

About the Atlas

Who has developed the Atlas?

The Australian Commission on Safety and Quality in Health Care (the Commission), in collaboration with the Australian Institute of Health and Welfare (AIHW), has led the development of the Atlas. Development has involved broad consultation with:

- The Australian Government Department of Health
- State and territory health departments and agencies
- Professional colleges and specialist societies
- Clinicians
- Healthcare organisations.

An oversight and advisory structure, including a Primary Care Expert Advisory Group and a state and territory advisory group (Jurisdictional Advisory Group), has ensured wide-ranging input into the development of the Atlas. For each chapter, a Topic Expert Group of lead clinicians and academic experts from across Australia was established. The Topic Expert Groups provided advice at each stage of development, from selection of the clinical items to interpretation of the Atlas findings. Members of the advisory groups are required to sign a confidentiality agreement and declare conflicts of interest before release of the preliminary data. The AIHW conducted the data extraction and analysis, produced the maps and graphs, and provided expertise in interpreting the data.

How was it developed?

The Atlas examines a selection of clinical items for featured procedures, tests, investigations, treatments or hospitalisations in a range of clinical areas.

A large number of clinical items were nominated and considered for inclusion, but many were not suitable because of poor data quality or small numbers, which limited the capacity to analyse and present the data. The final selection of clinical items reflects the following criteria:

- High levels of current or projected use
- Significant current or projected disease burden
- Significant potential for harm
- High use of health system resources
- Interest in the topic and clinical engagement to support review and action
- Availability of suitable data.

The clinical items that met these criteria were reviewed by the Primary Care Expert Advisory Group, the Jurisdictional Advisory Group and the Commission's executive. Following confirmation of clinical items for analysis, Topic Expert Groups were established around clinical themes. The Topic Expert Groups were consulted on prioritisation of the clinical items for analysis and on development of the data specifications, where possible. Following analysis of the data for each clinical item, the Primary Care Expert Advisory Group, the Jurisdictional Advisory Group, the Topic Expert Groups and an epidemiologist reviewed the results.

The expert groups also provided content for, and reviewed, the clinical commentaries. Their suggestions and the Commission's reviews of the literature were used as the basis for commentary on the possible reasons for healthcare variation and strategies for addressing variation. The clinical commentaries were also reviewed by:

- The AIHW
- Epidemiology and medicines use experts
- The National Aboriginal and Torres Strait Islander Health Standing Committee
- Relevant clinical colleges.

More than 150 clinicians, researchers, policy experts and consumer representatives have examined and commented on the data.

What does the Atlas measure?

The data in the Atlas show the rates for featured procedures, tests, investigations, treatments or hospitalisations in each geographic area. To calculate rates, the number of interventions that occurred in an area is divided by the population of that area. Rates are age and sex standardised. All rates are based on the patient's place of residence, not the location of the health service.

Why are the data age standardised and sex standardised?

The data in the Atlas have been age standardised (that is, controlled for age) so that fair comparisons can be made between areas that have different age structures. Without age standardisation, it would be difficult to know whether higher rates of an intervention in an area with a large number of retirees, for example, were due only to the older age of the local population. The data are also sex standardised, so that having a larger proportion of males or females in an area does not influence the findings. The early planned caesarean section indicator is not age standardised because of insufficient data quality.

Age standardisation involves calculating the rate in each area as if the area had a standard proportion of older and younger people. Sex standardisation involves calculating the rate in each area as if the area had a standard proportion of males and females. The resulting age- and sex-standardised rates can then be compared for all areas, knowing that differences in age and/or sex structure of the population have been accounted for.

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Magnitude of variation

The magnitude of variation ('fold variation' or 'times difference') shows how large the difference is between the lowest and highest rates of each intervention, and is expressed as a ratio of the highest to the lowest rates. For example, if the lowest rate was 10 per 100,000 people and the highest rate was 20 per 100,000 people, the magnitude of variation is two-fold.

Australian rate

Rates for an intervention may appear higher or lower than the Australian rate; in most cases, the most appropriate rate is difficult to define and not necessarily the Australian rate. Depending on the intervention, a higher or lower rate may be clinically appropriate. It is difficult to conclude what proportion of the variation is unwarranted or to comment on the relative performance of health services and clinicians in one area compared with another. An Australian rate is provided to encourage investigation into the reasons for any variation seen at local, regional, and state and territory levels.

About the data

The Atlas provides information on clinical items grouped into four clinical themes, covering procedures, tests, investigations, treatments or hospitalisations.

The introduction to each chapter provides an overview of the clinical items; international comparisons, where possible; national and state or territory initiatives to improve care; and key findings and recommendations. Specific data limitations are also outlined. Clinical commentary is presented alongside each clinical item, outlining the context, magnitude of variation, and possible reasons for the variation.

The Atlas uses data sourced from four national health datasets:

- Medicare Benefits Schedule (MBS) data
- National Hospital Morbidity Database (NHMD)
- National Perinatal Data Collection (NPDC)
- Pharmaceutical Benefits Scheme (PBS) data.

The years of data shown for each clinical item depend on the source and the most recently available data:

- MBS items are analysed for services provided in 2016–17
- NHMD items are analysed for hospitalisations in 2016–17, except the thyroidectomy item, which is analysed for three combined years (2014–15 to 2016–17) because of small numbers
- The NPDC item is analysed for early planned caesarean sections in 2015
- PBS items are analysed for prescriptions dispensed in 2016–17.

Seven repeat PBS items from the first Atlas are analysed for changes over four years and are presented in a series of 'turnip' graphs. These include prescriptions of antimicrobial, psychotropic and opioid medicines dispensed from 2013–14 to 2016–17.

For MBS and PBS items, the rates are based on where the patient lives as determined by the person's Medicare enrolment postcode. For NHMD items, the rates are determined by the person's place of residence as recorded at the time of hospital admission. For the NPDC item, the rates are based on the mother's place of residence.

The Atlas presents age- and sex-standardised rates per 100,000 people for all items. The exception is the NPDC item, which is presented as a percentage. Rates are age and sex standardised to the Australian population using the Australian Bureau of Statistics (ABS) Estimated Resident Population as at 30 June 2001 (based on the 2001 Census of Population and Housing).

The geographic local areas used are ABS standard geographical regions known as the Statistical Area Level 3 (SA3). SA3s provide a standardised regional breakdown to assist in analysing data at the regional level. SA3s generally have populations between 30,000 and 130,000 people. To enable comparisons, local areas are also grouped by state and territory, and by remoteness and socioeconomic status. The remote and very remote categories were combined into one, giving a total of four remoteness categories.

Remoteness is calculated according to the ABS Australian Statistical Geography Standard (ASGS) 2016 using Statistical Area Level 1 (SA1) to remoteness concordance. SA1 population was concorded to SA3, and the remoteness category with the highest percentage of population was allocated to the SA3.

The socioeconomic quintiles are based on the ABS 2016 Index of Relative Socio-Economic Disadvantage at the SA1 level. The quintile with the highest number of SA1s was allocated to the SA3. Some quintiles were combined within a remoteness category to ensure sufficient numbers of SA3s for comparison purposes.

Defined daily dose (DDD) is a measurement unit of assumed average maintenance dose per day for a medicine used for its main indication in adults, created by the World Health Organization. The DDD does not necessarily correspond to the recommended or average prescribed daily dose.

Use of DDDs allows comparisons of medicines dispensing independent of differences in price, preparation and quality per prescription. Expressing medicines dispensing in DDDs per thousand people per day (DDDs/1,000/day) allows the aggregation of data for medicines that have different daily doses.

The data specifications for each item can be accessed on the AIHW Metadata Online Registry (METeOR) at www.meteor.aihw.gov.au.

Data limitations

The clinical items describe variation in health service provision. It is not currently possible to conclude what proportion of the variation is unwarranted, or to comment on the relative performance of health services and clinicians in one area compared with another. The data are provided to encourage further analysis and discussion about the reasons for any variation at local, regional, and state and territory levels.

The hospital data from the NHMD excludes non-admitted care provided in outpatient clinics or emergency departments. Because there is no standardised admission policy across states and territories, analysis of variation for some procedures should take into account possible differences in admission practices and policies among providers, and states and territories. For example, some same-day procedures such as gastroscopy and colonoscopy can be performed in either non-admitted or admitted care settings.

Some data have been suppressed for the following reasons:

- To protect confidentiality of a patient – for example, when the number of prescriptions and the population are very small; this could potentially lead to identifying a patient
- To protect confidentiality of a service provider or a business entity in the MBS data – for example, when the services are predominantly provided by one or two providers
- To account for low numbers of events or very small populations – these rates are more susceptible to random fluctuations
- To preserve confidentiality – numbers of events are suppressed, where applicable.

Suppressed SA3 data are included for larger area analysis.

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The MBS rules for protecting provider and entity identity have had a marked effect on reporting of three items in this Atlas: myocardial perfusion scans, thyroid function tests and thyroid stimulating hormone tests. The implications of these suppression rules are outlined in the chapters on these items. For further information on the data limitations, refer to the individual clinical items. Detailed information on the methods used is provided in the Technical Supplement.

Data for Aboriginal and Torres Strait Islander Australians

Data according to Aboriginal and Torres Strait Islander status have been provided for NHMD and NPDC items only. However, analysis was not undertaken by Aboriginal and Torres Strait Islander status for the MBS and PBS data because this information was not available at the time of publication.

Analyses in this report have not been adjusted to account for the under-identification of Aboriginal and Torres Strait Islander Australians in NHMD and NPDC datasets. Data by Aboriginal and Torres Strait Islander status should be interpreted with caution because hospitalisations for Aboriginal and Torres Strait Islander patients are under-enumerated, and there is variation in the under-enumeration among states and territories.

Maps and graphs

Data for each of the items in the Atlas are displayed as graphs and maps to show variation in rates by geographic location of patient residence.

On the map, age- and sex-standardised rates in each of the geographic areas are ranked from lowest to highest and then split into 10 categories (deciles). These are displayed with colour gradients, where darker colours represent higher rates and lighter colours represent lower rates. Separate maps show the greater capital city areas in more detail.

Standard figures are provided for new items (non-repeat items). Each figure presents a different analysis:

- Numbers and rates by local area, listing the areas with the lowest and highest rates
- Numbers and rates by state and territory
- Numbers and rates by remoteness and socioeconomic status.

Standard figures for repeat PBS items are:

- Rates at a national level, and year
- DDDs/1,000/day, and year.

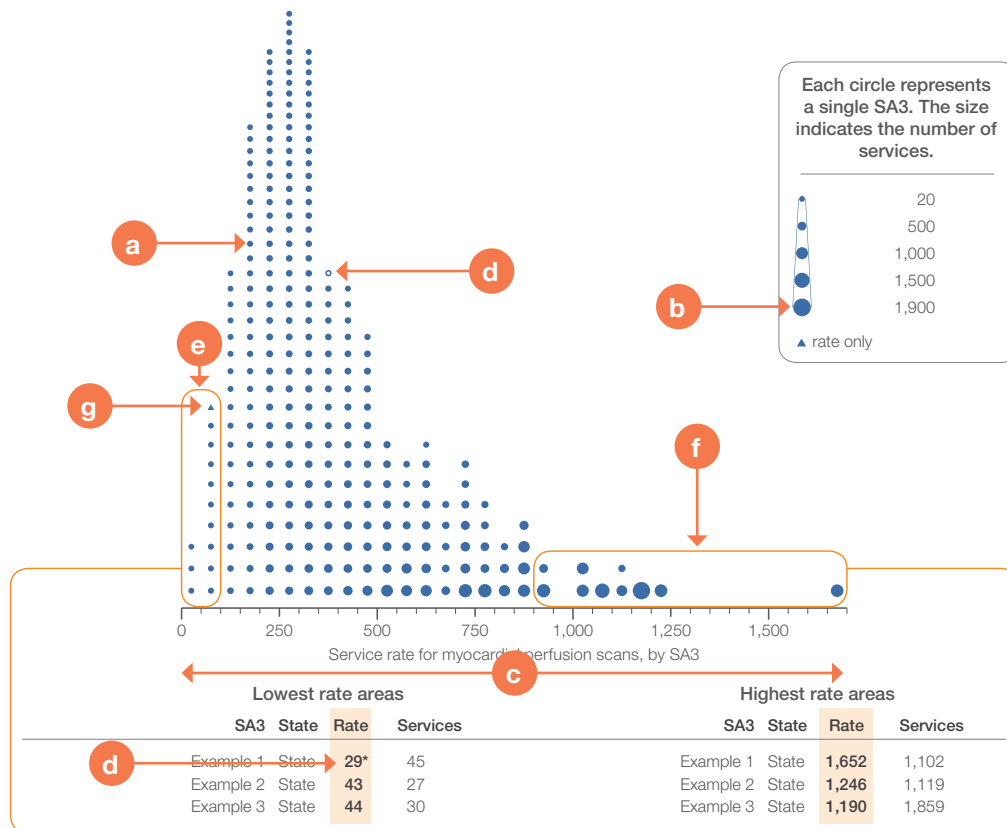
Some items include additional figures, for example, thyroidectomy item:

- Rates by state and territory, and Aboriginal and Torres Strait Islander status
- Rates by state and territory, and patient funding status.

Further information on interpreting the figures is provided on pages 33–37.

How to interpret our data visualisations

Histogram



a **What does the circle represent?**
Each circle represents an SA3. SA3s are geographical areas defined by the ABS that provide a standardised regional breakdown of Australia. SA3s generally have populations between 30,000 and 130,000 people.

b **Circle size**
The size of a circle indicates the number of events in that SA3. A large circle represents an SA3 with a greater number of events than SA3s with a smaller circle. Each histogram is accompanied by a legend to indicate scale.

c **Horizontal axis**
The horizontal axis shows the age- and sex-standardised rate. Rates are age and sex standardised to allow comparisons between populations with different age and sex structures.

d **Hollow circles and asterisks**
A hollow circle or an SA3 rate that has an asterisk indicates a rate that is considered more volatile and should be interpreted with caution.

e **Lowest rates**
Circles and triangles in the box are SA3s with the lowest age- and sex-standardised rates in Australia. The names, rates and numbers of events for these SA3s are listed in the table below the histogram.

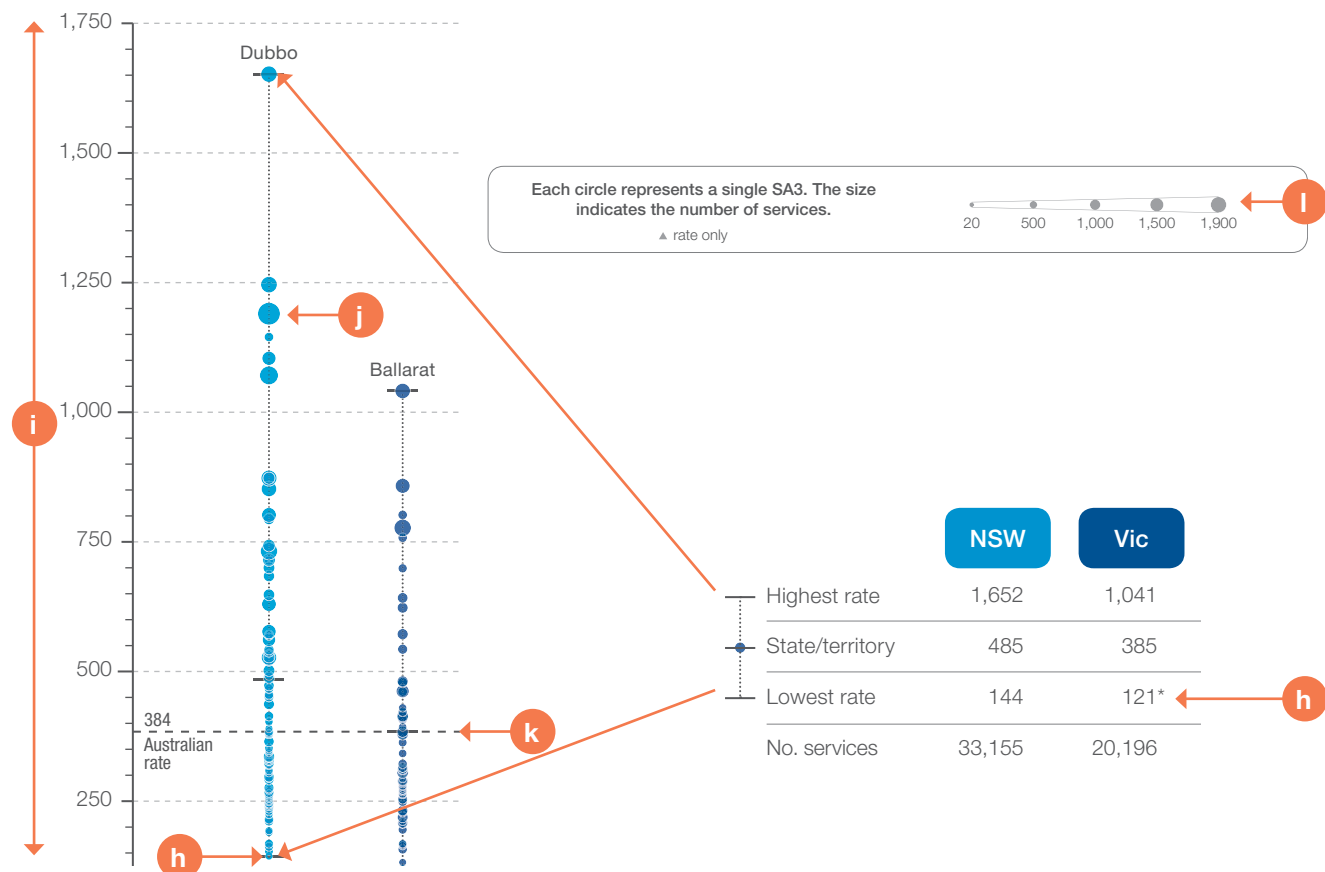
f **Highest rates**
Circles and triangles in the box are SA3s with the highest age- and sex-standardised rates in Australia. The names, rates and numbers of events for these SA3s are listed in the table below the histogram.

g **What does the triangle represent?**
Each triangle represents an SA3 where only the rate is published. The number of events is not published for confidentiality reasons.

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How to interpret our data visualisations

State and territory graphic



h Hollow circles and asterisks
A hollow circle or an SA3 rate that has an asterisk indicates a rate that is considered more volatile and should be interpreted with caution.

i Vertical axis
The vertical axis shows the age- and sex-standardised rate. Rates are age and sex standardised to allow comparisons between populations with different age and sex structures.

j What does the circle represent?
Each circle represents an SA3. SA3s are geographical areas defined by the ABS that provide a standardised regional breakdown of Australia. SA3s generally have populations between 30,000 and 130,000 people.

k Australian rate line
This line indicates the Australian age- and sex-standardised rate.

l Circle size
The size of a circle indicates the number of events in that SA3. A large circle represents an SA3 with a greater number of events than SA3s with a smaller circle. Each graphic is accompanied by a legend to indicate scale.

How to interpret our data visualisations

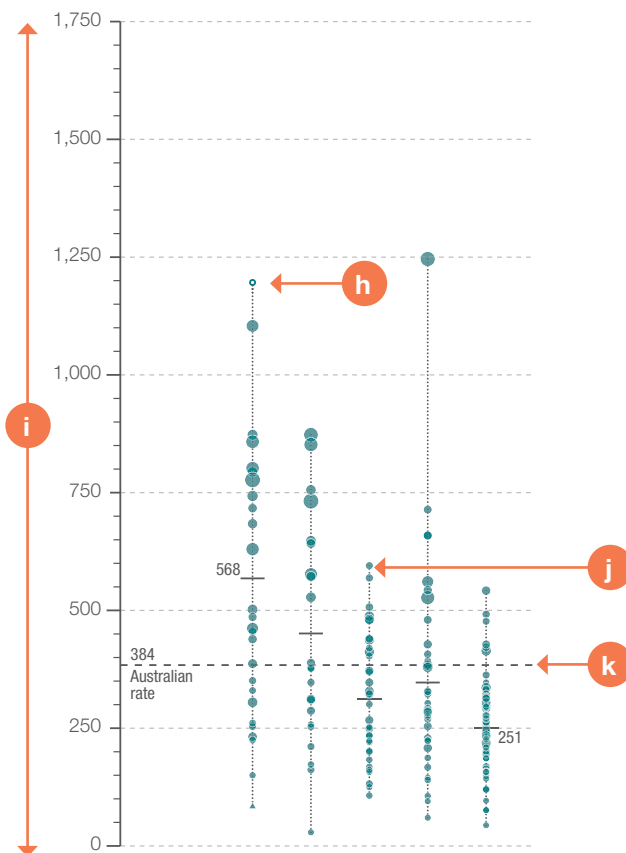
Remoteness and socioeconomic status graphic



m

Remoteness and socioeconomic status

Each SA3 is assigned a remoteness category and a socioeconomic status (SES) category, using remoteness and SES defined by the ABS. The lowest SES category has the most overall disadvantage, and the highest SES category has the least overall disadvantage. Some SES categories are combined in remoteness categories, except in major cities, to ensure sufficient numbers of SA3s for comparison. In this example, the remoteness and SES rate is higher with greater socioeconomic disadvantage.



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How to interpret our data visualisations

Repeat analyses graphic

- a What does the rectangle represent?**
Each rectangle represents an SA3. SA3s are geographical areas defined by the ABS that provide a standardised regional breakdown of Australia. SA3s generally have populations between 30,000 and 130,000 people.
- b Hollow rectangles and asterisks**
A hollow rectangle or an SA3 rate that has an asterisk indicates a rate that is considered more volatile and should be interpreted with caution.
- c Vertical axis**
The vertical axis shows the age- and sex-standardised rate. Rates are age and sex standardised to allow comparisons between populations with different age and sex structures.
- d Highest rate without top 10%**
This line indicates the highest age- and sex-standardised rate after excluding the highest 10% of SA3 rates.
- e Australian rate**
This line indicates the Australian age- and sex-standardised rate.
- f Lowest rate without bottom 10%**
This line indicates the lowest age- and sex-standardised rate after excluding the lowest 10% of SA3 rates.
- g Highest rate**
The highest rate is the highest age- and sex-standardised rate of all SA3 rates.
- h Lowest rate**
The lowest rate is the lowest age- and sex-standardised rate of all SA3 rates.
- i Magnitude of variation**
The magnitude of variation is the times difference between the highest and lowest SA3 rates in Australia. Rates published with caution are excluded from the calculation.
- j Magnitude of variation without top and bottom 10%**
The magnitude of variation is the times difference between the highest and lowest SA3 rates after excluding the highest and lowest 10% of SA3 rates.
- k Rate of dispensing**
Darker colours represent SA3s with a higher age- and sex-standardised rate, and lighter colours represent SA3s with a lower rate.

