#### Who has developed the Atlas?

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
- Consumers Health Forum Australia.

An oversight and advisory structure, including a clinical and consumer advisory group (Atlas 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 have provided advice at each stage of development, from selection of the clinical items to interpretation of the Atlas findings. 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 (hospitalisations, procedures or complications) in a range of clinical areas. A large number of clinical items were nominated and considered for inclusion, but many were not suitable, either because of poor data quality or because small numbers limited the capacity to analyse and present the data. The final selection of interventions examined 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 Atlas 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 Atlas Advisory Group, the Jurisdictional Advisory Group, the Topic Expert Groups and an epidemiologist reviewed the results.

The advisory and expert groups also provided content for, and reviewed, the clinical commentary. 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 commentary was also reviewed by:

- The expert epidemiologist
- The AIHW
- 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 of hospitalisations for featured conditions and procedures in each geographic area. The number of times the type of hospitalisation occurred in an area is divided by the population of that area. The rate is then age and sex standardised to allow comparisons between populations with different age and sex structures. All rates are based on the patient's place of residence, not the location of the hospital or 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 fair comparisons can be made between areas that may have different age structures. Without age standardisation, it would be difficult to know whether higher rates of hospitalisation 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 (except for the women's health and maternity items), so that having a larger proportion of males or females in an area does not influence the findings.

Age standardisation involves calculating the rate in each area as if it had a standard proportion of older and younger people. Sex standardisation involves calculating the rate in each area as if it had a standard proportion of males and females. The resulting ageand 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.

#### What does the magnitude of variation mean?

The magnitude of variation (or 'fold variation') shows how large the difference is between the lowest and highest rates of each type of hospitalisation, procedure or complication. For example, if the lowest rate of hospitalisation for a condition was 10 per 100,000 people and the highest rate was 20 per 100,000 people, the rate of hospitalisation shows two-fold variation.

# Is the overall Australian rate always the right rate?

No. The overall rate of hospitalisation or use of a procedure is not necessarily the right rate – in some cases, the overall rate of use of a procedure may be too high or too low, and, in many cases, the right rate has not been defined. With a complication that cannot be prevented in all cases, the right rate is also difficult to define.

### About the data

The Atlas provides information on 18 clinical items, grouped into four clinical themes, covering hospitalisations for medical care or surgical procedures, and complications from care (one item).

The introduction to each chapter provides an overview of the items included in the chapter; international comparisons, where possible; information about national, and state or territory activities to improve care for these items; and key 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 two national health datasets:

- National Hospital Morbidity Database (NHMD)
- National Perinatal Data Collection (NPDC).

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

- NHMD items are analysed for the year 2014–15, or the aggregation of three financial years 2012–13 to 2014–15 for clinical items with small numbers.
- NPDC items are analysed by the aggregation of three calendar years 2012, 2013 and 2014, because of small numbers.

For hospitalisations, the rates are determined by the person's place of residence as recorded at the time of hospitalisations.

The geographic local areas used are Australian Bureau of Statistics (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 of between 30,000 and 130,000. To enable comparisons, local areas are also grouped by state and territory, and by remoteness and socioeconomic status. The remoteness categories used are from the ABS 2011 Australian Statistical Geography Standard. The socioeconomic quintiles are based on the ABS 2011 Index of Relative Socio-Economic Disadvantage at the SA1 level. The remote and very remote categories were combined into one category to create four remoteness categories.

The Atlas presents age- and sex-standardised rates per 100,000 people for all interventions except the women's health and maternity interventions. For the women's health interventions, the data presented are age-standardised rates per 100,000 women. For the maternity items, the data presented are age-standardised rates per 1,000 selected women or vaginal births.

Age- and sex-standardised rates were calculated for all data using the ABS Estimated Resident Population report as at 30 June 2001 (based on the 2001 Census of Population and Housing).

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 interventions and 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 exclude episodes of non-admitted care provided in outpatient clinics or emergency departments. Because there is no standardised admissions 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 cervical loop excision and cervical laser ablation can be performed in either non-admitted or admitted care settings.

Some results have been suppressed for two reasons:

- To protect confidentiality if they could potentially identify a patient – for example, when the number of services, or the population used to calculate rates, is very small. A small number of SA3s have a very small or zero population – these are mainly very large national parks close to the outskirts of major cities. The data for these SA3s have been suppressed for the SA3-level analysis. However, the data from suppressed SA3s are included for larger area analysis.
- To account for low numbers of events or very small populations – these rates are more susceptible to random fluctuations.

For further information on the data limitations, refer to the individual clinical items. Detailed information on the methods used to calculate the data is provided in the Technical Supplement.

There may be chance fluctuations in the data from year to year. Three years of data for each indicator is available online, except for the indicators that are based on three years of data. The additional data are available at www.safetyandquality.gov.au/atlas.

#### Data for Aboriginal and Torres Strait Islander Australians

Analyses in this report have not been adjusted to account for the under-identification of Aboriginal and Torres Strait Islander Australians in any of the datasets used. 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 the 18 clinical items in the Atlas are displayed as both graphs and maps to show variation in rates by geographic location of patient residence.

On the map for each clinical item, age- and sexstandardised rates in each of the geographic areas are ranked from lowest to highest and then split into deciles. These are displayed with colour gradients, where darker colours represent higher rates and lighter colours represent lower rates. Separate maps show the greater metropolitan areas in more detail.

Figures are provided for each item. Each figure presents a different analysis of the data:

- Rate by state and territory and Indigenous status
- Rate by state and territory and patient funding status
- Number and rates by local area, listing the areas with the lowest and highest rates
- Number and rates by state and territory
- Number and rates by remoteness and socioeconomic status.

Further information on interpreting the figures is provided on pages 35–37.

### How to interpret our data visualisations





#### What does the circle represent

Each circle on the graph represents an SA3. SA3s are geographical areas defined by the Australian Bureau of Statistics that provide a standardised regional breakdown of Australia. SA3s generally have populations between 30,000 and 130,000.

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#### Circle size

The size of the circle indicates how many clinical events have been recorded for people living in that SA3. A large circle represents an SA3 with a greater number of clinical events than SA3s with a smaller circle. Each histogram is accompanied by a legend. The numbers represented by each circle size are shown in the legend for that histogram.

#### Horizontal axis

The horizontal axis shows the age- and sex-standardised rates for the clinical item. Rates are age and sex standardised to allow comparisons between populations with different age and sex structures. d

#### Crosses and asterisks

A circle with a cross or an SA3 rate that has an asterisk indicates a rate that should be interpreted with caution. For more information on rates published with caution, see the suppression protocol in the Technical Supplement.

#### Lowest rates

Circles in the box on the left are SA3s with the lowest rates in Australia. The names, rates and numbers of clinical items recorded for those SA3s are listed in the table below the histogram.

#### Highest rates

Circles in the box on the right are SA3s with the highest rates in Australia. The names, rates and numbers of clinical items recorded for those SA3s are listed in the table below the histogram.

### How to interpret our data visualisations

#### State and territory graphic



#### Crosses and asterisks

A circle with a cross or an SA3 rate that has an asterisk indicates a rate that should be interpreted with caution. For more information on rates published with caution, see the suppression protocol in the Technical Supplement.

#### Vertical axis

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The vertical axis shows the age- and sexstandardised rate for the clinical item. Rates are age and sex standardised to allow comparisons between populations with different age and sex structures.

#### What does the circle represent

Each circle on the graph represents an SA3. SA3s are geographical areas defined by the Australian Bureau of Statistics that provide a standardised regional breakdown of Australia. SA3s generally have populations between 30,000 and 130,000.



#### Australian rate line

This line indicates the Australian age- and sex-standardised rate for that clinical item in the year(s) analysed.

## How to interpret our data visualisations Remoteness and socioeconomic status graphic



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#### Circle size

The size of the circle indicates how many clinical events have been recorded for people living in that SA3. A large circle represents an SA3 with a greater number of clinical events than SA3s with a smaller circle. Each histogram is accompanied by a legend. The numbers represented by each circle size is shown in the legend for that histogram.



#### Socioeconomic status

Each SA3 is presented according to its remoteness and socioeconomic status (SES), using standard Australian Bureau of Statistics definitions. Each SA3 is assigned a remoteness category. Within each remoteness category each SA3 is further assigned an SES group. The lowest SES group has the most overall disadvantage and the highest SES group has the least overall disadvantage. Some SES groups are combined in remoteness categories, except in major cities, to allow sufficient number of SA3s for comparison purposes. In the example shown, the rate of hospitalisation is higher in areas with greater socioeconomic disadvantage.