

4.1 Knee replacement hospitalisations 18 years and over

Context

This data item examines hospitalisations for knee replacement surgery, including total, partial and revision procedures, in people aged 18 years and over by their place of residence. Knee replacement (also known as knee arthroplasty) is a surgical procedure that removes diseased parts of the bones forming the knee joint and replaces them with an artificial joint. Total knee replacements undertaken for the first time account for 88% of procedures. The remaining procedures are partial knee replacements (5%) and revisions of previous procedures (7%).¹

Between 2003 and 2014, the number of knee replacement procedures undertaken in Australia per year increased by 88% – by 97% in the private sector and by 71% in the public sector.¹ The increase is partly due to population ageing but also to the growing use of this intervention for people at earlier ages, as a result of rising levels of obesity, which have increased the need for knee replacements. In 2011, Australia had the highest rate of knee replacement among selected countries in the Organisation for Economic Co-operation and Development (OECD).² Previous studies have shown geographical variation in rates of knee replacement within Australia, with higher rates in some regional areas.^{3,4}

Pain or mobility problems caused by osteoarthritis are the reason for 98% of knee replacements in Australia.¹ Osteoarthritis is a common disease, affecting one in 12 Australians⁵, and is the sixth most common condition managed by general practitioners, accounting for 2.8% of encounters.⁶ The risk of osteoarthritis of the knee in overweight people is double that in people of normal weight; in obese people, it is four times as high.⁷ An estimated 43% of knee osteoarthritis and 53% of total knee replacements in Australia are due to obesity.⁷ Other risk factors for osteoarthritis of the knee include previous knee injury, female gender, older age and occupations that are physically demanding on the knee.⁸

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For people with knee osteoarthritis, guidelines recommend use of a range of pharmacological and non-pharmacological approaches before surgery, including weight loss, physiotherapy, and use of medicines to relieve pain and inflammation.^{9,10} These strategies are effective for some people. For example, even a 5% weight loss can improve symptoms for overweight people with symptomatic osteoarthritis of the knee.¹¹ However, guidelines relating to osteoarthritis have not been fully implemented in Australia, and non-pharmacological treatments remain underused.¹² It has been estimated that only 43% of people with osteoarthritis receive care that is concordant with guidelines.¹³

Knee replacement surgery can be very effective in relieving pain and improving mobility for many patients with severe symptoms in whom conservative, non-surgical treatments have been unsuccessful.¹⁰ Knee replacement surgery has some risks, related to the operation itself and to the risk of failure of the prosthetic joint. The 10-year revision rate ranges from 2.9% to 10.9%.¹ Although patient expectations about the likely outcomes of surgery are high, the operation is not successful for some people – approximately 15% of patients continue to experience pain and/or functional deficits after knee replacement surgery.^{14–16} Patients therefore need to be well informed about the range of treatment options, the likelihood of risks and benefits associated with each, and the range of possible outcomes.

Waiting times for knee replacement surgery are among the longest for any type of elective surgery in Australia. In 2014–15, the waiting time was more than 191 days for half of the patients admitted for total knee replacement surgery in public hospitals.¹⁷ Waiting times for total knee replacement surgery vary by Aboriginal and Torres Strait Islander status, remoteness and socioeconomic disadvantage. In 2014–15, the median waiting time for total knee replacement was 263 days for Aboriginal and Torres Strait Islander Australians and 190 days for other Australians.¹⁷ It was 173 days in major cities, 234 days in inner regional areas, 262 days in outer regional areas and 202 days in remote areas.¹⁸

The median waiting time was 218 days for the most socioeconomically disadvantaged and 148 days for the least socioeconomically disadvantaged.¹⁸ Nationally, 6.6% of people admitted for total knee replacements undertaken in 2014–15 had waited more than 365 days.

In 2013, the rate of knee replacement surgery varied widely among OECD countries, from 3 per 100,000 in Mexico to 226 per 100,000 in the United States.¹⁹ Knee replacement rates vary within countries as well as between countries. A study published in 2014 showed that there was a two- to three-fold difference within most participating OECD countries, including Australia.² Australia's knee replacement rates were considerably higher than the OECD average (180 compared with 121).²⁰

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 knee replacement per 100,000 people aged 18 years or over in 2014–15. Because a record is included for each hospitalisation for knee replacement surgery, rather than for each patient, patients hospitalised for this procedure more than once in the financial year will be counted more than once.

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

What do the data show?

Magnitude of variation

In 2014–15, there were 52,039 hospitalisations for knee replacement, representing 257 hospitalisations per 100,000 people aged 18 years and over (the Australian rate).

The number of hospitalisations for knee replacement across 319[†] local areas (Statistical Area 3 – SA3) ranged from 128 to 507 per 100,000 people aged 18 years and over. The rate was **4.0 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 155 per 100,000 people aged 18 years and over in the Northern Territory to 284 in Western Australia (Figures 4.4–4.7).

After the highest and lowest 10% of results were excluded and 255 SA3s remained, the number of hospitalisations per 100,000 people aged 18 years and over was 1.9 times as high in the area with the highest rate compared to the area with the lowest rate.

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

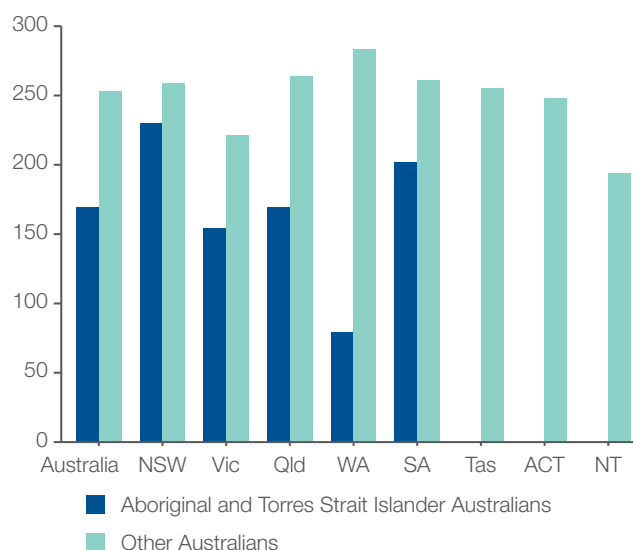
Analysis by remoteness and socioeconomic status

Rates of knee replacement surgery were higher in inner and outer regional areas than in major cities or remote areas. There was no clear pattern according to socioeconomic disadvantage (Figure 4.8).

Analysis by Aboriginal and Torres Strait Islander status

The rate for Aboriginal and Torres Strait Islander Australians (169 per 100,000 people) was 33% lower than the rate for other Australians (253 per 100,000 people) (Figure 4.2).

Figure 4.2: Number of hospitalisations for knee replacement per 100,000 people aged 18 years and over, age and sex standardised, by state and territory and Indigenous status, 2014–15



The data for Figure 4.2 are available at www.safetyandquality.gov.au/atlas.

[†] There are 333 SA3s. For this item, data were suppressed for 14 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 Tas, 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 2014–15 and ABS Estimated Resident Population 30 June 2014.

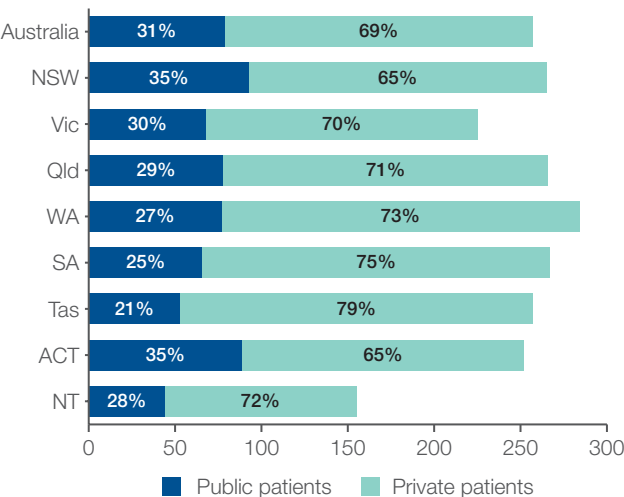
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Analysis by patient funding status

Overall, 69% of hospitalisations for knee replacement surgery were for privately funded patients. This proportion varied from 65% in New South Wales and the Australian Capital Territory to 79% in Tasmania. The median age of patients at the time of operation was 69 years for publicly funded patients and 68 years for privately funded patients (Figure 4.3).

Figure 4.3: Number of hospitalisations for knee replacement per 100,000 people aged 18 years and over, age and sex standardised, by state and territory and patient funding status, 2014–15



The data for Figure 4.3 are available at www.safetyandquality.gov.au/atlas.

Interpretation

Potential reasons for the variation include differences in:

- Burden of disease, particularly osteoarthritis
- Risk factors for knee problems, such as obesity
- Decision-making criteria of clinicians and thresholds for surgical intervention
- Patients' perceptions of the likely benefits and risks of different care options
- Access to models of care that provide a coordinated approach to alternatives to surgery, such as physiotherapy
- Access to public elective surgery
- Levels of private health insurance and access to private hospitals.

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.

Notes:

Rates are age and sex standardised to the Australian population in 2001.
Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator).
Analysis is based on the patient's area of usual residence, not the place of hospitalisation.
Hospitalisations for public patients do not incur a charge to the patient or to a third-party payer – for example, a private health insurance fund.
Hospitalisations for private patients do incur a charge to the patient and/or a third-party payer.
For further detail about the methods used, please refer to the Technical Supplement.

Sources: AIHW analysis of National Hospital Morbidity Database 2014–15 and ABS Estimated Resident Population 30 June 2014.

Addressing variation

Following earlier work highlighting variation in knee surgery rates within Australia¹⁹, the Commission has worked with clinical experts and consumers to investigate and recommend national action to reduce unwarranted variation and improve care. This work produced a number of approaches to identify and address unwarranted variation in knee surgery, with clinician, consumer and system-level strategies. A clinical care standard, identifying and defining the care that people should be offered, will be available from the Commission in 2017. Patient information on treatment options for knee osteoarthritis, and risks and benefits associated with each will also be available from the Commission in 2017.

International and Australian observational research suggests that orthopaedic wait-list triage systems led by advanced-scope physiotherapists or nurse practitioners can efficiently and appropriately stream patients for non-surgical and surgical interventions.²¹⁻²³ Arthritis Australia recommends establishment of multidisciplinary clinics for people with advanced osteoarthritis that include triage and conservative management, to improve management and reduce demand for elective joint replacement.¹⁰

Programs based on this model of care have shown improvements in uptake of conservative management, improved clinical outcomes, and shorter waiting times for those triaged to surgery.¹⁰ For example, the New South Wales Osteoarthritis Chronic Care Program reported that more than 1 in 10 (10.7%) of patients on the waiting list for knee replacement were removed because they no longer required surgery.²⁴ The Osteoarthritis Hip and Knee Service at the Royal Melbourne Hospital reported shorter waiting times to the initial appointment after general practitioner referral compared with usual care (81 days versus

105 days) and shorter time to surgery after consenting to surgery compared with usual care (median 141 days versus 218 days).²⁵ Most state and territory health departments are implementing multidisciplinary programs to improve the management of people with osteoarthritis; however, these are often still not coordinated between health services. Funding models that promote community-based multidisciplinary care and conservative management options should be explored. Given that obesity is a key risk factor for knee osteoarthritis, evidence-based obesity management programs should also be promoted.^{26,27}

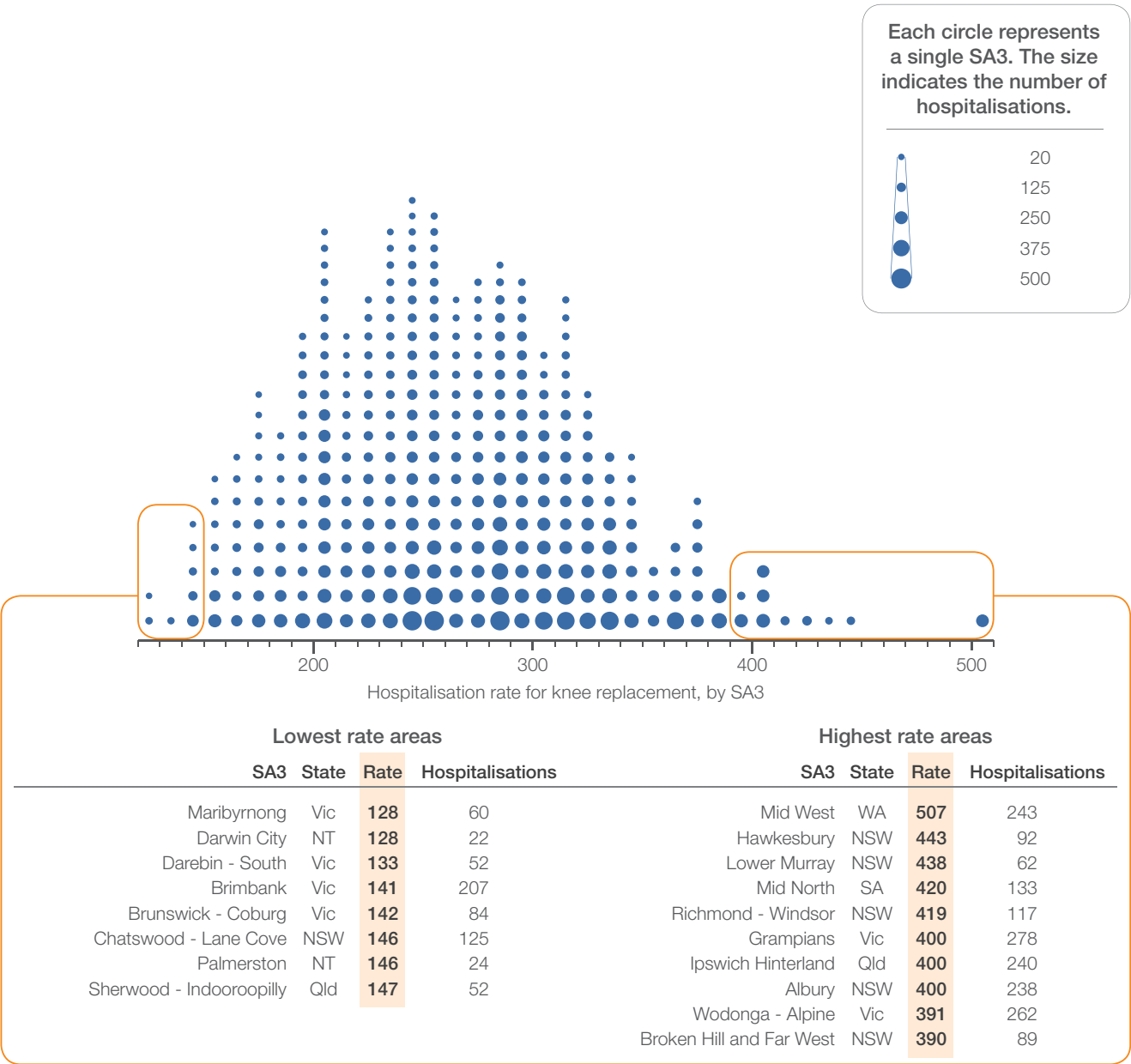
Routine measurement of treatment outcomes and patient preferences helps identify the groups of people who will benefit most from surgery, as well as those who are unlikely to benefit. This can help identify appropriate rates for knee replacement. Ensuring that patients have a clear understanding of potential outcomes of surgery and the effect that surgery might have on daily functioning is essential. Patient-reported outcome measures (PROMs) for knee replacement surgery measure the outcomes of treatment from a patient's perspective. This involves patients completing preoperative and postoperative surveys about their health and level of disability. In the United Kingdom, information about PROMs for knee replacement surgery is gathered nationally, and differences in thresholds for undertaking surgery and in health outcomes following surgery can be tracked.^{28,29} In Australia, PROMs are used in some orthopaedic services, but there is no national system for gathering information about functional outcomes of knee replacement surgery. The Arthroplasty Clinical Outcomes Registry collects information on clinical and patient-reported outcomes of knee replacement surgery from a small number of sites around Australia and provides publicly available annual reports on findings.³⁰

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The National Joint Replacement Registry collects data from hospitals on all knee joint replacements in Australia. This includes information on the physical condition of people undergoing surgery, the types of prosthesis used, and the time to first revision surgery for people who require reoperation. Currently, the registry does not have direct contact with patients and so does not gather PROMs. Collecting this information nationally and matching it with demographic and other data, such as therapies trialled before surgery, could help identify the types of patients who are unlikely to have a good outcome and the types of patients who would benefit from better access to knee replacement surgery. The Commission is currently evaluating the future use of PROMs in Australia, and has recently published a review examining the benefits and challenges of using PROMs to guide policymakers.³¹

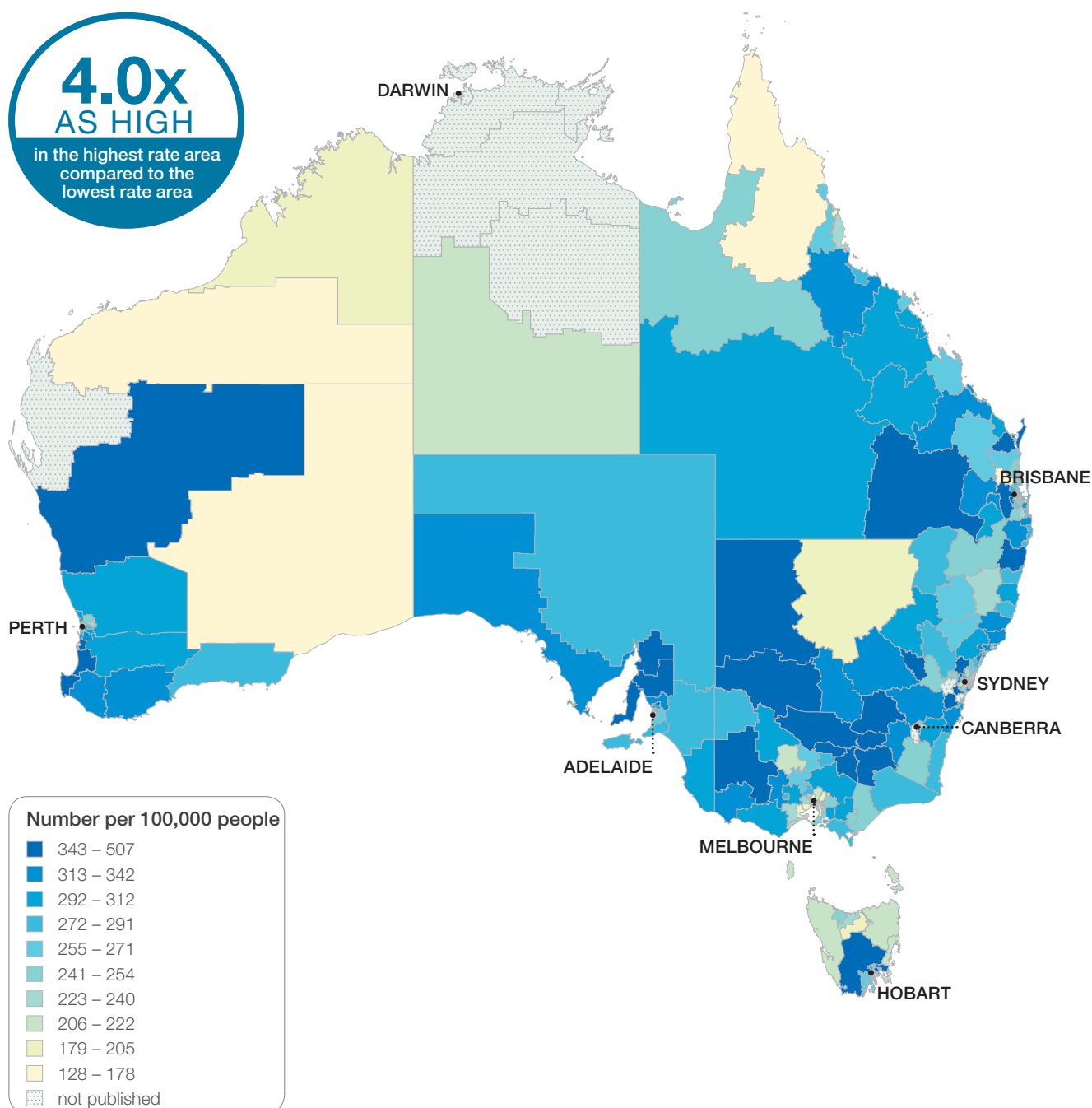
Figure 4.4: Number of hospitalisations for knee replacement per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3), 2014–15



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

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Figure 4.5: Number of hospitalisations for knee replacement per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3), 2014–15: Australia map



Notes:

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

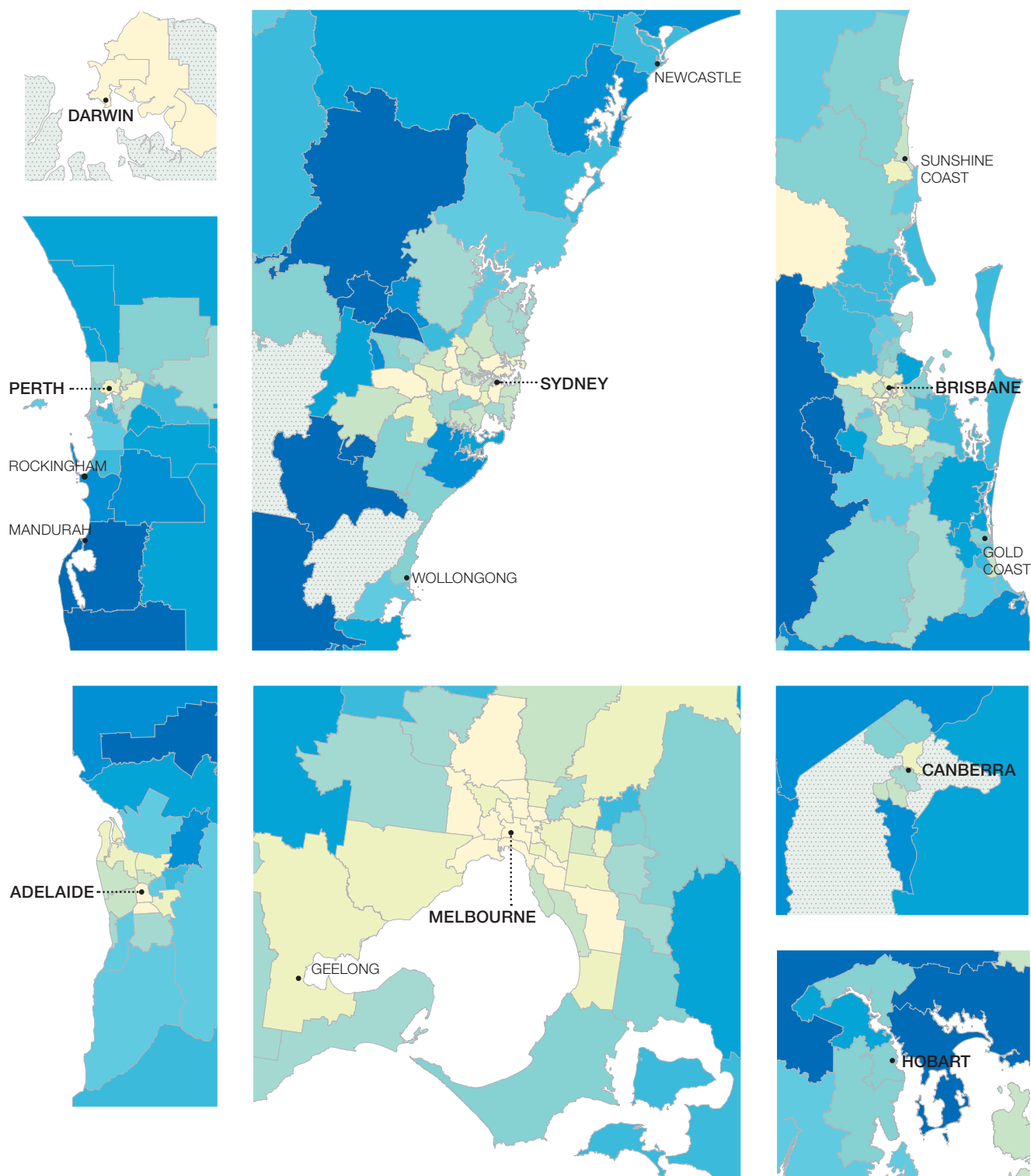
Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator).

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

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

Sources: AIHW analysis of National Hospital Morbidity Database 2014–15 and ABS Estimated Resident Population 30 June 2014.

Figure 4.6: Number of hospitalisations for knee replacement per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3), 2014–15: capital city area maps



Notes:

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

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

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

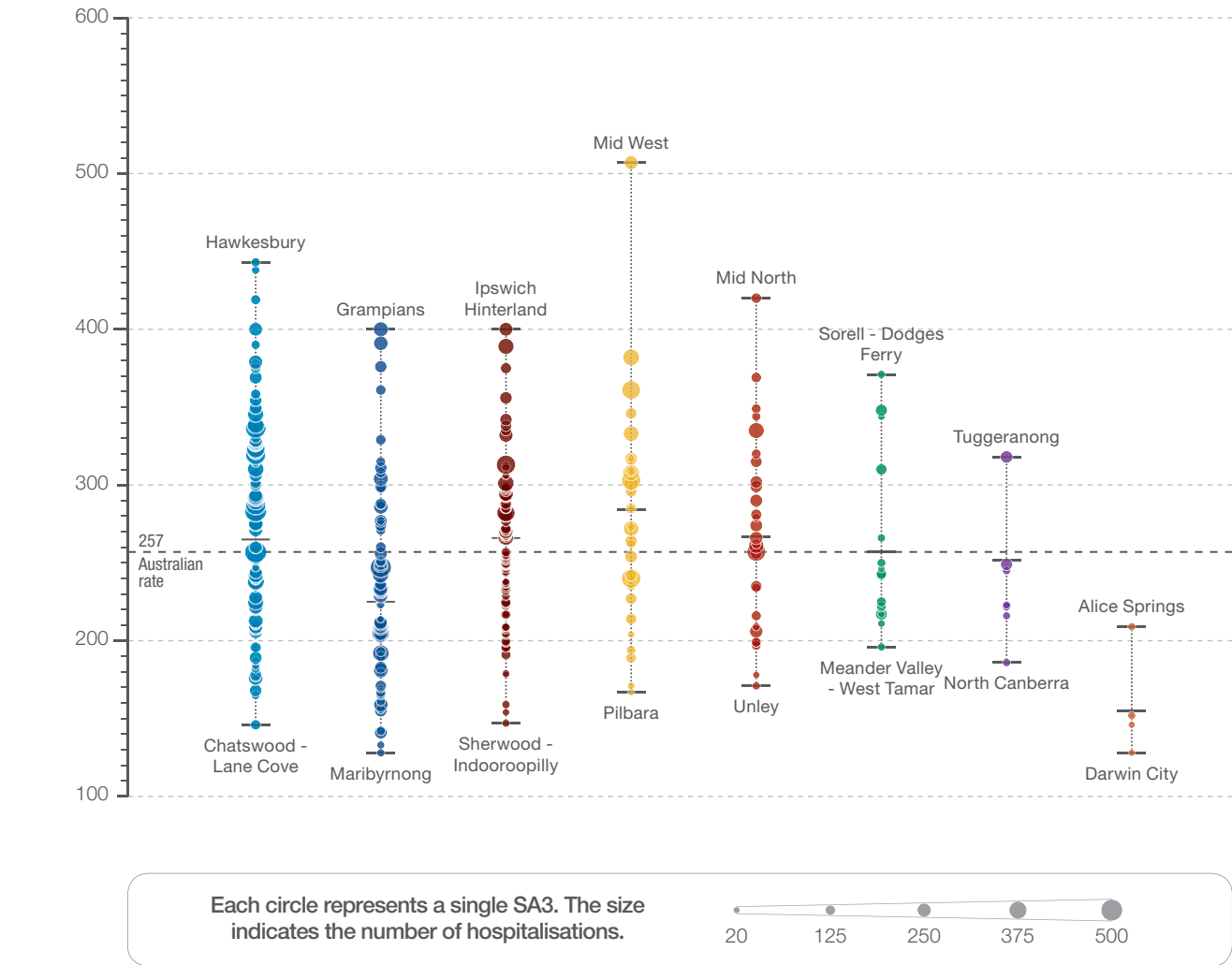
For further detail about the methods used, please refer to the Technical Supplement.

Sources: AIHW analysis of National Hospital Morbidity Database 2014–15 and ABS Estimated Resident Population 30 June 2014.

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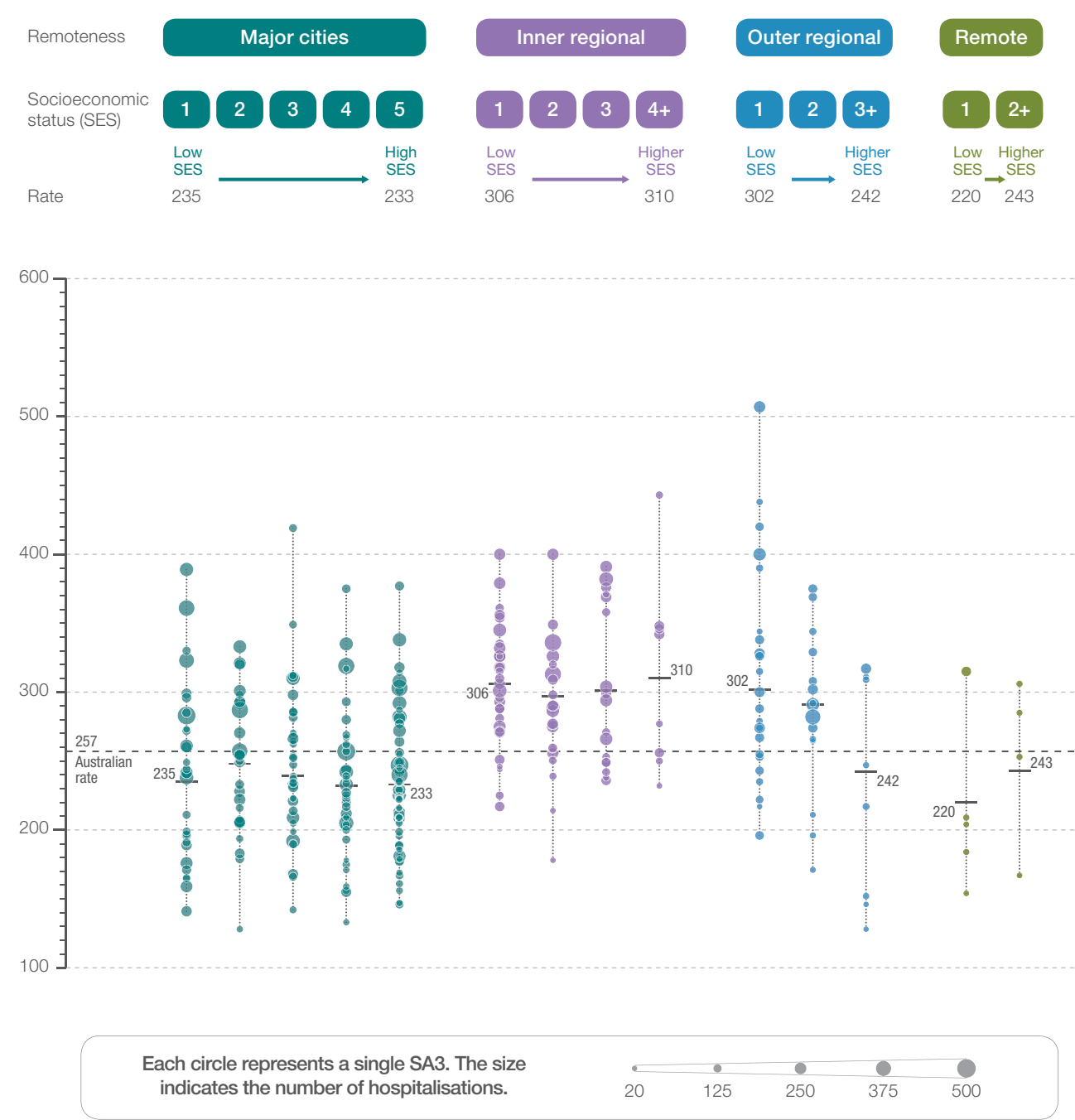
Figure 4.7: Number of hospitalisations for knee replacement per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3), state and territory, 2014–15

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Highest rate	443	400	400	507	420	371	318	209
State/territory	265	225	266	284	267	257	252	155
Lowest rate	146	128	147	167	171	196	186	128
No. hospitalisations	17,786	11,329	10,540	5,694	4,331	1,374	708	219



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 2014–15 and ABS Estimated Resident Population 30 June 2014.

Figure 4.8: Number of hospitalisations for knee replacement per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3), remoteness and socioeconomic status, 2014–15



Notes:
Rates are age and sex standardised to the Australian population in 2001.
Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator).
Analysis is based on the patient's area of usual residence, not the place of hospitalisation.
For further detail about the methods used, please refer to the Technical Supplement.

Sources: AIHW analysis of National Hospital Morbidity Database 2014–15 and ABS Estimated Resident Population 30 June 2014.

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Resources

- Australian Commission on Safety and Quality in Health Care. Clinical care standard for the management of knee pain. Sydney: ACSQHC; 2017.
- Tonic documentary on knee pain, available from www.tonicondemand.com.au/?s=knee.
- Australian Commission on Safety and Quality in Health Care. *Decision Support Tool for Osteoarthritis of the Knee*. (available 2017)
- Royal Australian College of General Practitioners. Guideline for the non-surgical management of hip and knee osteoarthritis. South Melbourne: RACGP; 2009.
- Australian Orthopaedic Association. National Joint Replacement Registry annual report 2015. Adelaide: AOA; 2015.

Australian initiatives

Australian initiatives to improve care for patients with knee osteoarthritis include:

- National Action Plan for Osteoarthritis, Rheumatoid Arthritis and Osteoporosis
- National Joint Replacement Registry (Australian Orthopaedic Association)
- Osteoarthritis Hip and Knee Service, Victoria
- Orthopaedic Physiotherapy Screening Clinic and Multidisciplinary Service, Queensland
- Osteoarthritis Chronic Care Program, New South Wales
- Waiting list management and model of care initiatives, Western Australia and South Australia
- A publication produced by the Royal Australasian College of Surgeons in partnership with Medibank, exploring variation in orthopaedic procedures, including knee replacement (www.surgeons.org/media/24529112/mpl-racs_orthopaedic_procedures.pdf).

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