage the heart muscle and its functions. The electrocardiogram characteristics at the time of presentation at hospital determine the initial management of heart attack. It is divided into STEMI (ST segment elevation myocardial infarction) and NSTEMI (non-ST segment elevation myocardial infarction). Both forms are almost always caused by a complete blockage of a major coronary artery, leading to a long interruption of blood supply. Beyond very initial care, the treatment of both types of myocardial infarction is the same.
- Angina is chest pain caused by reduced blood flow to the heart. With stable angina, periodic episodes of chest pain occur when the heart has a temporary deficiency in blood supply. Unstable angina is an accelerating pattern of chest discomfort and is the more dangerous form due to changing severity in partial coronary artery blockages. It requires treatment in hospital in a similar manner to heart attack.

Both heart attack and unstable angina are sudden, severe life-threatening events. They are part of a continuum of acute coronary heart diseases.

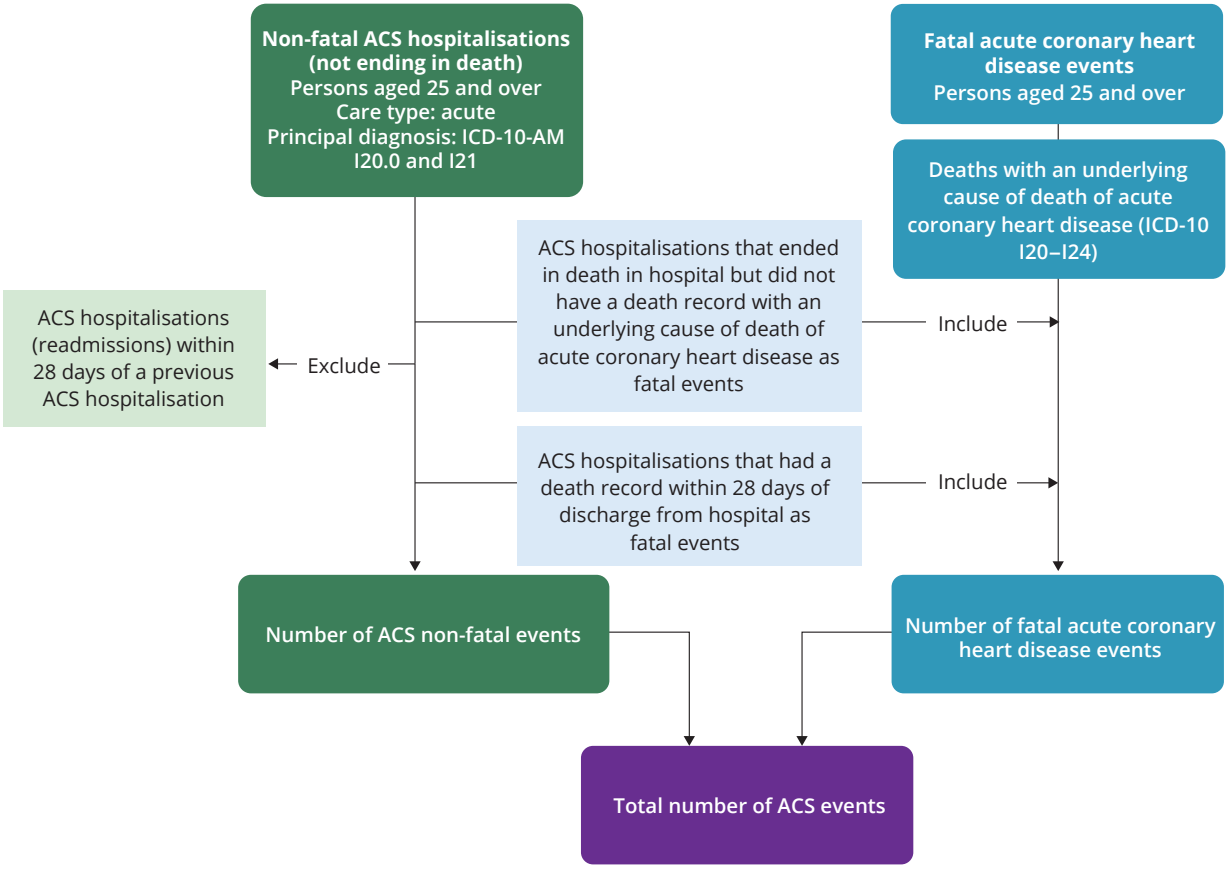
How are ACS events counted using linked data?

The incidence of ACS was estimated by counting non-fatal ACS hospitalisations and fatal acute coronary heart disease (CHD) events using the linked hospitalisations and deaths data in 2018. A 7-year look-back period from 2011 to 2017 was used to determine if an individual had a prior ACS hospital stay, and to identify new ACS events in 2018. People with a prior ACS hospital stay were excluded when estimating new non-fatal ACS events and fatal acute CHD events. ACS events including recurrent and new events were also estimated from 2011 to 2018.

Linked hospital data allows multiple hospital separations belonging to a person to be examined. Box 2 describes how a person may have several hospital separations between their admission and discharge from hospital, and how these separations were combined into one hospital stay for analysis.

After combining hospitalisations for a single ACS event into one hospital stay, the hospitalisation and deaths data for a person were examined to identify duplicate events from the linked hospitalisation and deaths data. Figure 7 summarises how an event might be double-counted across the 2 data sets and how multiple hospitalisations over time were differentiated when counting non-fatal ACS hospitalisations and fatal acute CHD events.

Figure 7: Summary of how ACS events were counted using linked hospital and deaths data in the NIHSI AA



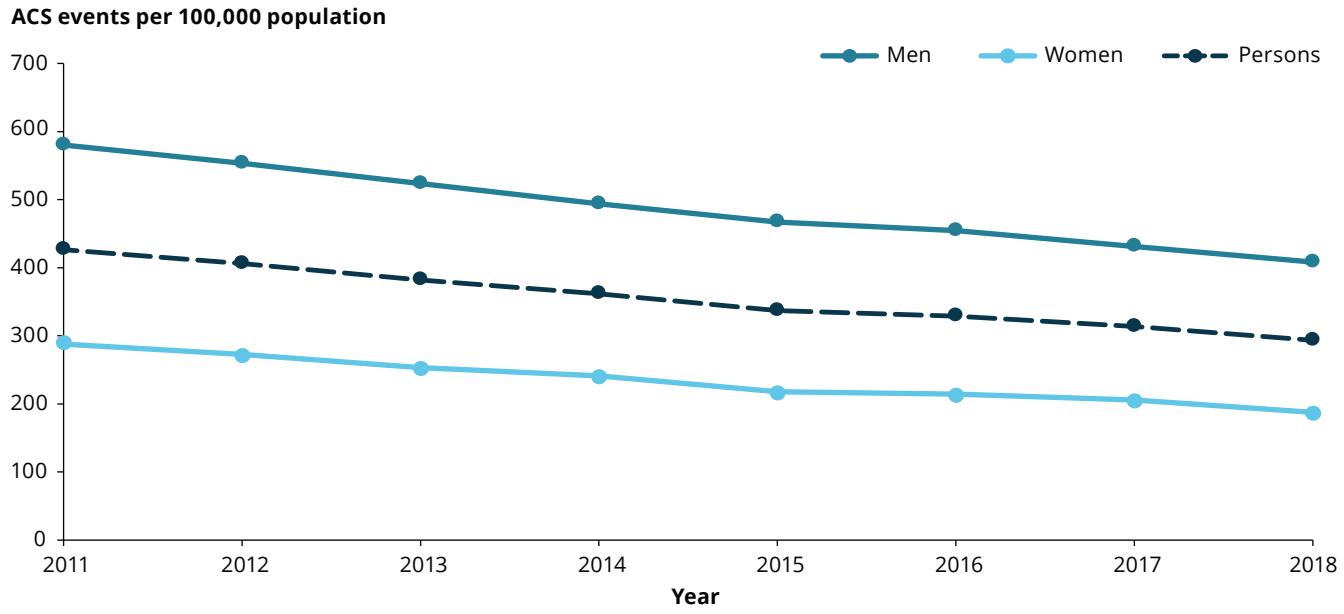
Note: Cause of death was coded using the International Statistical Classification of Diseases and Related Health Conditions, 10th Revision (ICD-10). Hospital diagnoses were coded using a classification modified for Australia (ICD-10-AM).

Acute coronary syndrome events in Australia

Based on linked hospital and deaths data from the NIHSI AA, there were almost 51,000 recurrent and new ACS events among Australians aged 25 and over in 2018 – about 140 every day.

Between 2011 and 2018, the rate of ACS events fell from 471.8 to 336.8 per 100,000 population. After adjusting for age differences, the rate of ACS events fell by around 31%. This decline was slightly greater for women (35%) than men (30%) (Figure 8).

Figure 8: ACS (recurrent and new) event rates among people aged 25 and over (age-standardised), by sex, 2011 to 2018



Notes

1. Age-standardised to the 2001 Australian population.
2. Data include stroke hospitalisations that occurred in public hospitals in New South Wales, Victoria, Queensland, South Australia, Tasmania, and the Australian Capital Territory from 2011 to 2018, and private hospitals (where available).
3. Records (hospitalisations and deaths) with usual state of residence in Western Australia and the Northern Territory were excluded from the analysis.

Source: AIHW NIHSI version 1.0.

Incidence of acute coronary syndrome in 2018

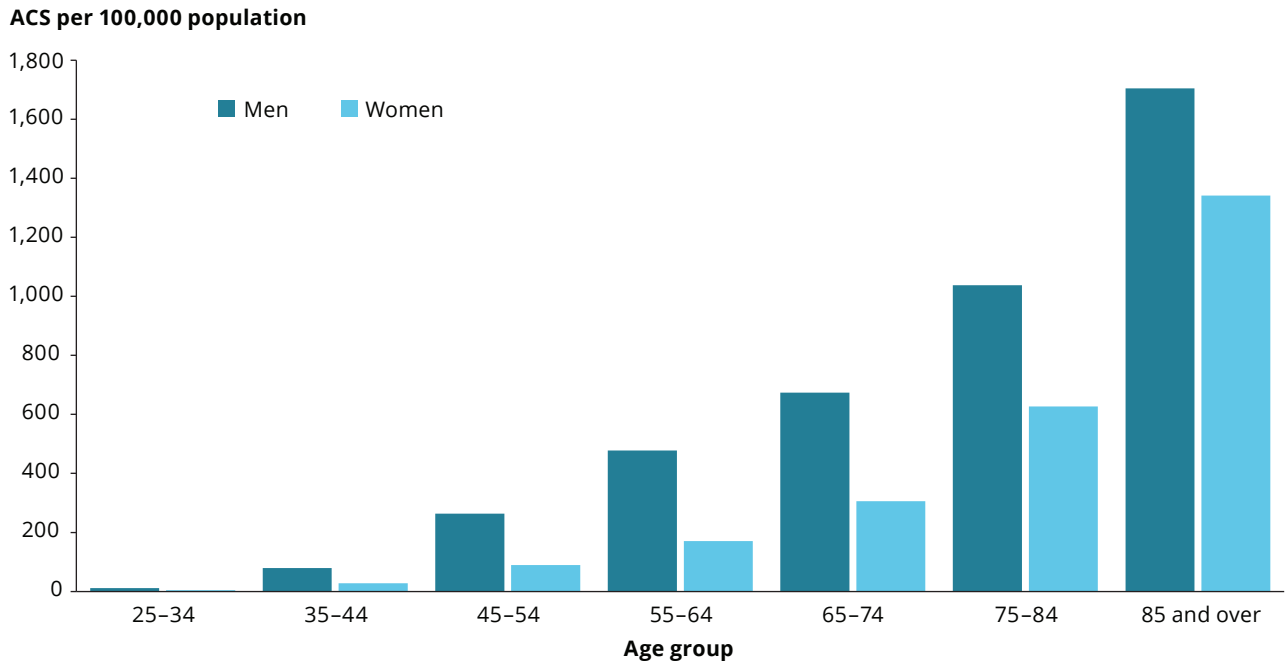
The incidence of new ACS events by age, sex, selected population characteristics, and state and territory in 2018 are presented below. People with a prior ACS hospitalisation in the look-back period of 2011 to 2017 were excluded when estimating new ACS events.

In 2018, there were around 40,200 new ACS events among people aged 25 and over in Australia – or 110 every day. The rate of new events was 265.5 per 100,000 population.

After adjusting for age differences, the incidence rate of ACS was twice as high in men as in women. Nearly two-thirds (64%) of new ACS events among people aged 25 and over were in men.

The incidence rate increased with age, with the rate in the 85 and over age group (1,479.1 per 100,000 population) almost 5 times the rate in the 55–64 age group (320.7 per 100,000 population) (Figure 9).

Figure 9: Incidence of ACS among people aged 25 and over, by sex and age group, 2018



Notes

1. Age-standardised to the 2001 Australian population.
2. Data include stroke hospitalisations that occurred in public hospitals in New South Wales, Victoria, Queensland, South Australia, Tasmania, and the Australian Capital Territory from 2011 to 2018, and private hospitals (where available).
3. Records (hospitalisations and deaths) with usual state of residence in Western Australia and the Northern Territory were excluded from the analysis.

Source: AIHW NIHSI version 1.0.

ACS subtypes

Of the 40,200 new ACS events in Australia in 2018, more than 4 in 5 (85% or 34,000) were not fatal. Of the non-fatal events, the principal diagnosis was:

- NSTEMI (52% of events)
- STEMI (24%)
- unstable angina (22%)
- unspecified myocardial infarction (MI) (1.3%). A myocardial infarction is a heart attack.

Around 6,200 of the new ACS events in 2018 were fatal. Of these, the underlying cause of death was:

- unspecified MI (80%)
- other acute ischaemic heart disease (4.3%)
- NSTEMI (3.2%).

Over 1 in 10 fatal events (12%) had the underlying cause of death recorded as something other than acute CHD: for example, a person had chronic ischaemic heart disease recorded as the underlying cause of death for an ACS hospitalisation that ended in death or an ACS hospitalisation with a death recorded within 28 days.

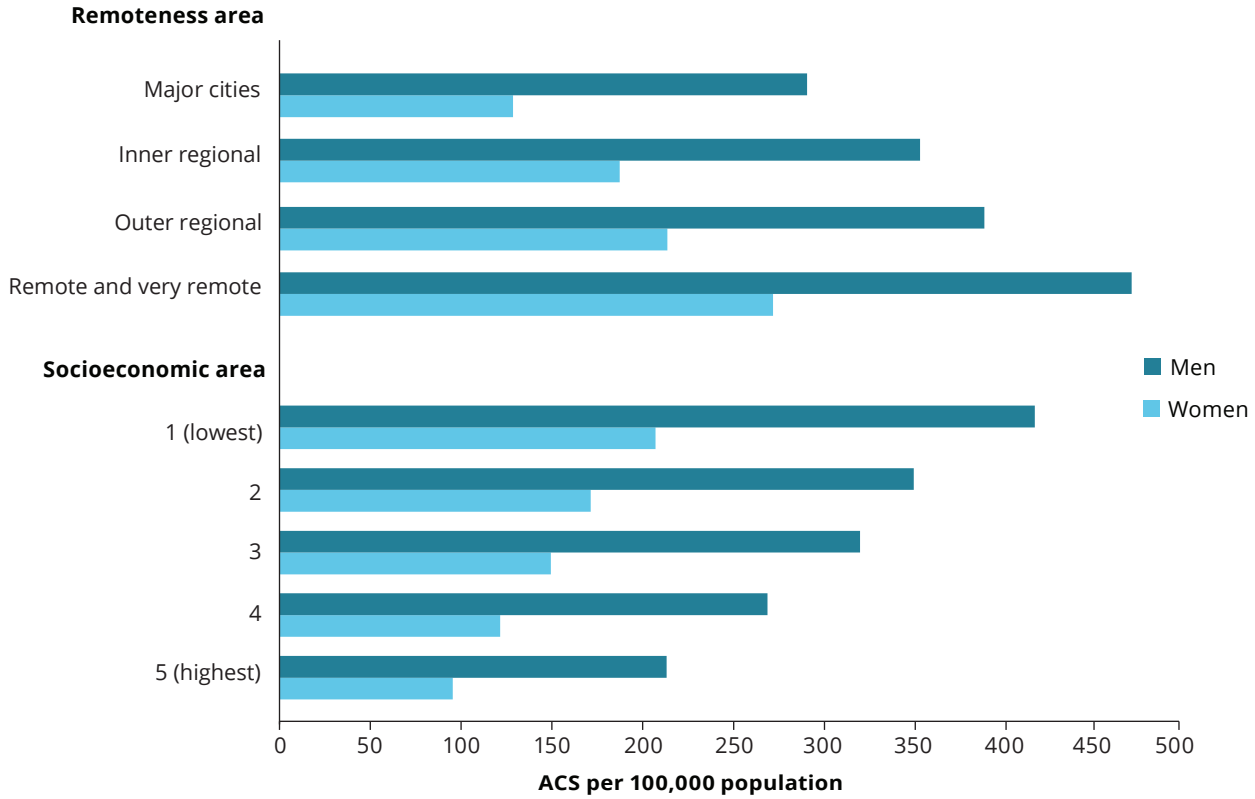
Due to small numbers, the proportions for angina and STEMI are not presented.

How do rates vary by remoteness and socioeconomic area?

In 2018, the incidence rate of ACS was 368.5 per 100,000 population in the lowest socioeconomic areas and 170.6 per 100,000 population in the highest socioeconomic areas, according to population-based quintiles based on the IRSD of the person's SA2 of usual residence. After adjusting for age differences, the incidence rate was twice as high in the lowest socioeconomic areas as in the highest socioeconomic areas in 2018. The age-standardised rate was around twice as high in males as in females across all socioeconomic areas (Figure 10).

The incidence rate of ACS was 415.0 per 100,000 population in *Remote and very remote* areas compared with 221.6 per 100,000 population in *Major cities*. After adjusting for age differences, the incidence rate was 1.8 times as high in *Remote and very remote* areas as in *Major cities*. The age-standardised incidence rate was higher in males than females across all remoteness areas (Figure 10).

Figure 10: Incidence of ACS among people aged 25 and over, by remoteness and socioeconomic area and sex, 2018



Notes

1. Age-standardised to the 2001 Australian population.
2. Data include stroke hospitalisations that occurred in public hospitals in New South Wales, Victoria, Queensland, South Australia, Tasmania, and the Australian Capital Territory from 2011 to 2018, and private hospitals (where available).
3. Records (hospitalisations and deaths) with usual state of residence in Western Australia and the Northern Territory were excluded from the analysis.
4. Socioeconomic areas are classified according to population-based quintiles using the Index of Relative Socio-Economic Disadvantage (IRSD) based on Statistical Area Level 2 (SA2) of usual residence.
5. Remoteness areas are classified according to the Australian Statistical Geography Standard 2016 Remoteness Areas structure based on Statistical Area Level 2 (SA2) of usual residence.

Source: AIHW NIHSI version 1.0.

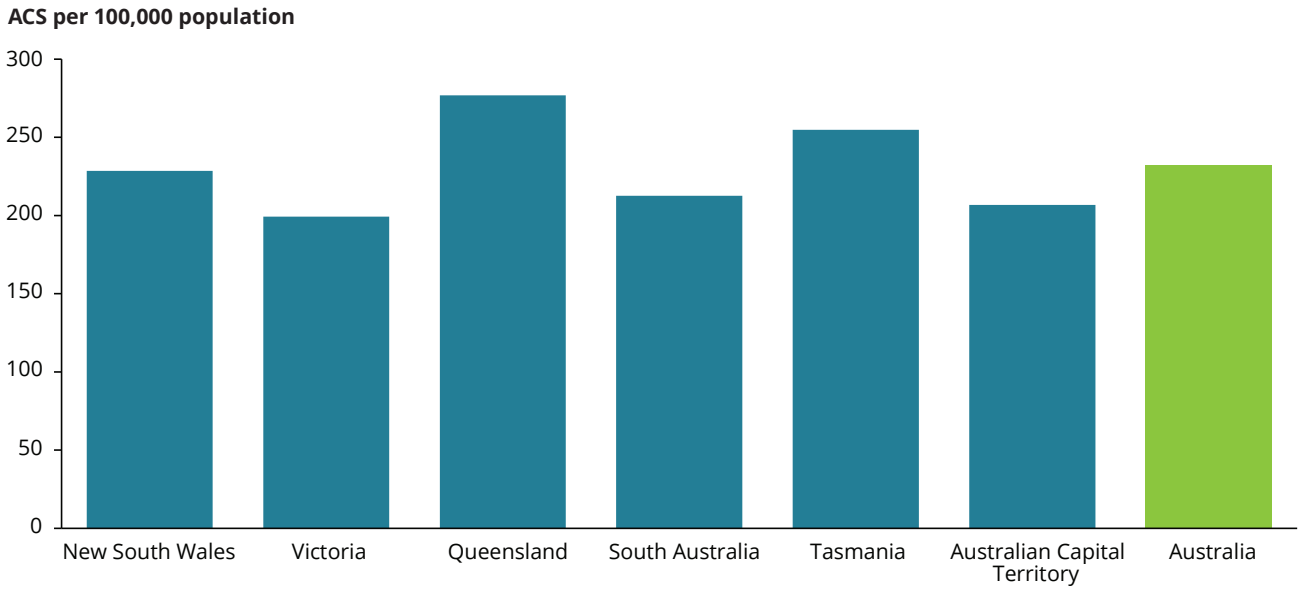
How do rates vary by state and territory?

The admitted patient care (hospitalisation) data in the NIHSI AA version 1.0 does not include hospital data from Western Australia and the Northern Territory. Admitted patient care data from private hospitals were included from some states (where available) in the NIHSI AA.

In 2018, New South Wales accounted for more than one-third (36%) of the 40,200 new ACS events in the linked hospitalisation and deaths data. Queensland accounted for 26%, Victoria for 25%, South Australia for 8.1%, Tasmania for 3.1%, and the Australian Capital Territory for 1.4%.

After adjusting for age differences, the incidence rate was highest in Queensland and lowest in Victoria (Figure 11). The lack of comprehensive private hospital data, and differing treatment and referral patterns and data recording practices across the states and territories are likely to contribute to the differences in the incidence rates.

Figure 11: Incidence of ACS among people aged 25 and over, by state and territory, 2018



Notes

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3. Records (hospitalisations and deaths) with usual state of residence in Western Australia and the Northern Territory were excluded from the analysis.

Source: AIHW NIHSI version 1.0.

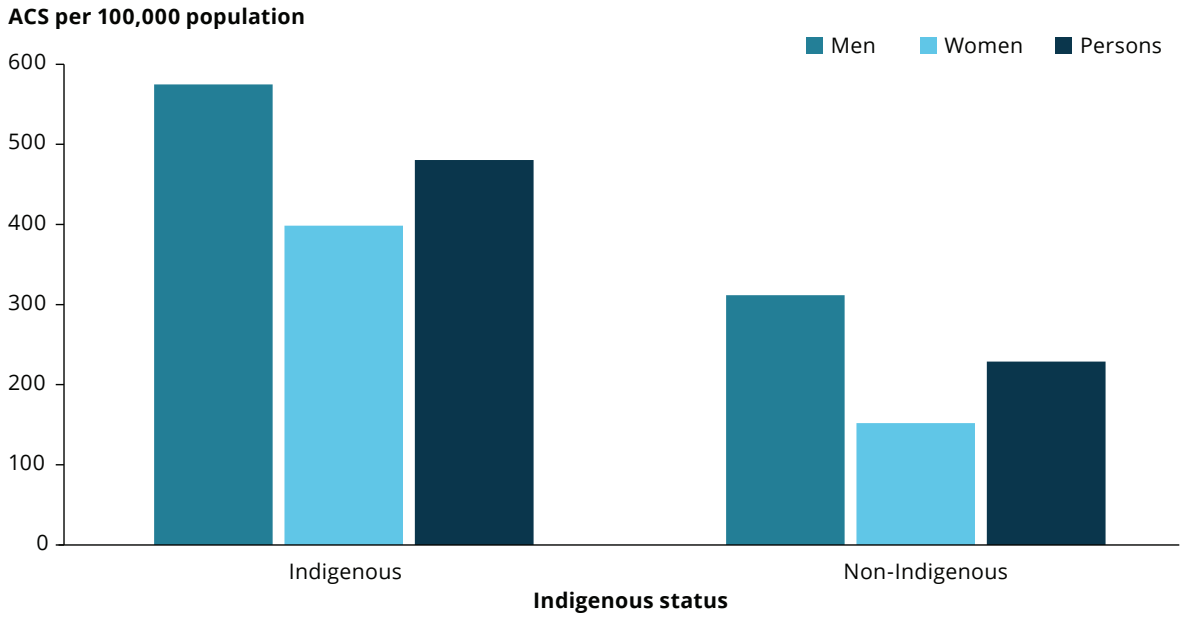
Aboriginal and Torres Strait Islander people

The admitted patient care (hospitalisation) data in the NIHSI AA version 1.0 does not include hospital data from Western Australia and the Northern Territory. This may result in an underestimation of ACS events in the Aboriginal and Torres Strait Islander population.

In 2018, there were more than 1,100 new ACS events among Aboriginal and Torres Strait Islander people. The rate of new events was 382.2 per 100,000 population.

After adjusting for age differences between the Indigenous and non-Indigenous populations, the incidence rate of ACS among Indigenous Australians was more than twice as high as for non-Indigenous Australians. Among Indigenous Australians, the age-standardised rate of new ACS events was higher in men than women in 2018 (Figure 12).

Figure 12: Incidence of ACS among people aged 25 and over, by Indigenous status and sex, 2018



Notes

1. Age-standardised to the 2001 Australian population.
2. Data include stroke hospitalisations that occurred in public hospitals in New South Wales, Victoria, Queensland, South Australia, Tasmania, and the Australian Capital Territory from 2011 to 2018, and private hospitals (where available). This is likely to result in an underestimation of the Aboriginal and Torres Strait Islander population.
3. Records (hospitalisations and deaths) with usual state of residence in Western Australia and the Northern Territory were excluded from the analysis.

Source: AIHW NIHSI version 1.0.

How do the linked and unlinked data estimates compare?

The validation of the unlinked ACS algorithm is presented in a separate report titled *Validating algorithms for incidence of cardiovascular disease: Technical Report*, available on the AIHW website: https://www.aihw.gov.au/reports/heart-stroke-vascular-diseases/incidence-of-stroke-acute-coronary-syndrome/contents/technical-report.

The total number of ACS events estimated from the unlinked data was 15% lower than the estimates from the linked data over the period 2011–2018 (415,900 events compared with 486,300). Compared to estimates from linked data, the number of fatal ACS events (70,700 compared with 79,500) and non-fatal ACS events (345,200 compared with 406,800) were lower.

The accuracy of the estimated number of ACS events for national monitoring could be improved by using linked data.

More information

For more information on the data sources and the methods used to estimate the incidence of stroke and acute coronary syndrome events, see *Validating algorithms for incidence of cardiovascular disease: Technical Report*, available on the AIHW website: https://www.aihw.gov.au/reports/heart-stroke-vascular-diseases/incidence-of-stroke-acute-coronary-syndrome/contents/technical-report.

This report is accompanied by supplementary tables available on the AIHW website: https://www.aihw.gov.au/reports/heart-stroke-vascular-diseases/incidence-of-stroke-acute-coronary-syndrome/data.

Glossary

Aboriginal or Torres Strait Islander: a person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander.

Cause of death: the causes of death entered on the Medical Certificate of Cause of Death are all diseases, morbid conditions or injuries that either resulted in or contributed to death, and the circumstances of the accident or violence that produced any such injuries. Causes of death are commonly reported by the underlying cause of death.

Electrocardiogram: a medical test that measures the electrical activity generated by the heart as it contracts.

Hospital separation: an episode of care for an admitted patient, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending in a change of type of care (for example, from acute care to rehabilitation). Separation also means the process by which an admitted patient completes an episode of care either by being discharged, dying, transferring to another hospital or changing type of care.

Hospital stay: the contiguous period of time a person receives hospital care. A hospital stay may be made up of one or more continuous hospital separations. When a person was discharged from one hospital and directly admitted to another hospital (or the same hospital) within one day, the separate hospital separations were combined in one hospital stay for analysis. If a person has a long hospital stay for one treatment, but also several 1-day treatments at another hospital or ward during the same period of time, these separations would also be counted as a single hospital stay.

Incidence: the number of new cases (of an illness or event, and so on) occurring during a given period, often expressed as a rate per population.

Look-back period: a defined pre-observation period without the illness or event to distinguish between recurrent and new cases.

Principal diagnosis: the diagnosis established after study to be chiefly responsible for occasioning the patient's hospitalisation.

Underlying cause of death: the disease or injury that initiated the sequence of events leading directly to death; that is, the primary or main cause. For each death, only a single underlying cause is selected from among all the conditions reported on a death certificate.

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