4.3 Lumbar spinal fusion hospitalisations 18 years and over

Context

This data item examines hospitalisations for lumbar spinal fusion in people aged 18 years and over based on their place of residence. The first *Australian Atlas of Healthcare Variation* examined variation in lumbar spinal decompression and lumbar spinal fusion combined, and found that the rate was 4.8 times as high in the area with the highest rate as in the area with the lowest rate. Further analysis to separately explore variation in lumbar spinal decompression (without fusion) and lumbar spinal procedures involving fusion was recommended. This analysis excludes any cases where lumbar spinal fusion procedures have been undertaken because of an injury, either a recent injury or where the underlying problem relates to a previous injury.

Lumbar spinal fusion permanently connects two or more vertebrae using bone grafts and, often, internal fixation such as metal rods.[1] In the past, spinal fusion surgery was primarily used to treat fractures and deformities of the spine, such as severe scoliosis.[2] Over time, the conditions for which the procedure is used have broadened. Studies in the United States have shown that degenerative spine disorders are now the most common reason for spinal fusion.[3,4]

Degeneration of the lumbar spinal joints and intervertebral discs commonly occurs with ageing; although it does not cause symptoms in most people, it can cause severe low back pain and reduced mobility in some people. Low back pain affects approximately 16% of the Australian population, and rates are highest among people aged 65–74 years.[5] Most back problems are managed non-surgically. Spinal surgery is considered for patients with severe chronic low back pain after more conservative treatment options have failed for three or more months.[6] Spinal fusion surgery aims to reduce symptoms by stabilising the spine. It can be performed on its own or together with spinal decompression.

There are differing views in the clinical community about the value of lumbar spinal fusion operations (both with and without accompanying decompression) for low back pain resulting from degenerative disease. Some systematic reviews have highlighted the lack of high-quality evidence to allow firm conclusions to be made about outcomes from these surgeries.[7-10]

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The most recent comprehensive review of interventions for low back pain and sciatica in people aged over 16 years, undertaken by the United Kingdom National Institute for Health and Care Excellence (NICE) as part of its guideline development process, identifies the need for high-quality evidence. The 2016 NICE guideline on management and assessment of low back pain and sciatica[11] notes that some studies report that approximately 20% of patients who undergo spinal fusion experience short- to medium-term complications. The NICE guideline recommends against treating patients with low back pain using spinal fusion except within the context of a clinical trial that could help clarify whether, and for whom, this procedure is of benefit.[11]

Cognitive interventions and exercises are strongly recommended because they have been shown to result in equal improvement to lumbar fusion in patients with chronic low back pain and disc degeneration (measured on a disability index considered the 'gold standard' of low back functional outcome tools).[12,13]

The rate of lumbar spinal fusion surgery in Australia has been increasing, with most of the increase occurring in the private sector. Between 1997 and 2006, the rate of lumbar spinal fusion surgery performed privately in Australia increased by 175%.[2] Comparable national data for publicly funded patients have not been published. New South Wales data for the same period showed that the rate of publicly performed spinal fusion procedures increased by 2%, compared with an increase of 167% for privately performed procedures.[2] Rates of spinal fusion surgery have also increased in other countries – for example, the rate among Medicare recipients in the United States tripled between 1992 and 2003.[14]

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 lumbar spinal fusion (with and without decompression) per 100,000 people aged 18 years and over from 2012–13 to 2014–15. Hospitalisations resulting from trauma (either a recent injury or an old injury) are excluded from this analysis. Because a record is included for each hospitalisation for lumbar spinal fusion surgery, rather than for each patient, patients hospitalised for this procedure more than once in the financial year will be counted more than once.

Data are aggregated over three years to provide sufficient numbers to support reporting at the local level. The number of hospitalisations and the summed population over three years are used to provide an average rate. This is comparable to a rate based on data collected over one year.

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

Over the three-year period 2012–13 to 2014–15, there were 14,746 hospitalisations for lumbar spinal fusion, representing an average rate of 26 hospitalisations per 100,000 people aged 18 years and over (the Australian rate).

There were 2,235 spinal fusion operations performed without an accompanying decompression for people aged 18 years and over during this three-year period. For lumbar fusion only, the national annual rate standardised for age and sex was four hospitalisations per 100,000 people aged 18 years and over.

The number of hospitalisations for lumbar spinal fusion across 305† local areas (Statistical Area 3 – SA3) ranged from 10 to 69 per 100,000 people aged 18 years and over. The rate was **6.9 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 12 per 100,000 people aged 18 years and over in the Northern Territory to 41 in Tasmania (Figures 4.18–4.21).

After the highest and lowest 10% of results were excluded and 249 SA3s remained, the number of hospitalisations per 100,000 people aged 18 years and over was 2.5 times as high in the area with the highest rate compared to the area with the lowest rate.

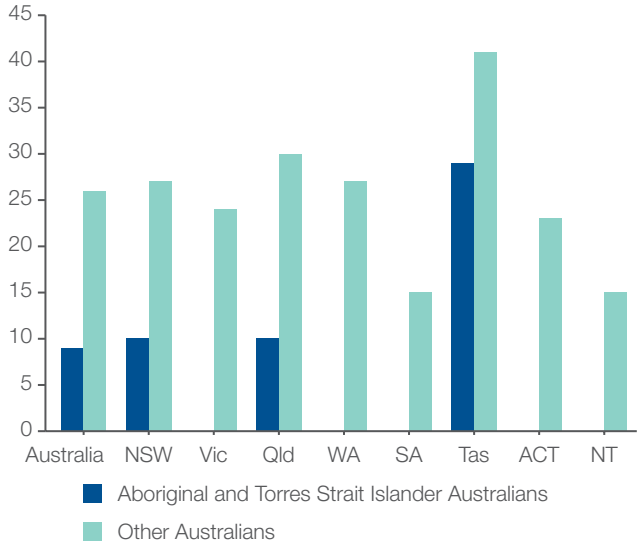
Analysis by remoteness and socioeconomic status

Rates of surgery were higher in inner regional areas than in major cities or outer regional areas, and were lowest in remote areas. In major cities, rates of surgery decreased with socioeconomic disadvantage, but this pattern was not evident in other categories of remoteness (Figure 4.22).

Analysis by Aboriginal and Torres Strait Islander status

The rate for Aboriginal and Torres Strait Islander Australians (9 per 100,000 people) was 65.4% lower than the rate for other Australians (26 per 100,000 people) (Figure 4.16).

Figure 4.16: Number of hospitalisations for lumbar spinal fusion per 100,000 people aged 18 years and over, age and sex standardised, by state and territory and Indigenous status, 2012–13 to 2014–15



The data for Figure 4.16 are available at www.safetyandquality.gov.au/atlas.

† There are 333 SA3s. For this item, data were suppressed for 28 SA3s due to a small number of hospitalisations and/or population in an area.

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.
Data for Vic, WA, SA, ACT and NT (Aboriginal and Torres Strait Islander Australians) have been suppressed.
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.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database 2012–15 and ABS Estimated Resident Population 30 June 2012 to 2014.

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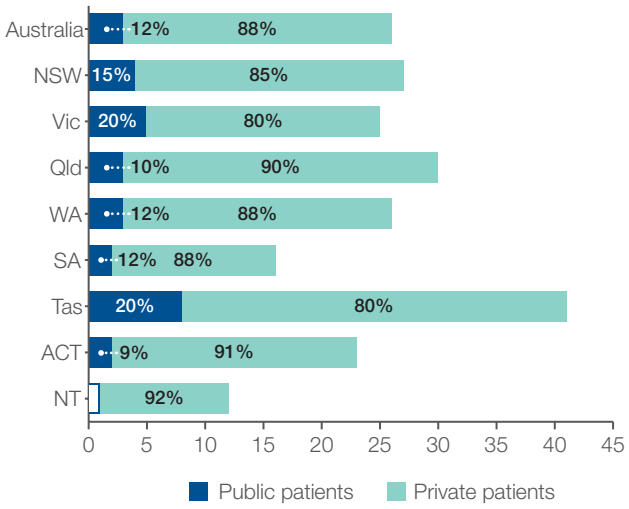
Analysis by patient funding status

Overall, 88% of hospitalisations for lumbar spinal fusion were for privately funded patients. This proportion varied from 80% in Victoria and Tasmania to 92% in the Northern Territory. The median age of patients at the time of operation was 61 years for publicly funded patients and 63 years for privately funded patients (Figure 4.17).

Figure 4.17: Number of hospitalisations for lumbar spinal fusion per 100,000 people aged 18 years and over, age and sex standardised, by state and territory and patient funding status, 2012–13 to 2014–15



The data for Figure 4.17 are available at www.safetyandquality.gov.au/atlas.

Interpretation

Potential reasons for the variation include differences in:

- Use of the procedure in management of low back pain and degenerative disease of the spine
- Risk factors for back pain, including the patient characteristics of obesity[15], physical inactivity, medical comorbidity[16] and occupation[17]
- Factors associated with prolonged symptoms, such as workplace factors, psychosocial factors and functional capacity[18]
- Access to models of care that provide a multidisciplinary approach to alternatives to surgery, such as physiotherapy, rheumatology services, pain clinics, cognitive behavioural therapy, exercise, weight loss initiatives and patient education
- Patient understanding of likely benefits and risks of different care options, and preferences for types of care
- Decision-making criteria of clinicians and thresholds for surgical intervention
- The availability and distribution of a surgical workforce
- Levels of private health insurance and access to private hospitals
- Access to public elective surgery.

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.
Unshaded data (NT public patients) is based on a small number of hospitalisations.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database 2012–15 and ABS Estimated Resident Population 30 June 2012 to 2014.

Variation between areas in rates of surgery may also be influenced by the number of clinicians providing services to people living in the area. The practices of specific clinicians are likely to have a greater impact on rates in smaller local areas with fewer clinicians, such as rural and regional locations. Specific clinicians may influence rates across several local areas, especially those with small populations. The effects of practice styles of individual clinicians will be diluted in areas with larger numbers of practising clinicians.

As well, variations between areas may not directly reflect the practices of the clinicians who are based in these areas. The analysis is based on where people live, rather than where they obtain their health care. Patients may travel outside their local area to receive care.

The discrepancy between private and public rates of spinal fusion is marked. This may reflect a lack of agreement on the value of this operation, and the influence of patient and surgeon preferences.[2]

Addressing variation

Lumbar spinal fusion surgery can be performed for a variety of reasons – spinal deformity, nerve and spinal cord compression caused by vertebral malalignment, and low back pain. This analysis does not explore stated reasons for having the surgery. The increase in the rate of lumbar spinal fusion surgery that has occurred in Australia suggests that the indications for use of this surgery have broadened or that the thresholds for intervention have changed. These changes should be further examined. The marked discrepancy between the percentages of lumbar spinal fusion surgery performed in public and private settings also requires further investigation. Use and availability of other treatment options, such as multidisciplinary clinics and specialist chronic pain clinics, for people with low back pain should be explored.

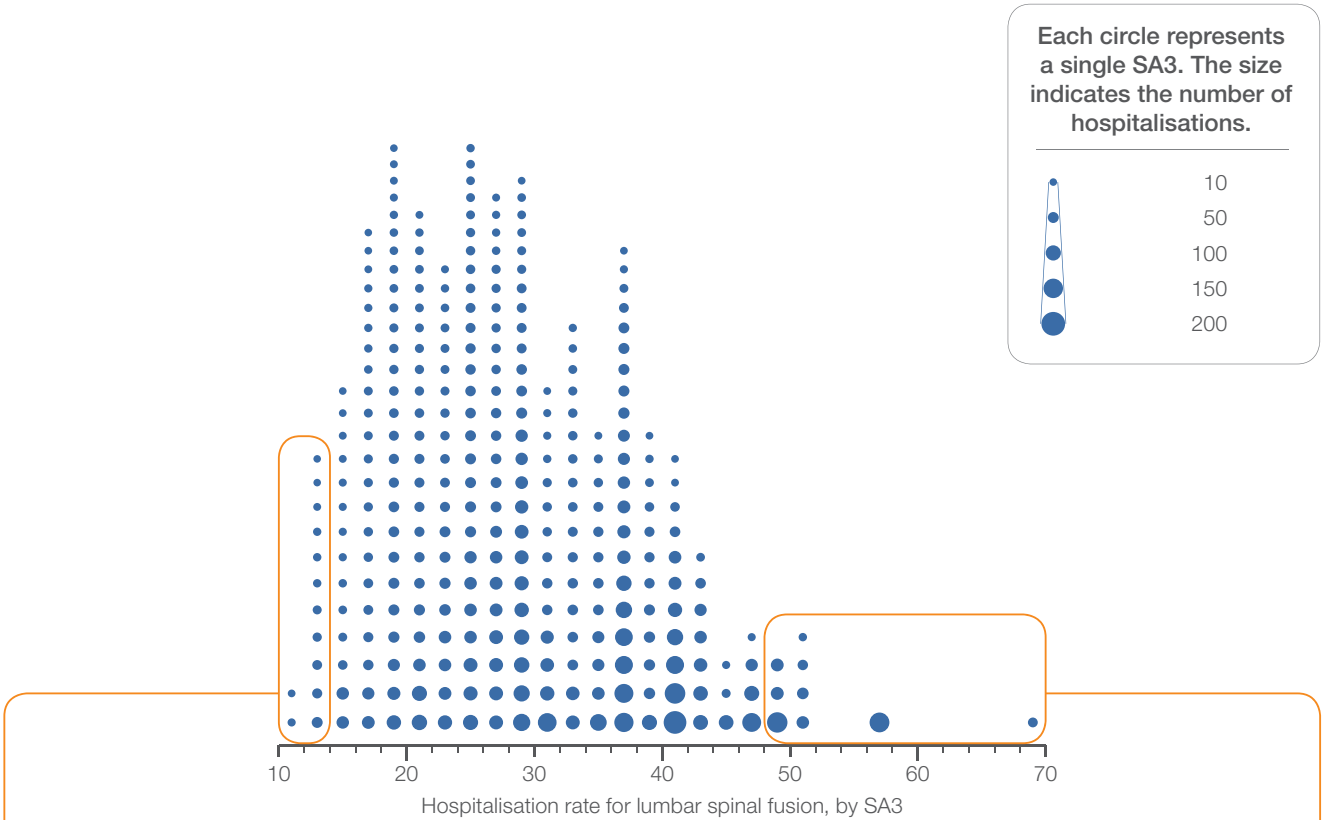
Determining whether there are subgroups of patients with low back pain who are more likely to benefit from spinal fusion procedures should be a research priority. Identification of patients who are likely to benefit would be aided by a national treatment registry, and by routine collection and analysis of patient-reported outcomes for all patients undergoing lumbar spinal fusion operations.

Limiting spinal fusion procedures undertaken because of low back pain to the context of clinical trials, as has been suggested in the United Kingdom, should be considered. This approach would require a nationally agreed system.[11]

Ensuring that patients with low back pain understand the evidence about risks and benefits of lumbar spinal fusion is particularly important, because the degree of benefit from surgical treatment is not clear for many patients, and there are risks associated with surgery.

Lumbar spinal fusion hospitalisations 18 years and over

Figure 4.18: Number of hospitalisations for lumbar spinal fusion per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3), 2012–13 to 2014–15



Lowest rate areas

SA3	State	Rate	Hospitalisations
Campbelltown	SA	10	12
Port Adelaide - East	SA	11	17
Strathfield - Burwood - Ashfield	NSW	12	40
Canterbury	NSW	12	37
Auburn	NSW	12	20
Eyre Peninsula and South West	SA	12	20
Maitland	NSW	12	19
South Perth	WA	12	14
Maryborough - Pyrenees	Vic	12	10
Newcastle	NSW	13	50
Port Phillip	Vic	13	30
Cairns - South	Qld	13	27
Upper Hunter	NSW	13	10

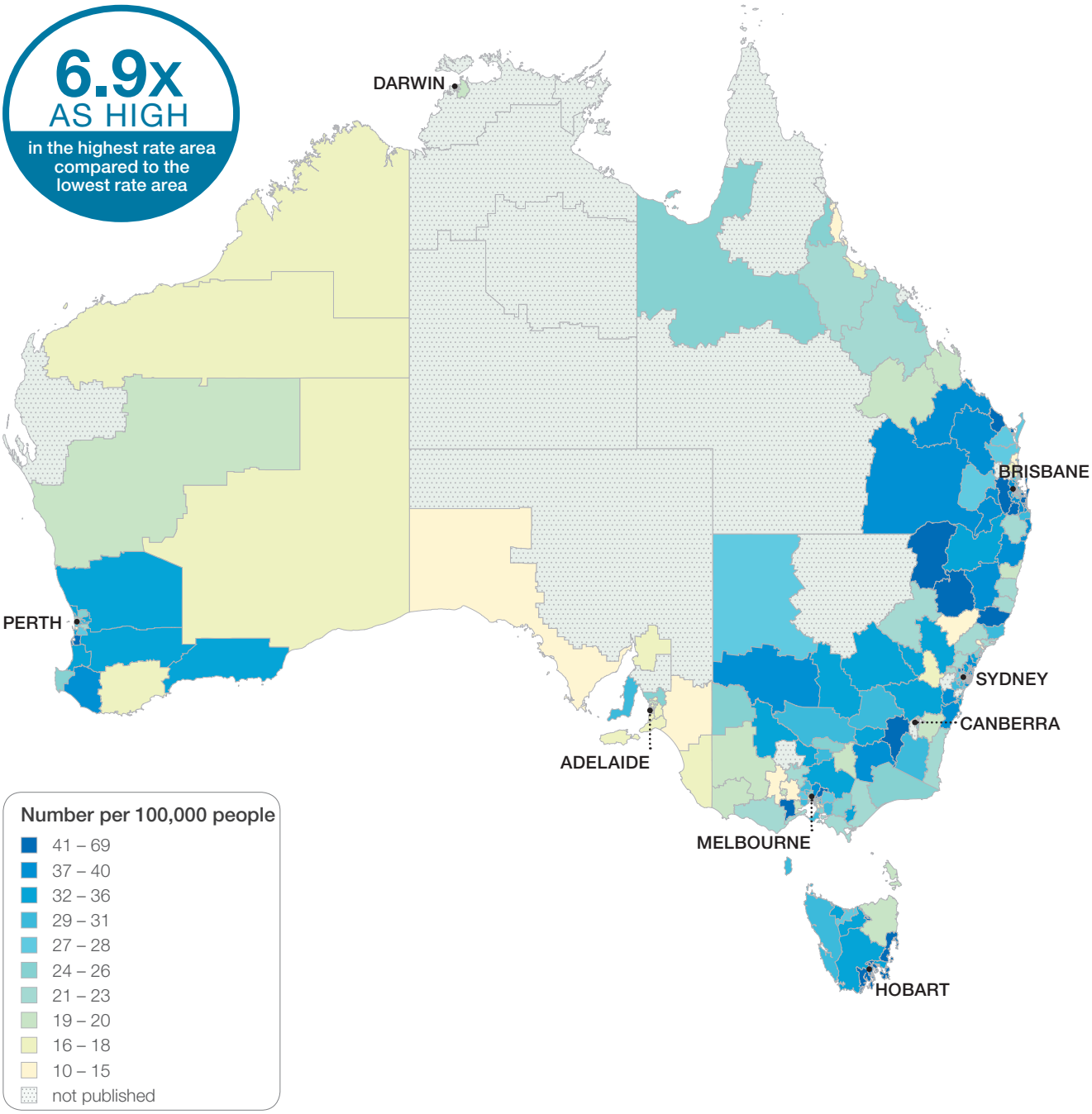
Highest rate areas

SA3	State	Rate	Hospitalisations
Huon - Bruny Island	Tas	69	37
Bundaberg	Qld	57	154
Hobart - North West	Tas	51	69
Barwon - West	Vic	51	20
Kenmore - Brookfield - Moggill	Qld	50	58
Hobart - South and West	Tas	50	44
Nillumbik - Kinglake	Vic	49	72
Banyule	Vic	48	161
Nerang	Qld	48	73

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.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database 2012–15 and ABS Estimated Resident Population 30 June 2012 to 2014.

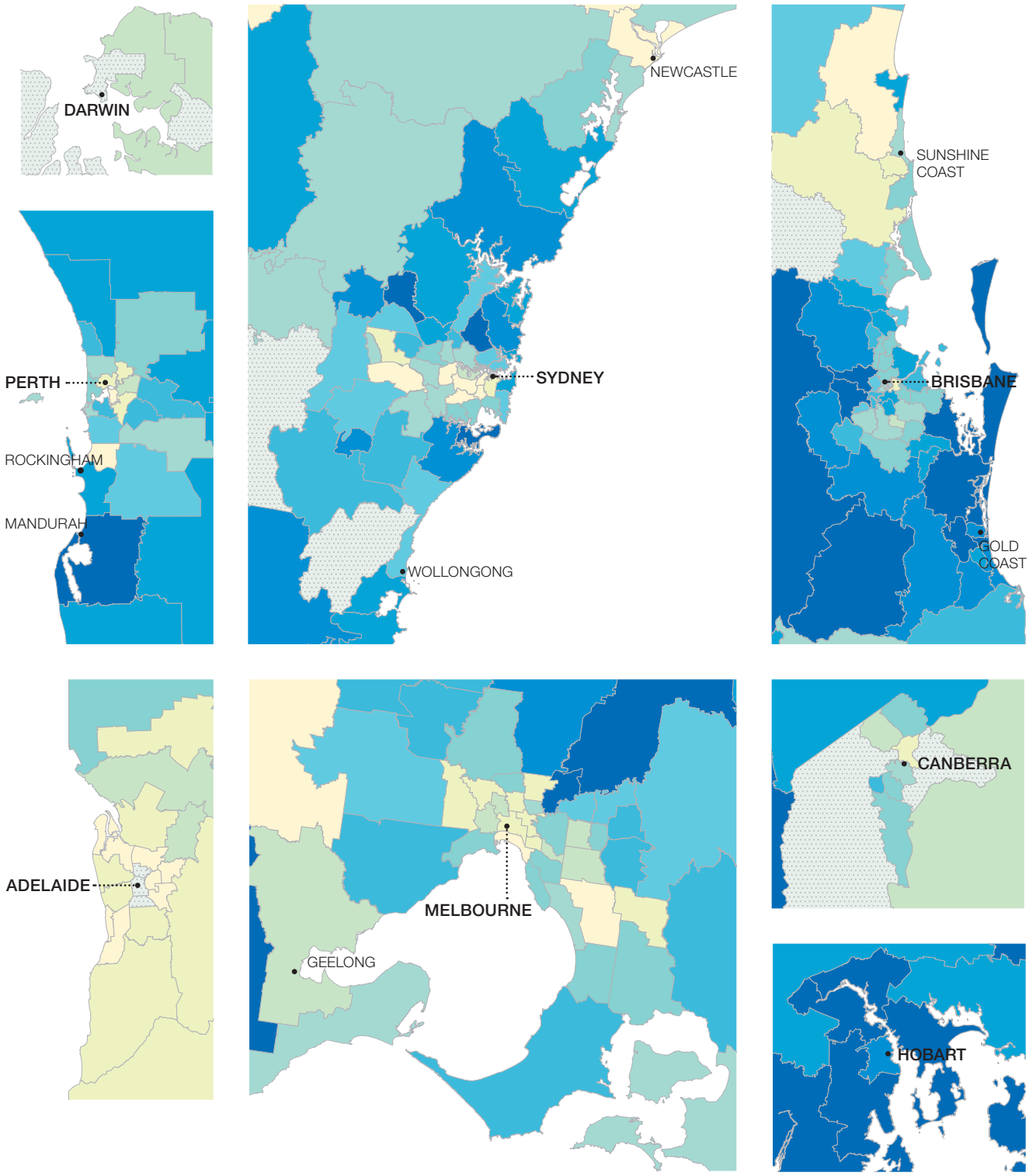
Lumbar spinal fusion hospitalisations 18 years and over

Figure 4.19: **Number of hospitalisations for lumbar spinal fusion per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3), 2012–13 to 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.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database 2012–15 and ABS Estimated Resident Population 30 June 2012 to 2014.

Figure 4.20: **Number of hospitalisations for lumbar spinal fusion per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3), 2012–13 to 2014–15: capital city area maps**

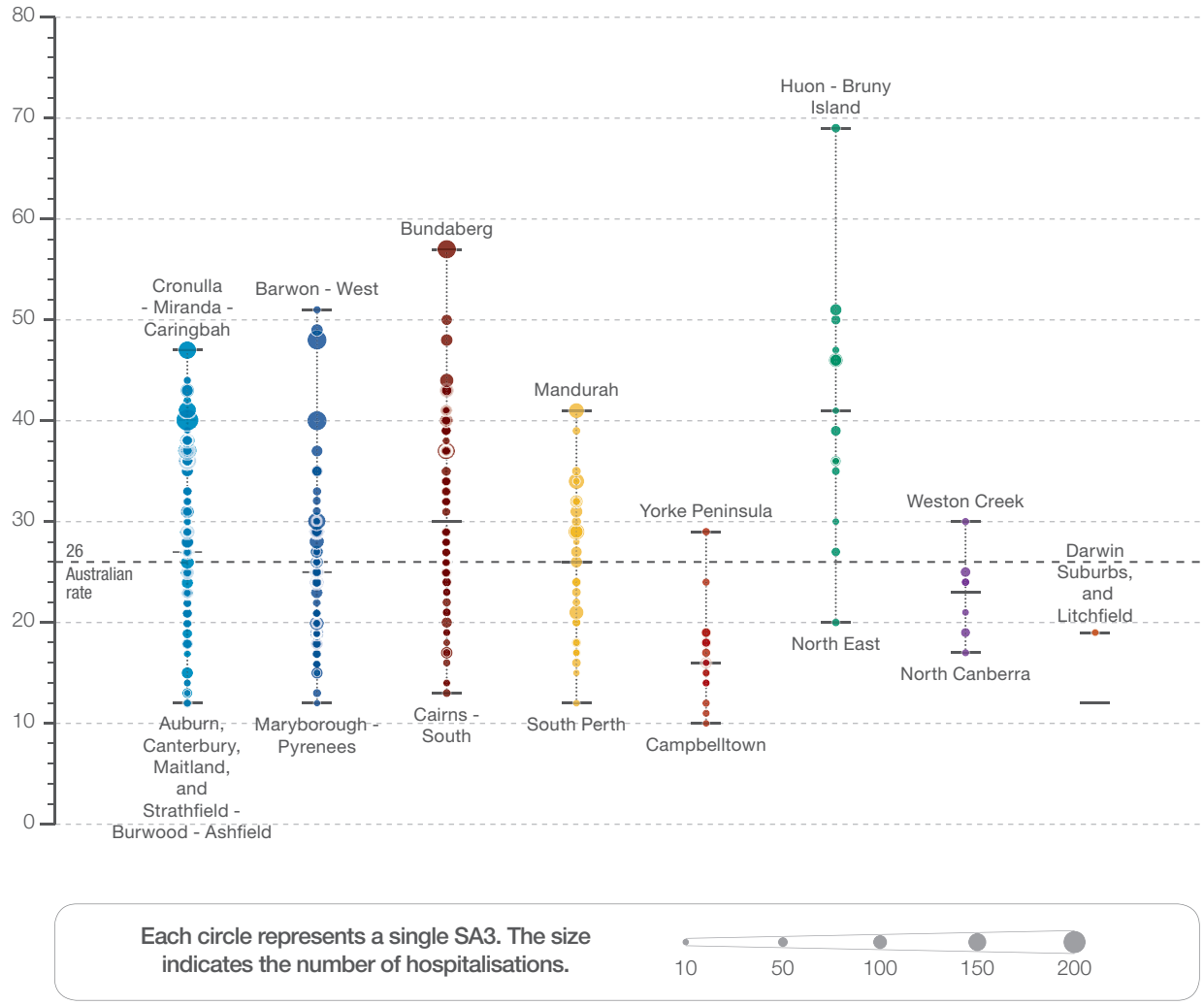


Notes:
Rates are age and sex standardised to the Australian population in 2001.
Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator).
Analysis is based on the patient's area of usual residence, not the place of hospitalisation.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database 2012–15 and ABS Estimated Resident Population 30 June 2012 to 2014.

Lumbar spinal fusion hospitalisations 18 years and over

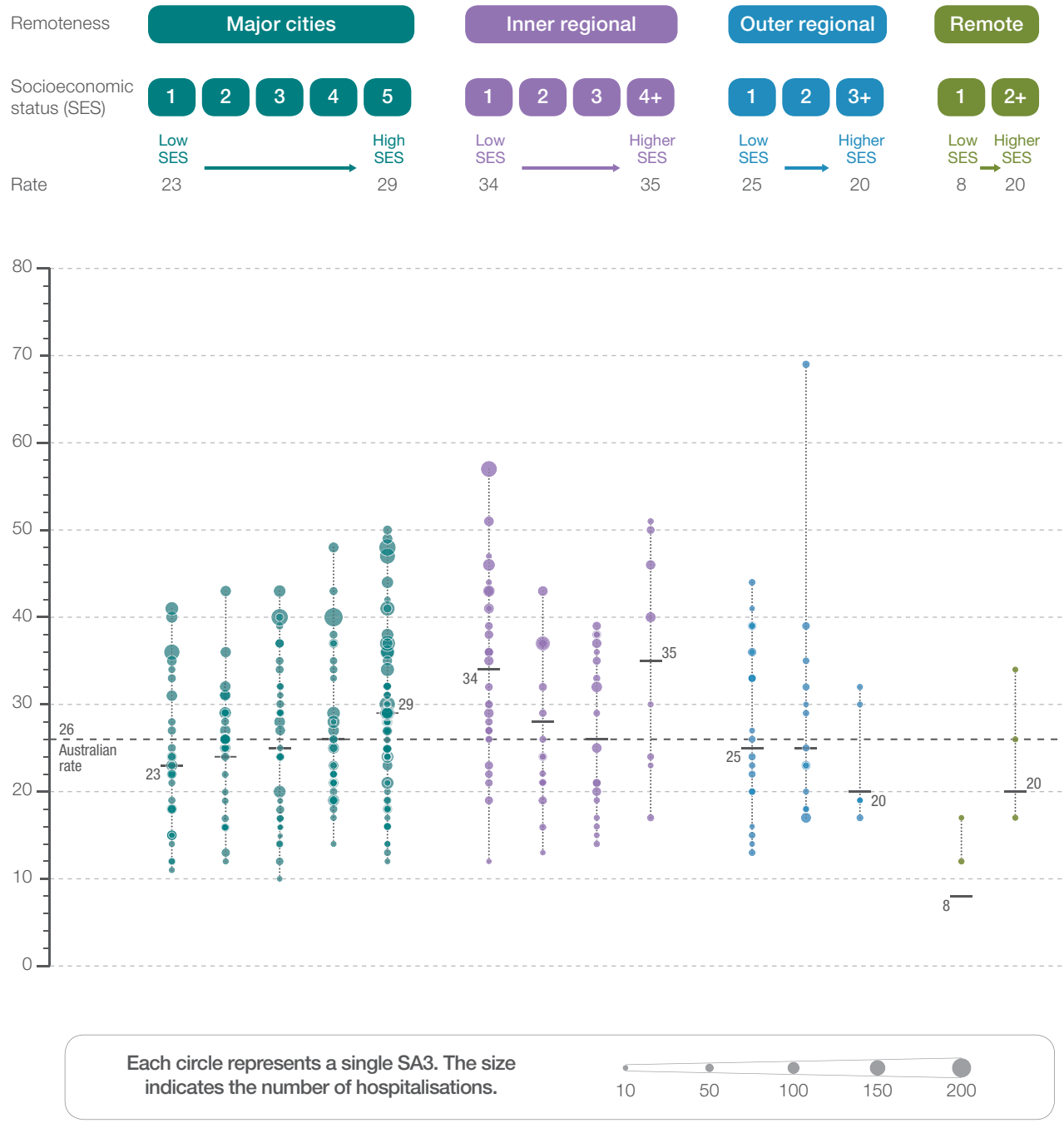
Figure 4.21: Number of hospitalisations for lumbar spinal fusion per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3), state and territory, 2012–13 to 2014–15

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Highest rate	47	51	57	41	29	69	30	19
State/territory	27	25	30	26	16	41	23	12
Lowest rate	12	12	13	12	10	20	17	19
No. hospitalisations	4,986	3,442	3,282	1,522	675	573	193	58



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.
Data from suppressed SA3s were included in analyses for larger geographic areas – for example, analysis by state and territory, remoteness and socioeconomic status. This explains why, for example, the overall rate for lumbar spinal fusion in the Northern Territory was outside the range of the publishable SA3 rates for the Northern Territory.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database 2012–15 and ABS Estimated Resident Population 30 June 2012 to 2014.

Figure 4.22: Number of hospitalisations for lumbar spinal fusion per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3), remoteness and socioeconomic status, 2012–13 to 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).
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Sources: AIHW analysis of National Hospital Morbidity Database 2012–15 and ABS Estimated Resident Population 30 June 2012 to 2014.

Lumbar spinal fusion hospitalisations 18 years and over

Resources

- National Institute for Health and Care Excellence. Low back pain and sciatica in over 16s: assessment and management. Invasive treatments. NICE guideline NG59. Methods, evidence and recommendations. London: NICE; 2016.

Australian initiatives

The information in this chapter will complement work already under way to improve management of low back pain in Australia. At a national level, this work includes:

- Physiotherapy-led triage clinics for low back pain[20,21]
- Establishment of the Australia & New Zealand Musculoskeletal Clinical Trials Network to support musculoskeletal research[22]
- A pilot trial of a multi-site Australian Spine Registry, being undertaken by the Spine Society of Australia and Monash University, that will provide an online database of patient-reported and clinical outcomes.

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

- *A model of care for spinal pain*, Western Australia[23]
- *A model of care for the management of people with acute low back pain*, NSW Agency for Clinical Innovation.[24]

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