# 4.4 Laparoscopic cholecystectomy hospitalisations

## Context

This data item examines hospitalisations for laparoscopic cholecystectomy for people of all ages based on their place of residence. Cholecystectomy is removal of the gall bladder, which is now commonly performed laparoscopically (using minimally invasive keyhole surgery) rather than with open surgery. Laparoscopic cholecystectomy can have greater risks in certain situations; in these situations, conversion to open surgery is recommended – for example, if the patient has severe local inflammation, adhesions or suspected bile duct injury.[1]

Cholecystectomy is used to treat symptomatic gallstones. These can cause pain from blockage of the bile ducts, and cholecystitis or pancreatitis (inflammation of the gall bladder or pancreas, respectively). Risk factors for gallstones include age, female gender, obesity and a sedentary lifestyle.[2-4] Gallstones are estimated to occur in 5–25% of people in comparable countries, but each year only 2–4% of people develop symptoms (most commonly biliary colic) and require treatment.[5] Most people with gallstones never have symptoms. Surgery is not recommended for people with asymptomatic gallstones. Serious complications related to gallstones include acute pancreatitis, which affects 0.04–1.5% of people with gallstones annually and has a 3–20% mortality rate after a first attack.[5]

In 2013, Australia had one of the highest rates of laparoscopic cholecystectomy among countries in the Organisation for Economic Co-operation and Development (OECD).[6] In this study, the rate of laparoscopic cholecystectomy per 100,000 people was 216 in Australia compared with 202 in Canada, 197 in Germany, 133 in Denmark, 125 in the United Kingdom and 116 in New Zealand.[6] The United States rate was 275 per 100,000 people in 2006 (more recent data were not available).[6]

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Rates of cholecystectomy in many OECD countries rose sharply after the introduction of the laparoscopic procedure in the 1990s. Rates had been steady for some years before this; within two years of the new procedure being introduced, rates had increased by 24% in Australia and 17% in Canada.[7] Offering laparoscopic cholecystectomy to patients who would not have been fit to undergo the open procedure contributed to the increase, but the threshold for cholecystectomy may also have become lower.[7,8]

Geographic variation in rates of cholecystectomy has been noted within other countries. For example, the United Kingdom rate of cholecystectomy (open and laparoscopic) in 2009–10 ranged between 51[1] and 170.8 per 100,000 people (a 3.3-fold variation between areas).[8] This may be partly due to differences in underlying risk factors and the prevalence of gallstones, as well as variation in the way gallstones are managed, including the threshold for surgery.[8]

### Early cholecystectomy

Early cholecystectomy for acute cholecystitis (without pancreatitis) results in a shorter hospital stay and reduced readmissions for recurrent acute cholecystitis.[9] However, a large proportion of patients with acute cholecystitis are not treated as urgent and are placed on a waiting list. For example, in a recent Australian study, 65% of patients with acute cholecystitis were categorised as semi-urgent or routine, and 5% of patients on the waiting list were readmitted for gallstone-related problems.[10]

In 2014–15, there was a small difference in median waiting times between Aboriginal and Torres Strait Islander Australians and other Australians (47 days compared with 44 days). The median waiting time was slightly longer in inner regional areas than in major cities (47 days compared with 43 days).[11]

### Intraoperative cholangiography

Intraoperative cholangiography (imaging of the bile duct) can be used during cholecystectomy to delineate the biliary anatomy and to detect stones in the common bile duct, with the aim of preventing bile duct injuries and retained stones. However, evidence of its benefit when used routinely is conflicting.[12] There is also a lack of agreement among surgeons about the benefit of routine intraoperative cholangiography, as opposed to selective cholangiography.

## 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 laparoscopic cholecystectomy per 100,000 people in 2014–15.

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

### Laparoscopic cholecystectomy

In 2014–15, there were 49,874 hospitalisations for laparoscopic cholecystectomy, representing 205 hospitalisations per 100,000 people (the Australian rate).

The number of hospitalisations for laparoscopic cholecystectomy across 318† local areas (Statistical Area 3 – SA3) ranged from 89 to 392 per 100,000 people. The rate was **4.4 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 170 per 100,000 people in the Australian Capital Territory to 226 in Tasmania (Figures 4.25–4.28).

After the highest and lowest 10% of results were excluded and 256 SA3s remained, the number of hospitalisations per 100,000 people was 2.0 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.

## Additional analysis

### Intraoperative cholangiography

In 2014–15, 81% (40,356 of 49,874) of the laparoscopic cholecystectomy hospitalisations included intraoperative cholangiography.

The proportion of hospitalisations for laparoscopic cholecystectomy that included intraoperative cholangiography across 209^ SA3s ranged from 22.6% in Bunbury (Western Australia) to 96.2% in Carindale (Queensland). This proportion was **4.3 times as high** in the area with the highest proportion as in the area with the lowest proportion. The proportion of hospitalisations that included intraoperative cholangiography varied across states and territories, from 53% in the Northern Territory to 89% in the Australian Capital Territory.

### Open cholecystectomy

In 2014–15, there were 3,767 hospitalisations for open cholecystectomy, representing 15 hospitalisations per 100,000 people (the Australian rate).

The number of hospitalisations for open cholecystectomy varied across states and territories, from 13 per 100,000 people in the Australian Capital Territory, Western Australia and Queensland to 20 per 100,000 people in Tasmania.

The Australian age- and sex-standardised rate of laparoscopic cholecystectomy was 13.7 times the rate of open cholecystectomy.

Note that conversions from laparoscopic to open cholecystectomy are included in the data for open cholecystectomy hospitalisations.

Data for intraoperative cholangiography or open cholecystectomy are not presented graphically; however, 2014–15 rates by SA3 for intraoperative cholangiography, and rates by state and territory for open cholecystectomy are available online at www.safetyandquality.gov.au/atlas.

^ There are 333 SA3s. For this analysis, data were suppressed for 124 SA3s due to a small number of hospitalisations.

† There are 333 SA3s. For this analysis, data were suppressed for 15 SA3s due to a small number of hospitalisations and/or population in an area.

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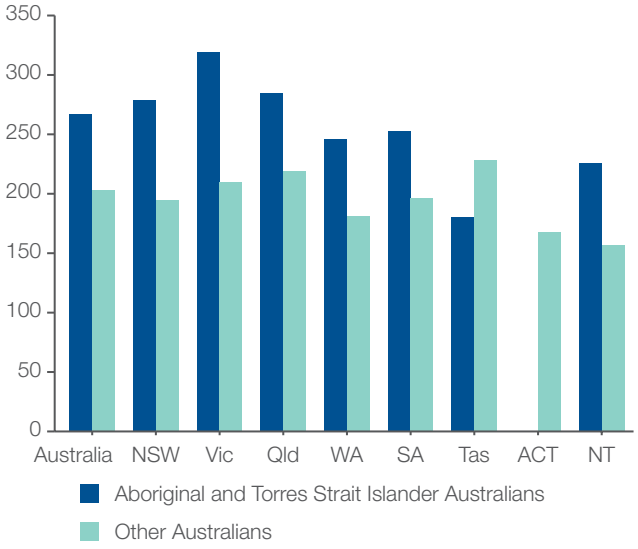
## Analysis by remoteness and socioeconomic status

Rates of hospitalisations for laparoscopic cholecystectomy tended to be higher in inner regional areas than in other categories of remoteness. Rates tended to be lower in areas of least socioeconomic disadvantage (Figure 4.29).

## Analysis by Aboriginal and Torres Strait Islander status

The rate for Aboriginal and Torres Strait Islander Australians (267 per 100,000 people) was 32% higher than the rate for other Australians (203 per 100,000 people) (Figure 4.23).

**Figure 4.23: Number of hospitalisations for laparoscopic cholecystectomy per 100,000 people, age and sex standardised, by state and territory and Indigenous status, 2014–15**



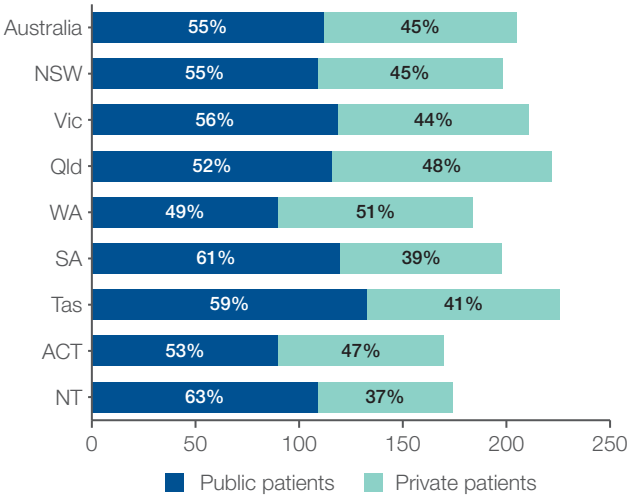

The data for Figure 4.23 are available at www.safetyandquality.gov.au/atlas.

## Analysis by patient funding status

Overall, 45% of hospitalisations for laparoscopic cholecystectomy were for privately funded patients. This proportion varied from 37% in the Northern Territory to 51% in Western Australia (Figure 4.24).

The median age at operation was 47 years for publicly funded patients and 53 years for privately funded patients.

**Figure 4.24: Number of hospitalisations for laparoscopic cholecystectomy per 100,000 people, age and sex standardised, by state and territory and patient funding status, 2014–15**




The data for Figure 4.24 are available at www.safetyandquality.gov.au/atlas.

**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.
Data for ACT (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.

## Interpretation

Potential reasons for the variation include differences in:

- Risk factors for gallstones, such as obesity, gender, diabetes and sedentary lifestyle
- Thresholds for performing the procedure in patients with biliary colic or asymptomatic gallstones[7]
- Referral patterns of general practitioners
- Risk factors and delays in care, which might be higher for people from rural and remote areas.

Variation in open cholecystectomy rates may relate to higher levels of risk factors, and delays in care, for people from rural and remote areas.

Variation between areas in rates of surgery may also be influenced by the number of clinicians providing services to people living in these areas. The practices of specific clinicians are likely to have a greater impact on rates in smaller local areas with fewer clinicians, such as in 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.

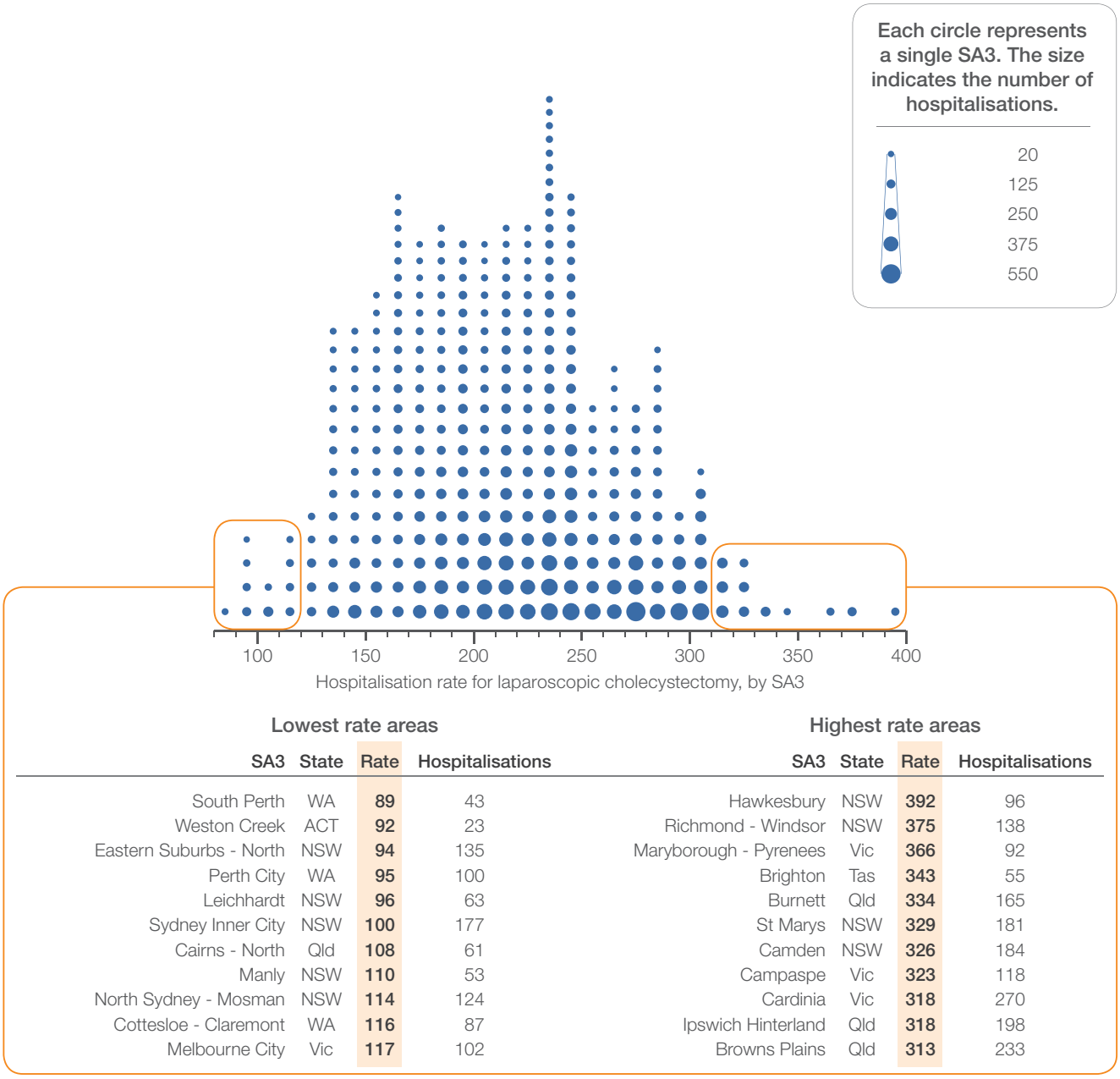
## Addressing variation

Routine national hospital datasets collect information on the patient's conditions that are relevant to the hospital care provided at that time. They will not necessarily capture information on all the patient's symptoms and conditions. Therefore, it is not possible to use these data to analyse the extent to which thresholds for laparoscopic surgery differ across Australia. Given the high rates of laparoscopic cholecystectomy in Australia compared with many other countries, and the variation observed across Australia, a study to explore differences in the approach to surgical intervention in patients with minimal or non-specific symptoms would be valuable. Collection and analysis of data about the severity and nature of symptoms before cholecystectomy, and correlation with outcomes would be useful for examining the appropriate indications for cholecystectomy and identifying appropriate rates. A workshop to define threshold biliary symptoms for operation would help identify a consistent recommended approach.

This analysis has not examined variation in the management of patients with their first case of acute cholecystitis at a hospital level. Further analysis of differences in rates of surgery during the first admission for acute cholecystitis between different catchment areas of hospitals and healthcare networks would be useful to determine variation in this aspect of practice. An exploration of initiatives to increase rates of early laparoscopic cholecystectomy for acute cholecystitis is also warranted, given the evidence of benefit in this situation.[10-14]

# Laparoscopic cholecystectomy hospitalisations

## Figure 4.25: Number of hospitalisations for laparoscopic cholecystectomy per 100,000 people, age and sex standardised, by Statistical Area Level 3 (SA3), 2014–15




**Lowest rate areas**

| SA3 | State | Rate | Hospitalisations |
|---|---|---|---|
| South Perth | WA | 89 | 43 |
| Weston Creek | ACT | 92 | 23 |
| Eastern Suburbs - North | NSW | 94 | 135 |
| Perth City | WA | 95 | 100 |
| Leichhardt | NSW | 96 | 63 |
| Sydney Inner City | NSW | 100 | 177 |
| Cairns - North | Qld | 108 | 61 |
| Manly | NSW | 110 | 53 |
| North Sydney - Mosman | NSW | 114 | 124 |
| Cottesloe - Claremont | WA | 116 | 87 |
| Melbourne City | Vic | 117 | 102 |

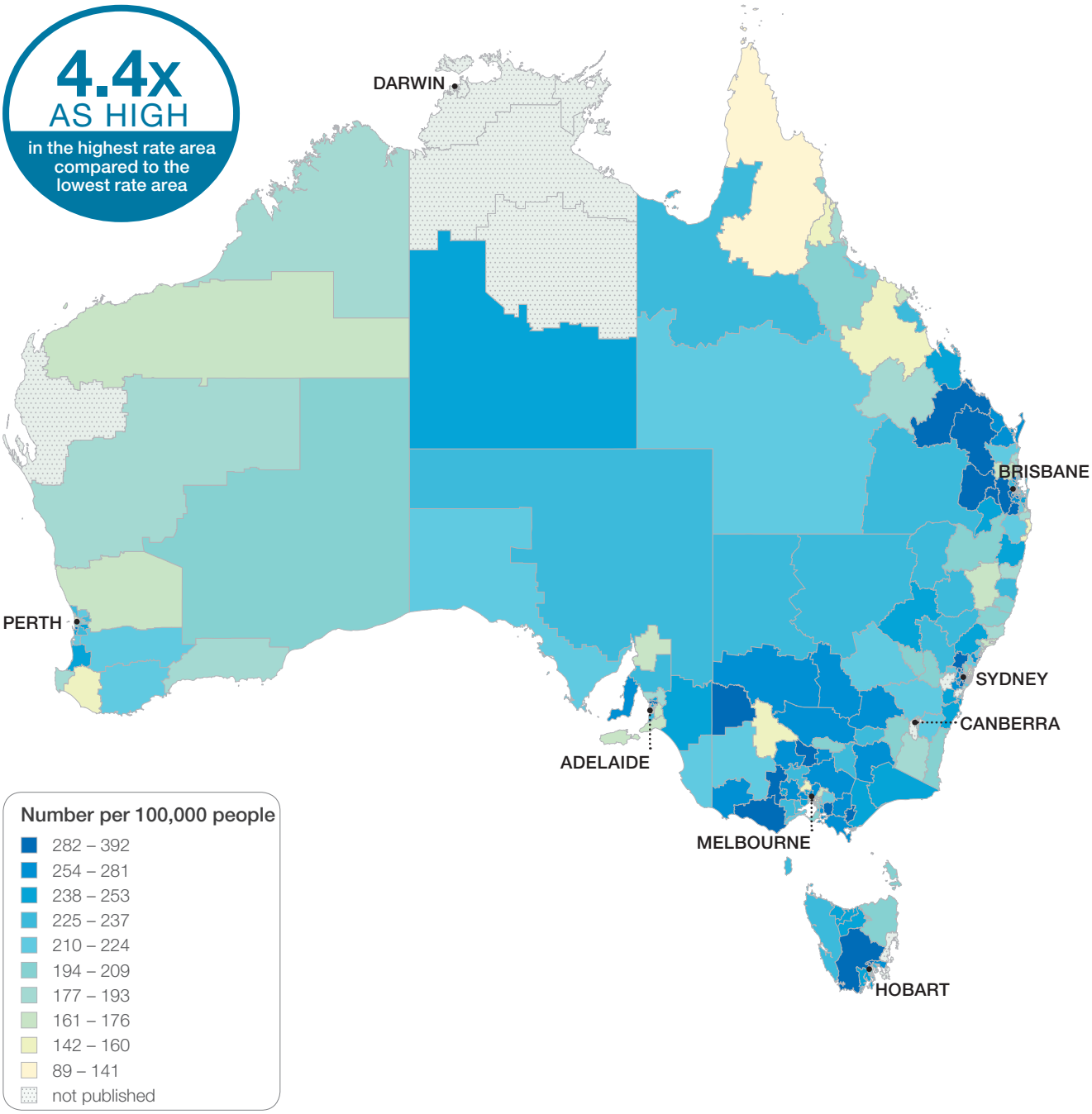
**Highest rate areas**

| SA3 | State | Rate | Hospitalisations |
|---|---|---|---|
| Hawkesbury | NSW | 392 | 96 |
| Richmond - Windsor | NSW | 375 | 138 |
| Maryborough - Pyrenees | Vic | 366 | 92 |
| Brighton | Tas | 343 | 55 |
| Burnett | Qld | 334 | 165 |
| St Marys | NSW | 329 | 181 |
| Camden | NSW | 326 | 184 |
| Campaspe | Vic | 323 | 118 |
| Cardinia | Vic | 318 | 270 |
| Ipswich Hinterland | Qld | 318 | 198 |
| Browns Plains | Qld | 313 | 233 |

**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.

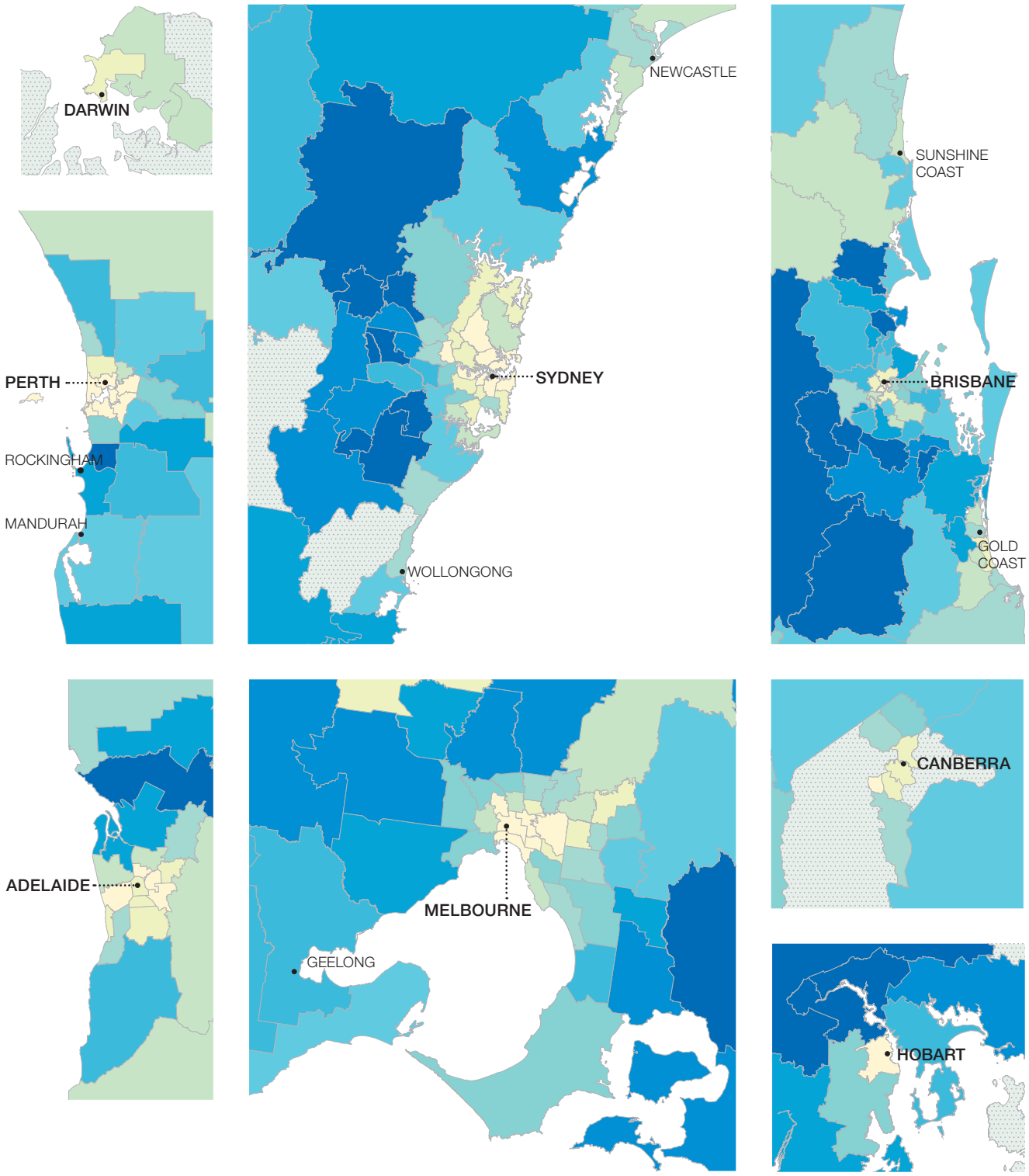
# Laparoscopic cholecystectomy hospitalisations

Figure 4.26: **Number of hospitalisations for laparoscopic cholecystectomy per 100,000 people, 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 4.27: **Number of hospitalisations for laparoscopic cholecystectomy per 100,000 people, age and sex standardised, by Statistical Area Level 3 (SA3), 2014–15: capital city area maps**

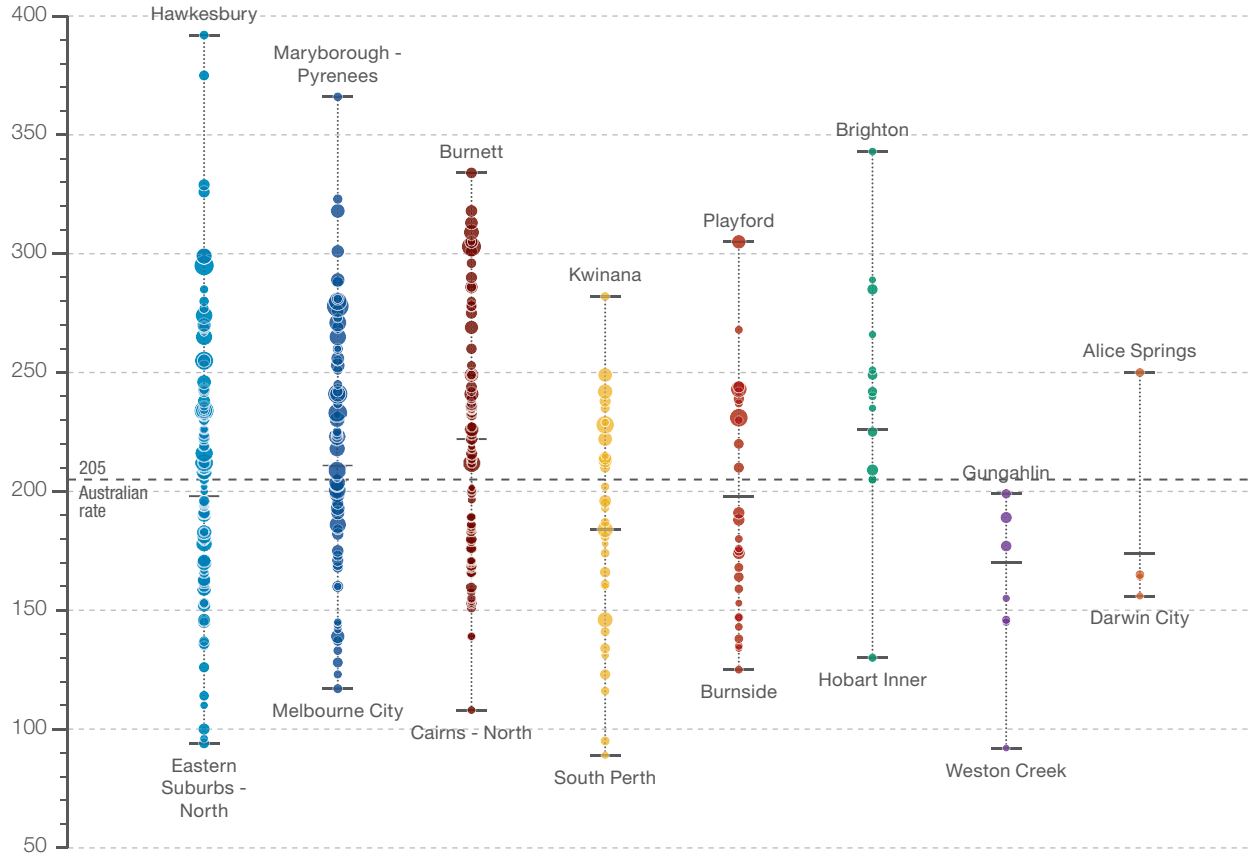


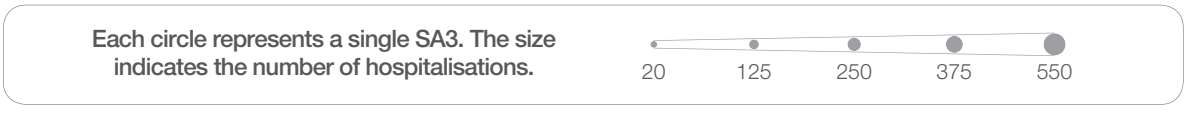

**Notes:**
Rates are age and sex standardised to the Australian population in 2001.
Rates are based on the number of hospitalisations in public and private hospitals (numerator) and people in the geographic area (denominator).
Analysis is based on the patient's area of usual residence, not the place 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.

# Laparoscopic cholecystectomy hospitalisations

**Figure 4.28: Number of hospitalisations for laparoscopic cholecystectomy per 100,000 people, age and sex standardised, by Statistical Area Level 3 (SA3), state and territory, 2014–15**

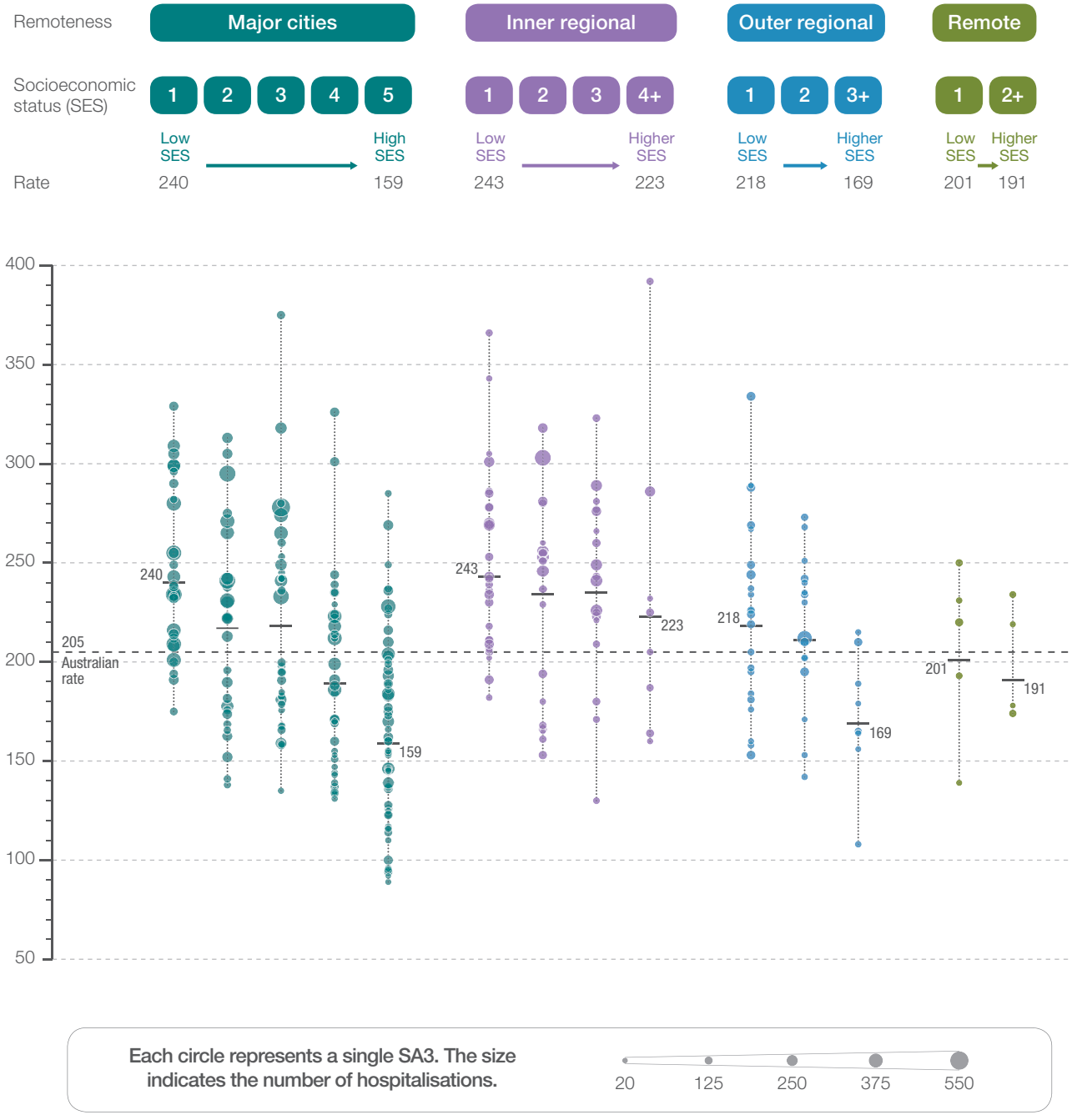
| | NSW | Vic | Qld | WA | SA | Tas | ACT | NT |
|---|---|---|---|---|---|---|---|---|
| Highest rate | 392 | 366 | 334 | 282 | 305 | 343 | 199 | 250 |
| State/territory | 198 | 211 | 222 | 184 | 198 | 226 | 170 | 174 |
| Lowest rate | 94 | 117 | 108 | 89 | 125 | 130 | 92 | 156 |
| No. hospitalisations | 15,555 | 12,905 | 10,716 | 4,758 | 3,535 | 1,231 | 659 | 391 |




**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 4.29: Number of hospitalisations for laparoscopic cholecystectomy per 100,000 people, 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).
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**Sources:** AIHW analysis of National Hospital Morbidity Database 2014–15 and ABS Estimated Resident Population 30 June 2014.

# Laparoscopic cholecystectomy hospitalisations

## Resources

- National Institute for Health and Care Excellence. Gallstone disease: diagnosis and management. United Kingdom: NICE; 2014.[15]

## Australian initiatives

The information in this chapter will complement work already under way on laparoscopic cholecystectomy in Australia. At a national level, this work includes:

- A publication produced by the Royal Australian College of Surgeons, in partnership with Medibank, exploring variation in general surgical practice, including a report on variation in laparoscopic cholecystectomy. (www.surgeons.org/media/24091469/Surgical-Variance-Report-General-Surgery.pdf)
- Welcome to the Healthy Weight Guide, a website with information and tools to help you achieve and maintain a healthy weight, Australian Government Department of Health (www.healthyweight.health.gov.au).

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