Chapter 2
Gastrointestinal investigations and treatments

At a glance

Colonoscopy

Most colonoscopies are done to detect bowel cancer. The Atlas found low rates of hospitalisation for colonoscopy in the following groups, raising concerns about their access to colonoscopy: Aboriginal and Torres Strait Islander Australians, people in outer regional and remote areas and people living in areas of low socioeconomic status. Strategies to increase participation in the National Bowel Cancer Screening Program in these groups and colonoscopy for those with a positive screening test will drive more appropriate care. Addressing preventable risk factors, such as obesity, smoking and poor diet, would reduce the rate of bowel cancer and lead to better use of healthcare services.

Gastroscopy

Gastroscopy is used mainly to investigate upper gastrointestinal symptoms such as heartburn. It is also used to exclude a diagnosis of cancer. Rates of gastroscopy in Australia continue to rise, despite low and stable rates of oesophageal and stomach cancers. The Atlas found that the rate of hospitalisation for gastroscopy varies up to seven-fold between local areas in Australia.

This pattern suggests underuse in some parts of the population and overuse in others. Lower rates of gastroscopy in outer regional and remote areas raise concerns about a lack of access in these areas. The low rates for Aboriginal and Torres Strait Islander Australians raise similar concerns.

The Atlas also found that, in 2016–17, there were 274,559 hospitalisations for gastroscopy and colonoscopy on the same day, representing 1,044 hospitalisations per 100,000 people of all ages. Investigation with both endoscopes is indicated in only a limited number of conditions, so the high rates reported suggest some inappropriate use.

Proton pump inhibitor medicines in adults

Proton pump inhibitor medicines are mainly used for gastro-oesophageal reflux disease. There is good evidence that proton pump inhibitor medicines are overused and that many people are inappropriately using them for long periods. Lifestyle changes can reduce symptoms of reflux in many patients. The Atlas found that the rate of dispensing of proton pump inhibitor medicines in adults varies up to five-fold between local areas in Australia.

Recommendations

Colonoscopy

2a State and territory health departments to adopt triaging systems to prioritise colonoscopy for individuals who are most at risk of bowel cancer. Colonoscopy should not be used routinely for primary screening, and timing of repeat surveillance colonoscopies should follow National Health and Medical Research Council guidelines.

2b. Health service organisations to ensure that, in settings where colonoscopy and gastroscopy are provided in the same clinic, patient need and likelihood of benefit of each procedure determine the overall clinical priority.

2c. The National Bowel Cancer Screening Program to develop and test methods to improve uptake by Aboriginal and Torres Strait Islander Australians.

2d. Relevant colleges and clinical societies to review their training programs to incorporate the Colonoscopy Clinical Care Standard and meet the needs of at-risk groups, including Aboriginal and Torres Strait Islander Australians, people at socioeconomic disadvantage and people living outside major cities.

2e. Health service organisations and facilities providing colonoscopies to monitor adherence to the Colonoscopy Clinical Care Standard to ensure that patients with the greatest need for colonoscopy are prioritised.

Gastroscopy

2f. The Medicare Benefits Schedule Review Taskforce to review descriptors for gastroscopy with evidence-based criteria using a consensus process. The taskforce to consider reserving subsidies for a set of specific indications for gastroscopy, including:

i. Upper abdominal symptoms that persist despite an appropriate trial of therapy

ii. Upper abdominal symptoms associated with other symptoms or signs suggesting structural change (for example, difficulty swallowing), or new-onset symptoms in patients over 50 years of age.

2g. State and territory health departments to prioritise gastroscopy for individuals, consistent with the epidemiology of upper gastrointestinal cancer.

Proton pump inhibitor medicines for adults

2h. Relevant colleges and clinical societies to:

i. Develop educational programs targeting both general practitioners and specialists to improve the appropriateness of use of proton pump inhibitor medicines

ii. Review their training programs to ensure that guidance on the use of PPI medicines is consistent with the current evidence base.

2i. Relevant colleges and clinical societies to develop educational programs for consumers to educate them about the importance and benefits of lifestyle changes to reduce their risk of chronic diseases, particularly gastro-oesophageal reflux disease and bowel cancer.

2j. The Commission to develop a clinical care standard on investigation and management of dyspepsia and gastro-oesophageal reflux disease.

2k. NPS MedicineWise to ensure that information for consumers about appropriate use of PPI medicines and about modifiable lifestyle factors that increase the risk of gastro-oesophageal reflux disease is highlighted, where appropriate, in its public education campaigns.

2.1 Colonoscopy hospitalisations, all ages

Why is this important?

Most colonoscopies are performed to detect bowel cancer. Australia's National Bowel Cancer Screening Program recommends colonoscopy for those people who have a positive faecal occult blood test. Guidelines for bowel cancer screening and surveillance provide evidence-based recommendations on the timing of colonoscopy for people who are at higher risk of bowel cancer. Other indications for colonoscopy include detection and assessment of inflammatory bowel disease. Australian data show that there is substantial overuse of colonoscopy in some parts of the population and underuse in others. This exposes some people to unnecessary risk from the procedure and others to potential harm because a needed procedure was not performed. It is a poor use of resources.

What did we find?

The Atlas found the rate of hospitalisation for inpatient colonoscopy varies up to about seven-fold between local areas across Australia. The rate of hospitalisations for colonoscopy for Aboriginal and Torres Strait Islander Australians was 47% lower than the rate for other Australians.

What can be done?

Triaging systems, already in place in some states, could be more widely used in Australia to prioritise colonoscopy for patients who are most at risk of bowel cancer, and to reduce inappropriate use for primary screening and unnecessary repeat colonoscopies. Lower participation in the National Bowel Cancer Screening Program, as well as poorer access to colonoscopy, needs to be addressed for Aboriginal and Torres Strait Islander Australians, people at socioeconomic disadvantage and those living outside major cities.

Colonoscopy hospitalisations, all ages

Context

Most colonoscopies are performed to detect bowel cancer. Australia is estimated to have the 11th highest incidence of colorectal cancer in the world, and bowel cancer is the second most commonly diagnosed cancer in men and in women in Australia.[1,2] Although the estimated age-standardised incidence of bowel cancer in Australia will have fallen between 1997 and 2018, the number of cases will increase from 11,184 to an estimated 17,004 per year due to the ageing population.[3]

About 51% of Australia's bowel cancer burden can be attributed to preventable risk factors such as physical inactivity, obesity, a diet low in fibre and high in red and processed meat, alcohol use, and smoking.[3] Although smoking rates have declined in the population as a whole, the percentage of Australian adults who are overweight or obese increased from 56% to 63% between 1995 and 2011–12.[4]

Screening reduces morbidity and mortality from bowel cancer, and Australia's National Bowel Cancer Screening Program offers biennial faecal occult blood testing (FOBT) for people aged 50–74 years. Guidelines recommend colonoscopy for people who have a positive FOBT, and for follow-up at particular time points for people who have had previous polyps or bowel cancer.

Recommendations to limit colonoscopy to higher-risk groups have been made, taking into account the risks of the procedure (for example, perforation of the bowel or bleeding) as well as the costs to society and the individual.[5] However, these recommendations do not appear to be followed well currently, resulting in overuse of colonoscopy in people at lower risk and underuse in those at higher risk. For every 1 million Australians aged 50 years and over, an estimated 80,000 people at average risk of bowel cancer are being over-screened with colonoscopy and 29,000 people at increased risk are not having the colonoscopy they need.[5-7]

The National Bowel Cancer Screening Program commenced in 2006, and the rate of Medicare Benefits Schedule (MBS)-subsidised colonoscopy increased by 46% between 2006 and 2017.[8] In Australia, the rate of MBS-subsidised colonoscopy was 2,355 per 100,000 people in 2013–14.[9] In England, the rate of colonoscopy and flexible sigmoidoscopy combined was lower, at 1,527 per 100,000 people in 2014–15.[10]

Why revisit variation in colonoscopy?

The first *Australian Atlas of Healthcare Variation* found that, in 2013–14, the highest rate of MBS-subsidised colonoscopy was 30 times as high as the lowest rate.[9] While people living in outer regional areas have the highest rate of bowel cancer in Australia[1], the first Atlas found that they had some of the lowest rates of colonoscopy. In major cities, colonoscopy rates were lowest in areas of low socioeconomic status, despite such areas having the highest bowel cancer incidence and mortality rates. This socioeconomic patterning was not observed in regional or remote areas. Analysis in the first Atlas was based on MBS data, which did not include data on colonoscopies provided to publicly funded patients admitted to hospital, and did not allow analysis by Indigenous status.

This edition of the Atlas uses admitted patient data from the National Hospital Morbidity Database (NHMD), which captures information on people admitted as day patients or overnight in both public and private hospitals throughout Australia. The NHMD does not capture colonoscopies for non-admitted patients. While the MBS database includes data on people who receive an MBS-subsidised service whether or not they are admitted, no national data are available on the number of non-admitted (that is, outpatient) colonoscopies funded publicly under a hospital budget. Therefore, it is not possible to get a complete picture of all colonoscopy activity across Australia.

The reason for exploring colonoscopy using NHMD data in this edition of the Atlas is to produce a more complete picture of the use of this investigation in Australia, to see whether the patterns for admitted patients are similar to those found in the MBS data. The analysis will also shine a light on access for vulnerable populations who may be missing out on appropriate colonoscopy care, particularly:

- Aboriginal and Torres Strait Islander Australians
- Publicly funded patients (patients without private health insurance or without the ability to pay for the service themselves).

About the data

Data are sourced from the NHMD, and include admitted patients in both public and private hospitals. Rates are based on the number of hospitalisations for colonoscopy per 100,000 people of all ages in 2016–17.

Because a record is included for each hospitalisation for the procedure rather than for each patient, patients hospitalised for the 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 comparisons between populations with different age and sex structures.

Same-day procedure admission policies

States and territories differ in their admission policies for same-day procedures. As colonoscopies for non-admitted publicly funded patients are not included in the data shown, variation in admission policies is expected to contribute to variation in colonoscopy rates between states and territories. For example, in 2013–14 in Western Australia and Victoria, almost all endoscopy procedures occurred as admitted patient care, so the data shown should be a near complete count of colonoscopies in these states.[11] In contrast, many colonoscopies in South Australia occurred as non-admitted care, and so the data shown are likely to be an under-count.

In Tasmania, procedures that are bulk-billed are coded as non-admitted episodes. This will lead to an underestimate of colonoscopy rates. A substantial proportion of public patients accessing Tasmanian public hospitals may be bulk-billed and therefore not represented in the data.

Aboriginal and Torres Strait Islander identification

The identification of Aboriginal and Torres Strait Islander patients may not be accurate for all admissions, and processes for seeking and recording identification may vary among states and territories. Therefore, the data shown may under-count the number of Aboriginal and Torres Strait Islander Australians hospitalised for colonoscopy.

What do the data show?

Magnitude of variation

In 2016–17, there were 765,411 hospitalisations for colonoscopy, representing 2,881 hospitalisations per 100,000 people of all ages (the Australian rate).

The number of hospitalisations for colonoscopy across 330* local areas (Statistical Area Level 3 – SA3) ranged from 622 to 4,607 per 100,000 people of all ages. The rate was **7.4 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 1,144 per 100,000 people of all ages in the Australian Capital Territory to 3,371 in Victoria (Figures 2.3-2.6).

* There are 340 SA3s. For this item, data were suppressed for 10 SA3s due to a small number of hospitalisations and/or population in an area.

Notes:

Data from a number of ACT private hospitals, which undertake some colonoscopies, were not provided to the National Hospital Morbidity Database. For this reason, data for the ACT should be interpreted with caution.

Some of the published SA3 rates were considered more volatile than others. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.

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

Colonoscopy hospitalisations, all ages

After the highest and lowest 10% of results were excluded and 264 SA3s remained, the number of hospitalisations per 100,000 people of all ages was 2.2 times as high in the area with the highest rate compared to the area with the lowest rate.

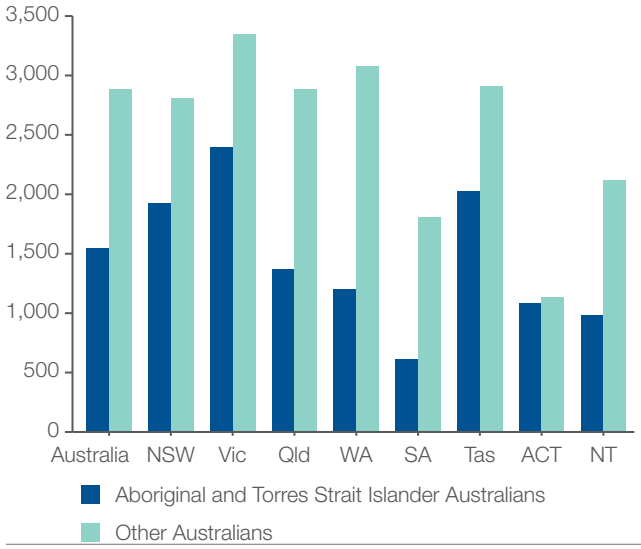
Analysis by remoteness and socioeconomic status

Rates for hospitalisation for colonoscopy were higher in major cities and inner regional areas than in outer regional and remote areas. Rates were lower in areas with lower socioeconomic status in major cities and remote areas. However, there was no clear pattern according to socioeconomic status in other remoteness categories (Figure 2.7).

Analysis by Aboriginal and Torres Strait Islander status

The rate for Aboriginal and Torres Strait Islander Australians (1,542 per 100,000 people) was 47% lower than the rate for other Australians (2,884 per 100,000 people) (Figure 2.1).

Figure 2.1: Number of hospitalisations for colonoscopy per 100,000 people of all ages, age and sex standardised, by state and territory of patient residence, by Aboriginal and Torres Strait Islander status, 2016–17



Analysis by sex for people aged 49 years and under

The age-standardised rate of hospitalisations for colonoscopy among people aged 49 years and under was 1,022 per 100,000 for males and 1,291 per 100,000 for females (Figure 2.2).

Figure 2.2: Number of hospitalisations for colonoscopy per 100,000 people aged 49 years and under, age standardised, by state and territory of patient residence, by sex, 2016–17

The data for Figures 2.1 and 2.2 are available at www.safetyandquality.gov.au/atlas.

Notes:
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.
Data from a number of ACT private hospitals, which undertake some colonoscopies, were not provided to the National Hospital Morbidity Database. For this reason, data for the ACT should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Interpretation

Variation is warranted and desirable when it reflects variation in the underlying need for care. However, use of colonoscopy does not appear to match patterns of patient need. The pattern in major cities, where there is greater use of colonoscopy in higher socioeconomic areas, does not reflect disease patterns for bowel cancer, as bowel cancer incidence and mortality rates are highest in areas of socioeconomic disadvantage.[1,3] The higher rate of colonoscopy in females across all states is the reverse of what would be expected, given the known higher rates of bowel cancer in men.[1]

These data are consistent with the patterns found in the first Atlas using MBS colonoscopy data.[9] The degree of overall variation observed in these hospitalisation data is less than previously observed when using MBS data. Differences in the scope of each dataset are likely to contribute to this.

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.

Variation in rates of colonoscopy is likely to be due to geographical differences in the factors discussed below and the data issues discussed above.

Clinical decision-making

High rates of colonoscopy in some areas may be related to clinical practice that is not supported by guidelines. A recent Australian study found that, among people who underwent colonoscopy in the previous five years, in 21% of cases it had been performed as a screening test or for another reason not supported by guidelines.[12] Previous Australian studies have also found that repeat and surveillance colonoscopies were often requested sooner than recommended by guidelines.[13,14]

Inappropriate use of colonoscopy to investigate non-specific irritable bowel syndrome symptoms, particularly in younger patients without red flags such as rectal bleeding or weight loss, may also contribute to variation in rates and the high rates in people under 50 years of age, particularly women. Conversely, not performing colonoscopy when it is warranted – for example, in older patients with unexplained iron deficiency anaemia or rectal bleeding – will also contribute to variation.

Access to colonoscopy services

Ability to pay out-of-pocket costs for colonoscopy is likely to be lower in areas of socioeconomic disadvantage, and geographic access is likely to be more difficult in areas with fewer gastroenterology services. Open access endoscopy services are likely to increase the rates of colonoscopy in areas where these services are available, because general practitioners are effectively able to request a colonoscopy without further review from a specialist.

Rates of colonoscopy are lower in outer regional and remote areas, raising concerns about adequate access to colonoscopy in these areas. The lower rates in Aboriginal and Torres Strait Islander Australians suggest that this population group is also missing out on appropriate care and need improved access to colonoscopy.

Rates of private health insurance

Having private health insurance significantly reduces waiting time between presenting to a doctor and having a diagnosis of bowel cancer (with colonoscopy in most cases).[15] Higher rates of private health insurance in areas of greater socioeconomic advantage may explain the higher rates of colonoscopy in these areas.

Notes:
Data from a number of ACT private hospitals, which undertake some colonoscopies, were not provided to the National Hospital Morbidity Database. For this reason, data for the ACT should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Colonoscopy hospitalisations, all ages

Uptake of bowel cancer screening

The percentage of invited people who participate in the National Bowel Cancer Screening Program varies by:

- State and territory – between 28% (Northern Territory) and 47% (South Australia)
- Remoteness – 28% and 44% in very remote and inner regional areas, respectively
- Socioeconomic status – 30% and 43% in areas of highest and lowest socioeconomic status, respectively.[3]

Participation by Aboriginal and Torres Strait Islander Australians was estimated at 20% in 2015–16, compared to 42% of other Australians.[3]

Other factors

Higher rates of colonoscopy in women under 50 years of age may also reflect investigation of anaemia in women who have not been properly investigated for heavy menstrual bleeding. Management of heavy menstrual bleeding according to the Australian Clinical Care Standard[16] may reduce rates of unnecessary colonoscopy in premenopausal women.

Variation in rates of colonoscopy between areas 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.

Addressing variation

The National Bowel Cancer Screening Program has been implemented in stages, and by 2020 all eligible Australians between 50 and 74 years of age will be invited for screening every two years.[3] This will further increase the demand for colonoscopies, and adds to the urgency to better target colonoscopy resources so that those with a clear need are prioritised. Strategies could include prioritising patients who are most at risk of bowel cancer, and reducing the number of colonoscopies inappropriately used for primary screening or repeated more frequently than recommended. Despite national guidelines, confusion persists about appropriate use of colonoscopy in people with a family history of bowel cancer.

Lower participation in the National Bowel Cancer Screening Program, as well as poorer access to colonoscopy, needs to be addressed for Aboriginal and Torres Strait Islander Australians, people at socioeconomic disadvantage and those living outside major cities. Improving management of irritable bowel syndrome could reduce inappropriate use of colonoscopy.

Colonoscopy Clinical Care Standard

The Australian Commission on Safety and Quality in Health Care (the Commission) released a national Colonoscopy Clinical Care Standard in 2018, which includes a requirement for timely and appropriate use of colonoscopy, as per Australian guidelines.[17] As the number of colonoscopies continues to increase in Australia, ensuring quality and safety is essential to maximise the benefits that are delivered to individual patients and the population as a whole. The Colonoscopy Clinical Care Standard highlights the key components of a high-quality colonoscopy. These include appropriate referral and timely assessment, maximising adenoma detection rates through certification of proceduralists and adequate bowel preparation before colonoscopy, safe use of sedation, and surveillance intervals based on best evidence. The clinical care standard also requires that patients are properly informed about each aspect of their care.

Facilities providing colonoscopies should be monitoring adherence to the clinical care standard to ensure that patients with the greatest need are prioritised for colonoscopy. Aligning surveillance intervals with guidelines is one of the aims of the proposed changes to MBS items for colonoscopy, and this may reduce the use of colonoscopies more frequently than recommended.[18]

Triage systems

Some states in Australia (Queensland, Victoria and Western Australia) have introduced models of care or triage guidelines to support appropriate referral for colonoscopy.[19-21] These programs include guidance for prioritisation of patients for colonoscopy, and prompts for key information required from referring clinicians. Implementing such triaging programs more widely across Australia, through online systems or with standardised referral templates, could result in better use of current colonoscopy capacity.

Appropriate prioritisation of colonoscopy and gastroscopy

Gastroscopies and colonoscopies are often performed by the same specialists and on the same procedural list. Bowel cancer is much more common than cancer of the upper gastrointestinal tract, but gastroscopies currently may be inappropriately prioritised over more clinically important colonoscopies, thus contributing to access problems. One way to examine whether this is happening at a local level would be to explore the volume of each procedure being undertaken and the pathology yield rates for both colonoscopy and gastroscopy.

The national rate of hospitalisations for colonoscopy is 2,881 per 100,000, and for gastroscopy it is 1,931 per 100,000. However, these figures do not reflect the relevant relative burden of disease. For example, the estimated age-standardised incidence rate per 100,000 in 2017 for oesophageal cancer was 8.4 for men and 3.0 for women; for stomach cancer, the estimated age-standardised incidence rate per 100,000 in 2017 was 10.9 for men and 5.2 for women.[22] In comparison, for bowel cancer in 2017, the estimated age-standardised incidence rate per 100,000 was 67.3 for men and 49.4 for women.[22]

A reduction in gastroscopy services could free up resources for colonoscopy. The MBS Review Taskforce recommended that the Gastroenterological Society of Australia consider the need for guidelines on the appropriate concurrent use of upper and lower gastrointestinal endoscopy services.[23] See page 97 for analysis of gastroscopy services in Australia.

Prevention of bowel cancer

Preventing bowel cancer by promoting lifestyle changes, particularly in populations with the highest rates of risk factors, would reduce the overall need for colonoscopy. Risk factors for bowel cancer include smoking, alcohol intake, dietary factors, obesity and family history.[1] Physical inactivity and high body mass index (BMI) are the greatest contributors to bowel cancer burden in Australia (16% and 13%, respectively).[3]

Aboriginal and Torres Strait Islander Australians and bowel cancer

Although the reported incidence of bowel cancer is equal among Aboriginal and Torres Strait Islander Australians and other Australians, survival rates are not.[24] (Additionally, the reported incidence of bowel cancer for Aboriginal and Torres Strait Islander Australians may be an underestimate.) Aboriginal and Torres Strait Islander Australians have a 58% chance, on average, of surviving for five years after being diagnosed with bowel cancer, compared with other Australians, who have a 67% chance, on average, of surviving for five years.[24]

Trends in detected bowel cancers and mortality do not show improvements for Aboriginal and Torres Strait Islander Australians. The incidence of bowel cancer increased significantly among Aboriginal and Torres Strait Islander Australians between 1998 and 2013, but remained steady among other Australians.[24] The mortality rate from bowel cancer remained steady among Aboriginal and Torres Strait Islander Australians between 1998 and 2015, but fell among other Australians.[24]

Colonoscopy hospitalisations, all ages

Participation by Aboriginal and Torres Strait Islander Australians in the National Bowel Cancer Screening Program (20% in 2014–15) was lower than for other Australians (42%).[3] Lower participation in the screening program is likely to contribute to poorer outcomes among Aboriginal and Torres Strait Islander Australians.[24] Many factors may contribute to lower participation, including:

- Lack of knowledge and awareness about bowel cancer (poor health literacy)
- Bowel cancer being a taboo topic or not a health priority
- An out-of-date address in Medicare registration details preventing Aboriginal and Torres Strait Islander Australians receiving an FOBT kit.

Lower rates of private health insurance may also contribute to the lower rate of colonoscopy among Aboriginal and Torres Strait Islander Australians[25], as well as poorer access to effective and culturally safe primary health care and specialist care.

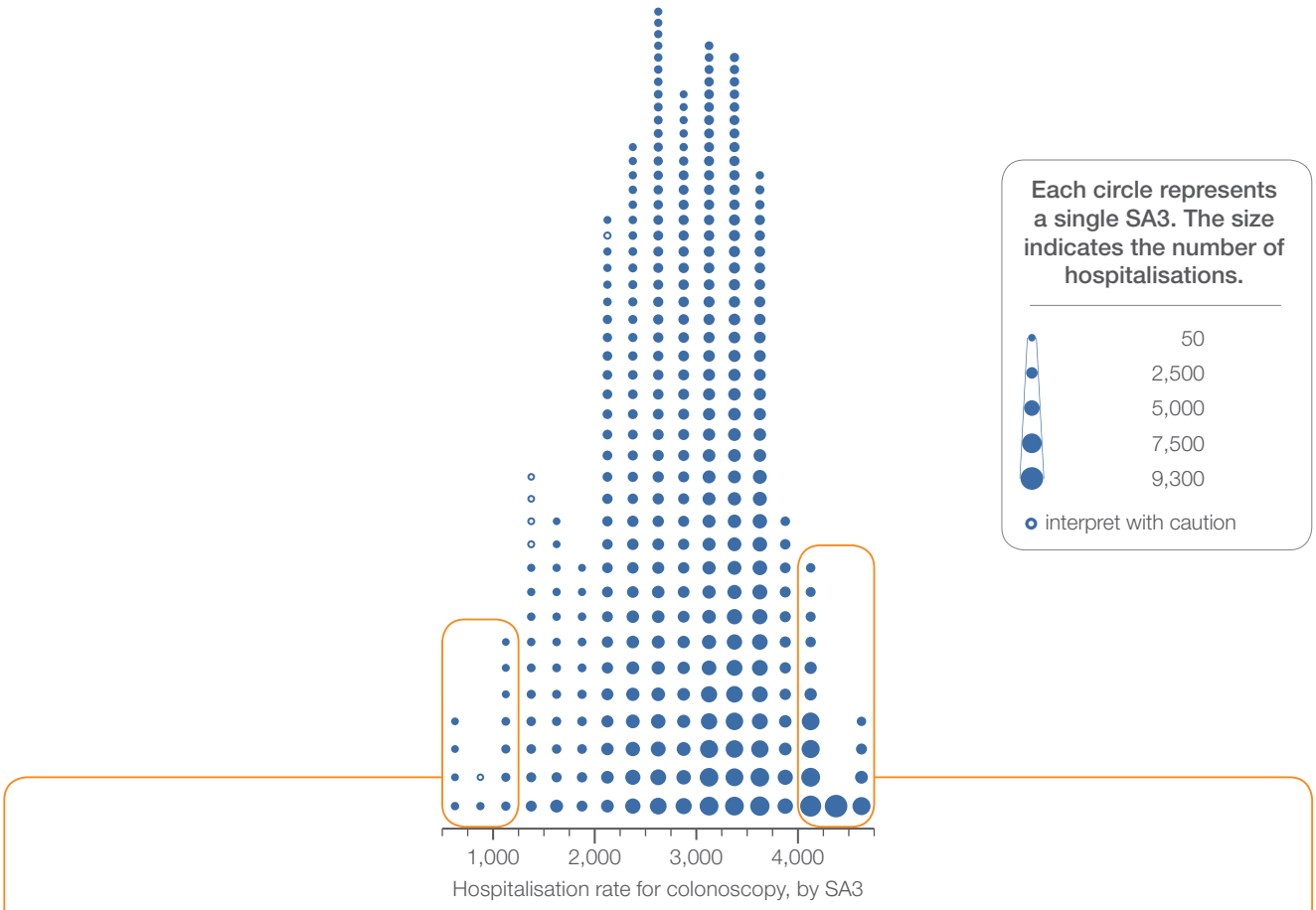
Increasing participation by Aboriginal and Torres Strait Islander Australians in the National Bowel Cancer Screening Program could improve survival rates, if matched by better access to treatment.

A New South Wales study of bowel cancer among Aboriginal and Torres Strait Islander Australians reported poorer survival than for other Australians, despite no obvious differences in the treatment or follow-up.[26] It is possible that small delays and differences in treatment, which could be due to cultural barriers, also contribute to poorer survival, in addition to other factors.[26]

More work is needed to identify and understand the reasons for the disparities between Aboriginal and Torres Strait Islander Australians and other Australians in bowel cancer screening and survival.

Rates by local area

Figure 2.3: Number of hospitalisations for colonoscopy per 100,000 people of all ages, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



Lowest rate areas

SA3	State	Rate	Hospitalisations
Woden Valley	ACT	**622**	244
Tuggeranong	ACT	**656**	586
Weston Creek	ACT	**673**	187
South Canberra	ACT	**724**	227
Baw Baw	Vic	**878**	543
Barkly	NT	**952***	48
Eyre Peninsula and South West	SA	**1,117**	782
Far North	Qld	**1,172**	342
Murray and Mallee	SA	**1,179**	1,149
Port Douglas - Daintree	Qld	**1,184**	175
Playford	SA	**1,186**	1,039
Outback - North and East	SA	**1,193**	350
Limestone Coast	SA	**1,194**	1,017

Highest rate areas

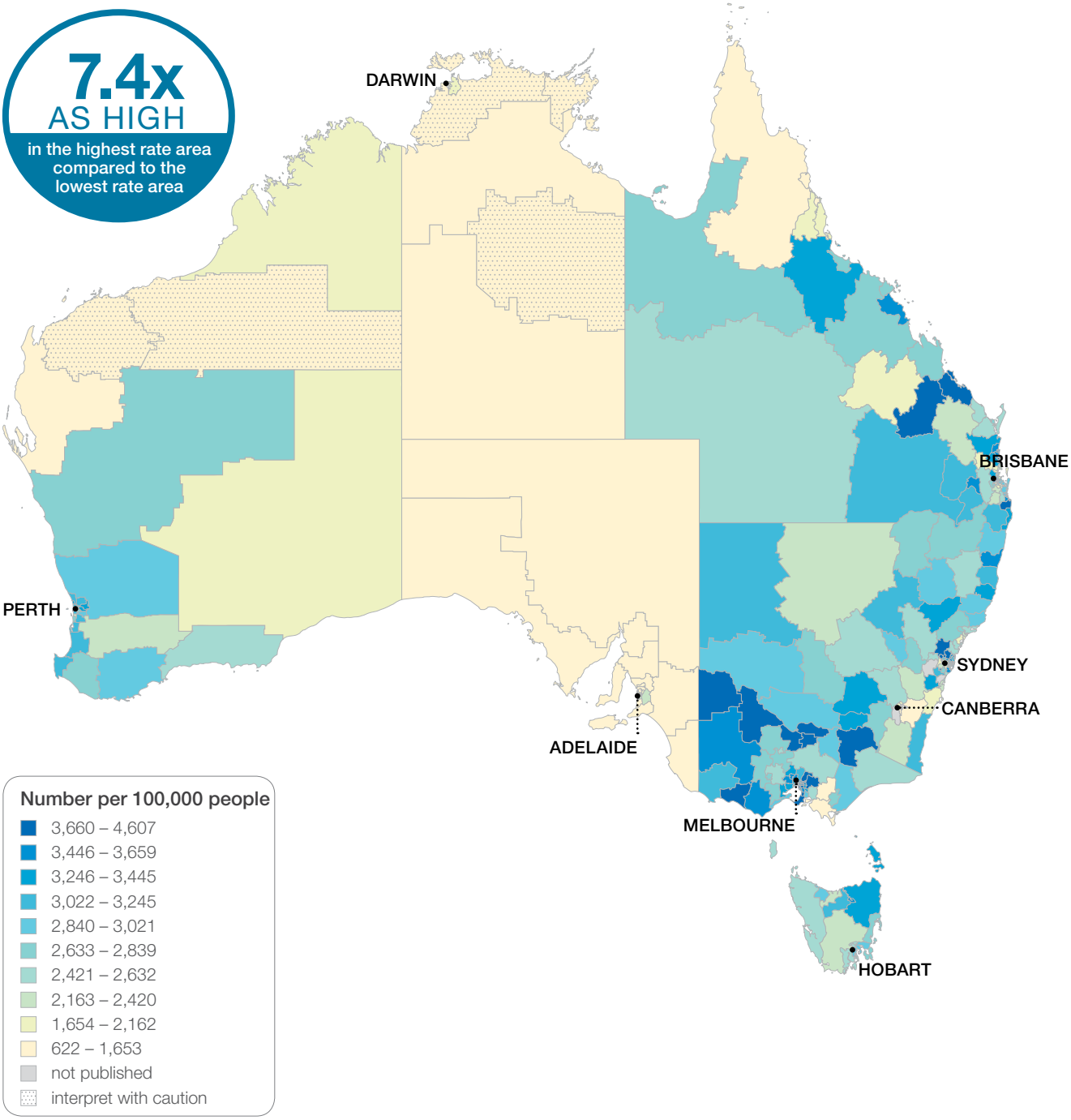
SA3	State	Rate	Hospitalisations
Hawkesbury	NSW	**4,607**	1,227
Shepparton	Vic	**4,579**	3,332
Eastern Suburbs - North	NSW	**4,547**	6,530
Campaspe	Vic	**4,534**	2,193
Mornington Peninsula	Vic	**4,357**	9,265
Richmond - Windsor	NSW	**4,241**	1,638
Rouse Hill - McGraths Hill	NSW	**4,195**	1,281
Moira	Vic	**4,142**	1,572
Monash	Vic	**4,139**	8,316
Frankston	Vic	**4,112**	6,312
Yarra Ranges	Vic	**4,036**	7,019
Stonnington - East	Vic	**4,035**	1,876
Whitehorse - East	Vic	**4,021**	2,949
Nillumbik - Kinglake	Vic	**4,001**	3,040
Glen Eira	Vic	**4,000**	6,558

Notes:
Hollow circles (○) and asterisks (*) indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
Data from a number of ACT private hospitals, which undertake some colonoscopies, were not provided to the National Hospital Morbidity Database. For this reason, data for the ACT should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Colonoscopy hospitalisations, all ages

Rates across Australia

Figure 2.4: Number of hospitalisations for colonoscopy per 100,000 people of all ages, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



Notes:
Dotted areas indicate rates that are considered more volatile than other published rates and should be interpreted with caution. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.
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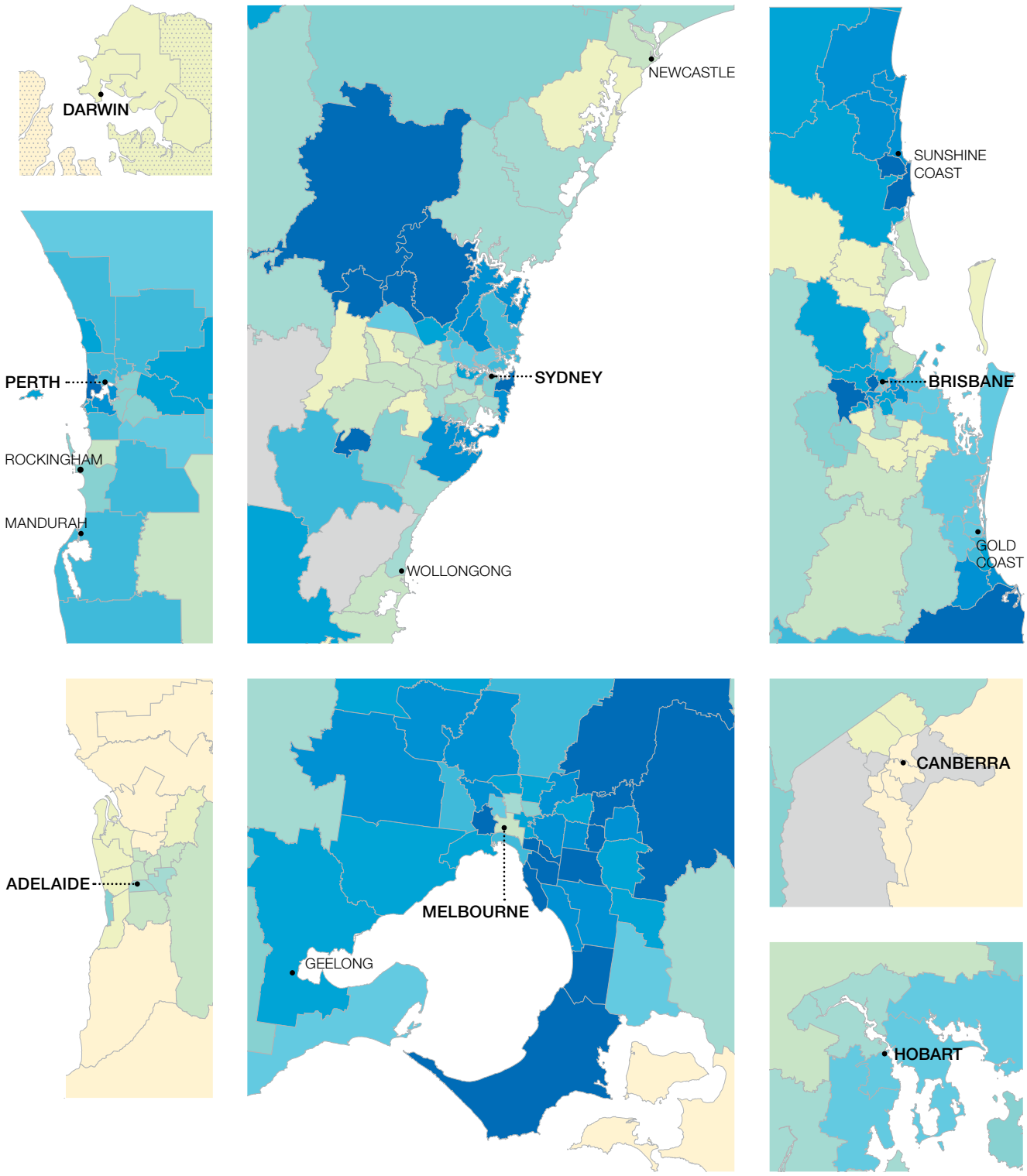
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Rates across capital city areas

Figure 2.5: Number of hospitalisations for colonoscopy per 100,000 people of all ages, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



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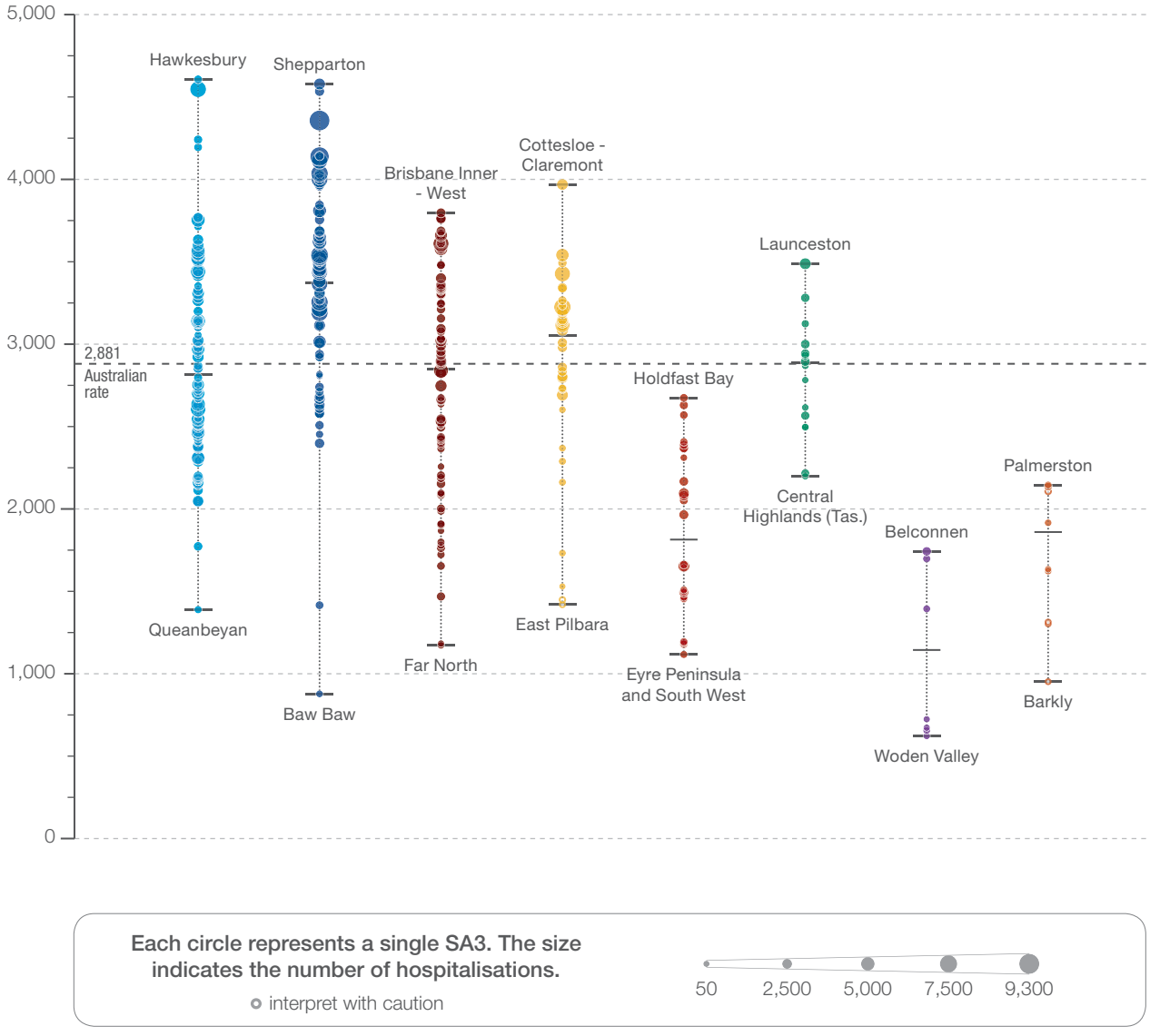
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Colonoscopy hospitalisations, all ages

Rates by state and territory

Figure 2.6: Number of hospitalisations for colonoscopy per 100,000 people of all ages, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Highest rate	4,607	4,579	3,797	3,969	2,674	3,488	1,743	2,146
State/territory	2,814	3,371	2,851	3,051	1,814	2,885	1,144	1,860
Lowest rate	1,389	878	1,172	1,420*	1,117	2,198	622	952*
No. hospitalisations	242,070	225,764	150,784	82,217	37,203	18,529	4,557	3,833



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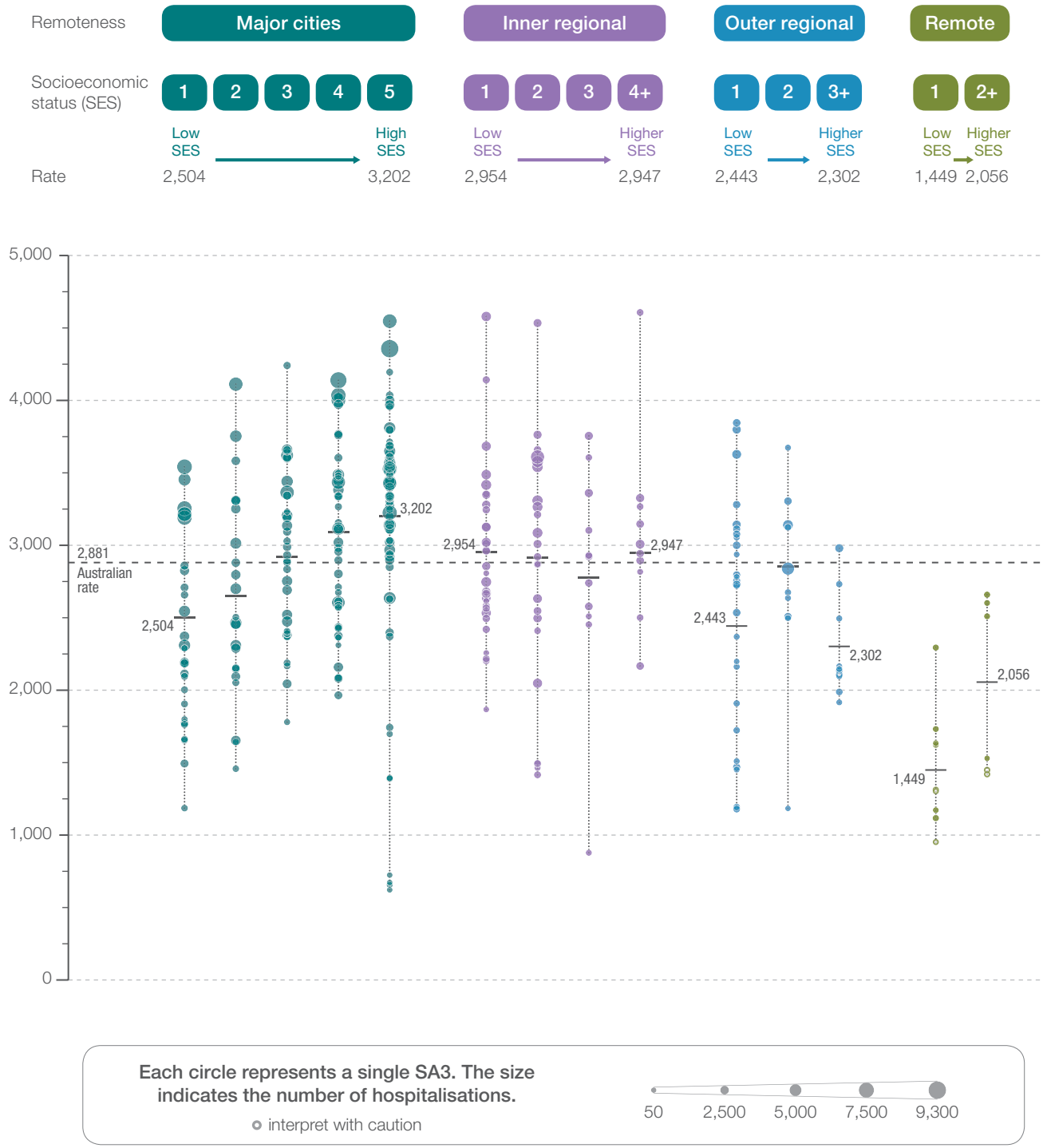
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Rates by remoteness and socioeconomic status

Figure 2.7: Number of hospitalisations for colonoscopy per 100,000 people of all ages, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



Notes:
Hollow circles (○) indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Colonoscopy hospitalisations, all ages

Resources

- Australian Commission on Safety and Quality in Health Care, Colonoscopy Clinical Care Standard[17]
- Australian Commission on Safety and Quality in Health Care, Colonoscopy Clinical Care Standard clinician and consumer fact sheets[27]
- Cancer Council Australia, *Clinical Practice Guidelines for the Prevention, Early Detection and Management of Colorectal Cancer*[28]
- Gastroenterological Society of Australia, IBS4GPs, an online IBS management tool for general practitioners[29]
- Cancer Council Australia, *Clinical Practice Guidelines for Surveillance Colonoscopy*[30]
- Royal Australian College of General Practitioners, *Guidelines for Preventive Activities in General Practice* (9th edition). Section 9.2: Colorectal cancer.[31]

Australian initiatives

The information in this chapter will complement work already under way to improve the use of colonoscopy in Australia. At a national level, this work includes:

- MBS Review Taskforce, review of MBS colonoscopy items[23]
- Australian Commission on Safety and Quality in Health Care, Colonoscopy Clinical Care Standard[17]
- Gastroenterological Society of Australia, Choosing Wisely recommendation 1: Do not repeat colonoscopies more often than recommended by the National Health and Medical Research Council (NHMRC) endorsed guidelines[32]
- Gastroenterological Society of Australia, online management tool for irritable bowel syndrome[29]
- Colorectal Surgical Society of Australia and New Zealand, Bi-National Colorectal Cancer Audit.

Many states and territory initiatives are also in place to improve the use of colonoscopy, including:

- Queensland Health, clinical prioritisation criteria for gastroenterology[33]
- Agency for Clinical Innovation, New South Wales, clinical priority categories for colonoscopy[34]
- NSW Cancer Institute, grants for research projects on access to bowel cancer screening services
- Department of Health, Tasmania, Patients First Colonoscopy Access Strategy
- Department of Health and Human Services, Victoria, *Colonoscopy Categorisation Guidelines*[20]
- Department of Health, Western Australia, *Colonoscopy Services Model of Care*.[19]

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2.2 Gastroscopy hospitalisations, all ages

Why is this important?

Gastroscopy is mainly used to investigate upper gastrointestinal symptoms such as heartburn. It is also used to exclude a diagnosis of cancer.[1-3] Rates of gastroscopy in Australia continue to rise despite the limited role of gastroscopy in reflux and dyspepsia; and low rates of oesophageal and stomach cancers.[4-8] Guidelines recommend acid suppression therapy or a 'test and treat' regimen for *Helicobacter pylori*, as first-line treatment for the management of upper gastrointestinal symptoms.[6-8] Guidelines recommend against use of gastroscopy to investigate uncomplicated reflux or dyspepsia in people at low risk of oesophageal or stomach cancer.[8] Australian data show a reduction in gastroscopy when guidelines are followed.[9] Improving adherence to guidelines and reducing the number of inappropriate referrals for gastroscopy could free up services for higher-yield procedures, such as colonoscopy for people with positive faecal occult blood tests.

What did we find?

The Atlas found the rate of hospitalisation for inpatient gastroscopy varies up to about seven-fold between local areas across Australia. The pattern of use suggests overuse of gastroscopy in some areas. Lower rates of gastroscopy in outer regional and remote areas raise concerns about a lack of access to gastroscopy in these areas. The low rates for Aboriginal and Torres Strait Islander Australians raise similar concerns.

What can be done?

Aligning Medicare Benefits Schedule (MBS) items for gastroscopy with evidence-based criteria, together with auditing against the revised items, are important strategies that could be used to reduce inappropriate use of gastroscopy. Prioritising patients waiting for either colonoscopy or gastroscopy as a single group, rather than having separate lists, could improve the diagnostic yield from these investigations and improve patient outcomes. Education and audit for referrers could be a useful tool for improving appropriate use of gastroscopy, as could structured referral forms. Consumer education for women about the importance of excluding heavy menstrual bleeding in the management of anaemia may reduce unnecessary gastroscopy in this group.

Gastroscopy hospitalisations, all ages

Context

Gastroscopy (or upper gastrointestinal endoscopy) involves inserting a flexible tube with a camera (an endoscope) through the mouth into the oesophagus, stomach or duodenum.[1,2] The procedure is used to investigate signs and symptoms of upper gastrointestinal disease, including iron deficiency, difficulty swallowing and possible cancer.[1,3] Gastroscopy is also used to treat upper gastrointestinal conditions, monitor chronic conditions and perform biopsies (for example, for suspected coeliac disease).[1,3] Therapeutic gastroscopies are not included in this data item.

Guidelines recommend against using gastroscopy to investigate uncomplicated reflux or dyspepsia in people at low risk of oesophageal or stomach cancer, such as people under 55 years of age.[8,10] This is because most people with upper gastrointestinal symptoms can be effectively treated without investigation and do not have any abnormalities visible on gastroscopy.[6,8] Also, upper gastrointestinal cancers are rare, particularly before 55 years of age (Figure 2.8).[6,8]

Gastroscopy is recommended for excluding a diagnosis of cancer in people at risk, such as those aged over 55 years with signs and symptoms suggestive of cancer.[8,10] Risk factors for stomach and oesophageal cancer include smoking, alcohol and dietary factors.[5] Stomach cancer is also associated with *Helicobacter pylori* infection.[11]

Rates of upper gastrointestinal cancer are relatively low in Australia. For example, in 2017, the estimated age-standardised incidence per 100,000 people for oesophageal cancer was 8.4 for men and 3.0 for women; the estimated age-standardised incidence for stomach cancer was 10.9 for men and 5.2 for women.[12] In comparison, the estimated age-standardised incidence for bowel cancer in 2017 was 67.3 for men and 49.4 for women.[12] Aboriginal and Torres Strait Islander Australians have a higher age-standardised incidence of oesophageal cancer per 100,000 people than other Australians (11.5 compared with 5.2 in 2009–2013) and a higher incidence of stomach cancer (12.2 compared with 7.8 in 2009–2013).[13]

Although the age-standardised incidence of stomach cancer per 100,000 people has fallen in Australia (from 9.4 to 8.0 between 2004 and 2014) and that of oesophageal cancer is relatively stable (5.9 in 2004 and 5.4 in 2014)[14], the rate of gastroscopy is continuing to rise.[4] The crude rate of MBS-subsidised gastroscopy per 100,000 people grew by 3% per year in Australia between 2008 and 2017.[15] In 2016–17, gastroscopy was the sixth most common same-day procedure in Australian hospitals.[16]

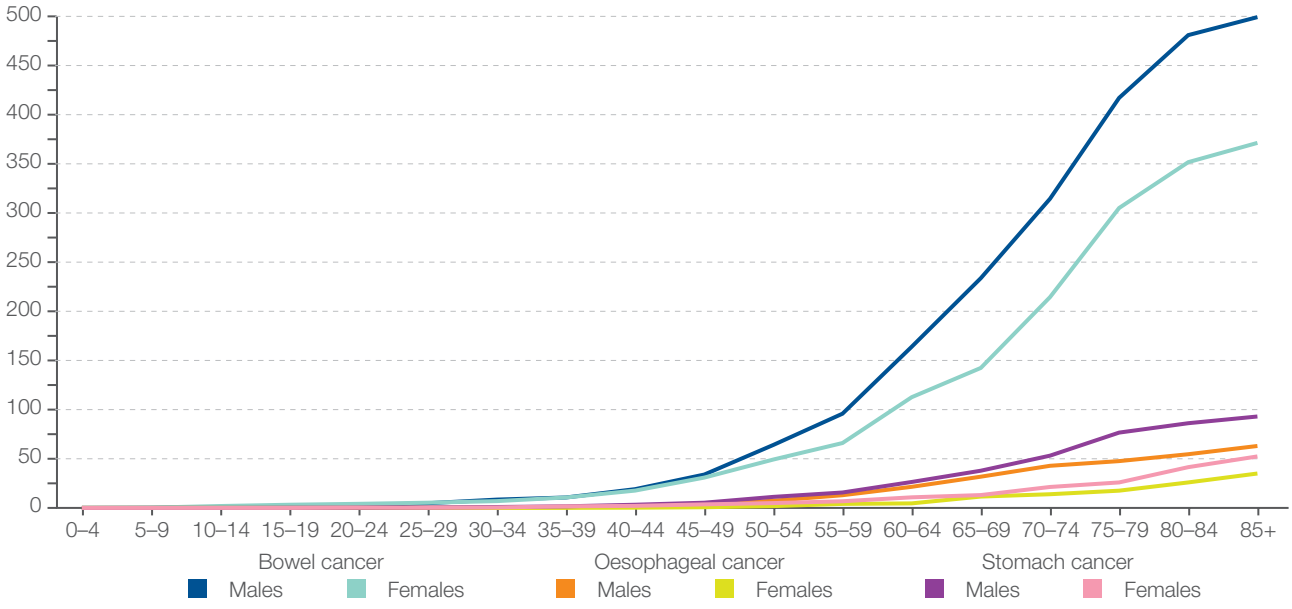
There are few international comparisons of gastroscopy rates. In 2014–15, the crude rate of gastroscopy in Australia was 1,629 MBS-subsidised services per 100,000 people[15], while the age-, sex- and deprivation-standardised rate in England for the same year was 1,331 per 100,000 people.[17]

Use of gastroscopy was included in a recent New South Wales analysis of low-value care in public hospitals – that is, care that is unlikely to provide benefit to patients, or care for which risks exceed benefit or added costs do not provide proportional added benefit.[18,19] The authors found that, in 2016–17, approximately 14% of gastroscopies in adults under 55 years of age in New South Wales public hospitals fitted the criteria for low-value care and cost approximately $11 million.[18] In addition, the rate of low-value gastroscopy was reported to be increasing: the proportion of gastroscopies in New South Wales public hospitals that were assessed as low value rose by approximately 8% annually between 2010–11 and 2016–17.[18]

Overuse of gastroscopy has also been studied internationally, with estimated rates of inappropriate requesting ranging from 7.5% to 54%.[20,21] According to a 2018 study in the United Kingdom, gastroscopy for inappropriate indications is one of the top five most costly and commonly performed interventions that offer little benefit.[22]

The five-year survival rate for stomach and oesophageal cancer is substantially lower than for bowel cancer[12], and concerns about late diagnosis and medico-legal issues may contribute to over-testing. Although diagnostic gastroscopy has a relatively low rate of adverse events (between 1 in 200 and 1 in 10,000)[23], the risks still need to be considered, particularly when the diagnostic yield in patients without alarm symptoms is also very low. Even in the presence of Barrett's oesophagus, which can progress to oesophageal cancer, guidelines note that the harms of surveillance with gastroscopy may outweigh the benefits for some patients who do not have additional risk factors.[7]

Figure 2.8: Incidence of bowel cancer, oesophageal cancer and stomach cancer per 100,000 people, by age group and sex, in Australia, 2014



Sources: Australian Institute of Health and Welfare. Australian Cancer Incidence and Mortality (ACIM) books: colorectal cancer, stomach cancer, oesophageal cancer. Canberra: AIHW; 2017.

Gastroscopy hospitalisations, all ages

About the data

Data were sourced from the National Hospital Morbidity Database (NHMD), and include admitted patients in both public and private hospitals throughout Australia. Rates are based on the number of hospitalisations for gastroscopy per 100,000 people of all ages in 2016–17.

Because a record is included for each hospitalisation for the procedure rather than for each patient, patients hospitalised for the 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 comparisons between populations with different age and sex structures.

The NHMD includes data on people admitted to hospital as day patients or overnight, but does not include data on people who are not admitted to hospital. While the MBS database includes data on people who receive an MBS-subsidised service whether or not they are admitted, no national data are available on the number of non-admitted (that is, outpatient) gastroscopies funded publicly under a hospital budget. Therefore, it is not possible to get a complete picture of all gastroscopy activity across Australia.

Limitations of the data source may account for some variations seen.

Same-day procedure admission policies

States and territories differ in their admission policies for same-day procedures. As gastroscopies for non-admitted publicly funded patients are not included in the data shown, variation in admission policies is expected to contribute to variation in gastroscopy rates between states and territories. For example, in 2013–14 in Western Australia and Victoria, almost all endoscopy procedures occurred as admitted patient care, so the data shown should be a near complete count of gastroscopies in these states.[24] In contrast, many gastroscopies in South Australia occurred as non-admitted care, and so the data shown are likely to be an under-count.

In Tasmania, procedures that are bulk-billed are coded as non-admitted episodes. This will lead to an underestimate of gastroscopy rates. A substantial proportion of public patients accessing Tasmanian public hospitals may be bulk-billed and therefore not represented in the data.

Aboriginal and Torres Strait Islander identification

The identification of Aboriginal and Torres Strait Islander patients may not be accurate for all admissions, and processes for seeking and recording identification may vary among states and territories. Therefore, the data shown may under-count the number of Aboriginal and Torres Strait Islander Australians hospitalised for gastroscopy.

What do the data show?

Magnitude of variation

In 2016–17, there were 505,544 hospitalisations for gastroscopy, representing 1,931 hospitalisations per 100,000 people of all ages (the Australian rate).

The number of hospitalisations for gastroscopy across 328* local areas (Statistical Area Level 3 – SA3) ranged from 444 to 3,297 per 100,000 people of all ages. The rate was **7.4 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 701 per 100,000 people of all ages in the Australian Capital Territory to 2,259 in Victoria (Figures 2.12–2.15).

After the highest and lowest 10% of results were excluded and 264 SA3s remained, the number of hospitalisations per 100,000 people of all ages was 2.1 times as high in the area with the highest rate compared to the area with the lowest rate.

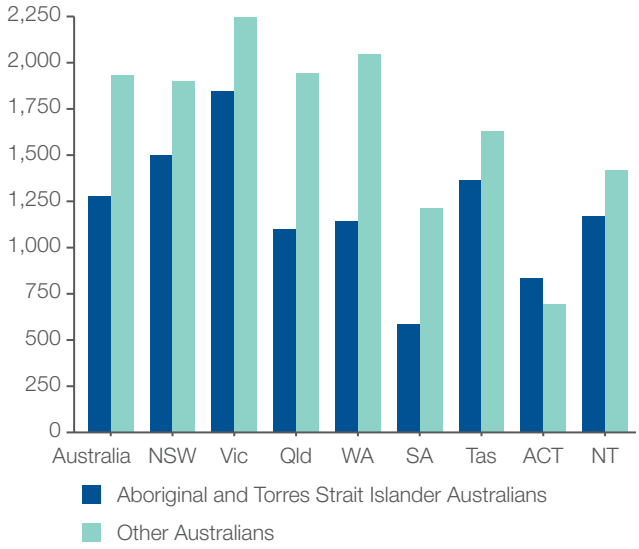
Analysis by remoteness and socioeconomic status

Rates of hospitalisation for gastroscopy were higher in major cities and inner regional areas than in outer regional and remote areas. Rates were lower in areas with lower socioeconomic status in major cities and remote areas. However, there was no clear pattern according to socioeconomic status in other remoteness categories (Figure 2.16).

Analysis by Aboriginal and Torres Strait Islander status

The rate for Aboriginal and Torres Strait Islander Australians (1,279 per 100,000 people) was 34% lower than the rate for other Australians (1,934 per 100,000 people) (Figure 2.9).

Figure 2.9: Number of hospitalisations for gastroscopy per 100,000 people of all ages, age and sex standardised, by state and territory of patient residence, by Aboriginal and Torres Strait Islander status, 2016–17



The data for Figure 2.9 are available at www.safetyandquality.gov.au/atlas.

* There are 340 SA3s. For this item, data were suppressed for 12 SA3s due to a small number of hospitalisations and/or population in an area.

Notes:

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.

Data from a number of ACT private hospitals, which undertake some gastroscopies, were not provided to the National Hospital Morbidity Database. For this reason, data for ACT should be interpreted with caution.

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

Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Gastroscopy hospitalisations, all ages

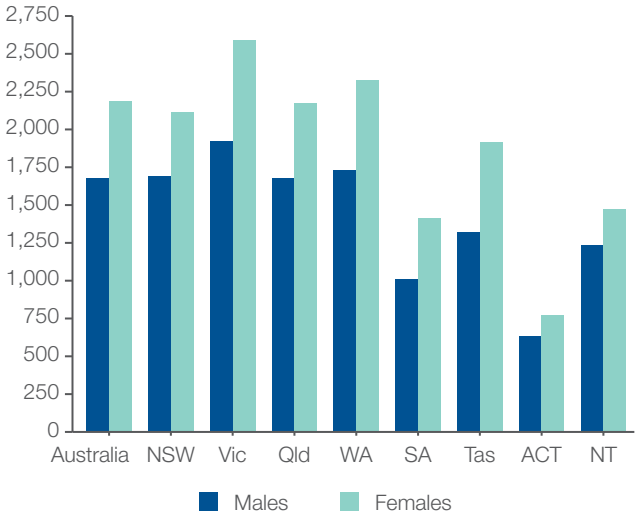
Analysis by sex

The rate of hospitalisations for gastroscopy was 1.3 times as high in females as in males.

In 2016–17, there were 220,687 hospitalisations for gastroscopy for males of all ages, representing 1,673 hospitalisations per 100,000 males (the Australian rate). The number of hospitalisations varied across states and territories, from 632 per 100,000 males in the Australian Capital Territory to 1,923 per 100,000 in Victoria.

In 2016–17, there were 284,857 hospitalisations for gastroscopy in females of all ages, representing 2,185 hospitalisations per 100,000 females (the Australian rate). The number of hospitalisations varied across states and territories, from 769 per 100,000 females in the Australian Capital Territory to 2,590 per 100,000 in Victoria (Figure 2.10).

Figure 2.10: Number of hospitalisations for gastroscopy per 100,000 people of all ages, age standardised, by state and territory of patient residence, by sex, 2016–17

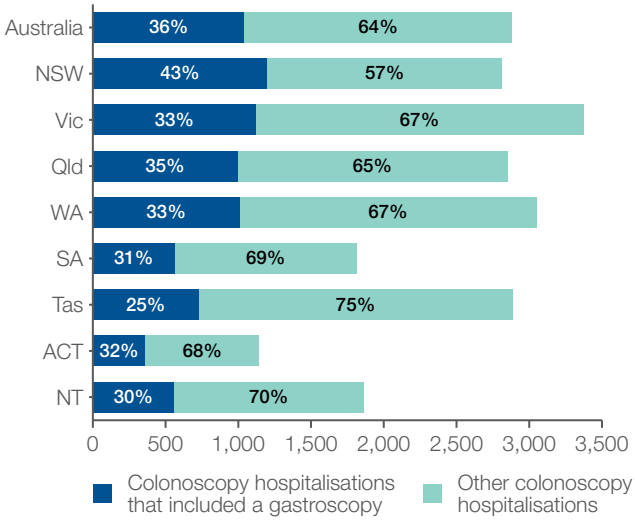


The data for Figure 2.10 are available at www.safetyandquality.gov.au/atlas.

Gastroscopy and colonoscopy during the same hospitalisation

In 2016–17, 36% of hospitalisations for colonoscopy included a gastroscopy. There were 274,559 hospitalisations for colonoscopy that also included gastroscopy, representing 1,044 hospitalisations per 100,000 people of all ages (the Australian rate). The number of hospitalisations varied across states and territories, from 362 per 100,000 people in the Australian Capital Territory to 1,200 per 100,000 people in New South Wales (Figure 2.11).

Figure 2.11: Number of hospitalisations for colonoscopy per 100,000 people of all ages, age and sex standardised, by state and territory of patient residence and same hospitalisation included a gastroscopy, 2016–17



The data for Figure 2.11 are available at www.safetyandquality.gov.au/atlas.

Notes:
Data from a number of ACT private hospitals, which undertake some colonoscopies and gastroscopies, were not provided to the National Hospital Morbidity Database. For this reason, data for the ACT should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Interpretation

The patterns of gastroscopy use suggest possible underuse in some parts of the population and overuse in others. Lower rates of gastroscopy in outer regional and remote areas raise concerns about a possible lack of appropriate access to gastroscopy in these areas. The low rates for Aboriginal and Torres Strait Islander Australians raise similar concerns.

Variation is warranted and desirable when it reflects variation in the underlying need for care. The use of gastroscopy should reflect the distribution of symptoms of upper gastrointestinal cancer and other conditions for which gastroscopy is appropriate. The pattern in major cities, where there is greater use of gastroscopy in areas of higher socioeconomic status, does not reflect need. Upper gastrointestinal symptoms and gastro-oesophageal reflux disease (GORD) are more common in low socioeconomic groups.[25-28] Smoking and obesity, which are risk factors for upper gastrointestinal symptoms and cancers, are also more common in lower socioeconomic groups.[7,29] Overall, the pattern of use does not reflect the burden of disease, suggesting a component of unwarranted variation.

Data artefacts may account for some of the disparity, as people from areas of lower socioeconomic status may be higher users of non-admitted public hospital services and therefore may be under-counted. However, this is unlikely to explain all of the association. Public–private partnership models may also influence patterns of gastroscopy use.

The Atlas has also found a clear anomaly between cancer burden and use of investigations for gastrointestinal diseases in Australia. The national rate for colonoscopy hospitalisations is about 1.5 times that for gastroscopy hospitalisations (2,881 per 100,000 compared with 1,931 per 100,000), yet the incidence of colorectal cancer is about 7 times that of stomach cancer and about 11 times that of oesophageal cancer.[15] This anomaly and other patterns observed in the data raise concern about the appropriateness of this use.

The higher rate of gastroscopy in females than in males (2,185 per 100,000 versus 1,673 per 100,000) may reflect higher rates of iron deficiency in females (due to heavy menstrual bleeding), as gastroscopy is recommended to investigate some cases of iron deficiency.[30] Management of heavy menstrual bleeding according to the Australian Heavy Menstrual Bleeding Clinical Care Standard may reduce rates of unnecessary gastroscopy in premenopausal women.[31] Functional dyspepsia is also more common in women, and gastroscopy may be used to rule out organic causes.[32,33]

Clinical decision-making

Variation in adherence to guidelines may influence use of gastroscopy. According to a meta-analysis, an estimated 22% of referrals for gastroscopy are inappropriate (as defined by United States and European guidelines).[22] It is likely that inappropriate gastroscopy for people aged 55 years and under contributes to variation in rates seen in Australia. Australian and United States guidelines recommend that young patients with longstanding mild reflux symptoms and no alarm symptoms be trialled with acid suppression therapy without having gastroscopy.[11,34]

Access to endoscopy services

Availability and affordability of endoscopy services are likely to influence the pattern of gastroscopy use. Open access endoscopy services are likely to increase the rates of gastroscopy in areas where these services are available, because general practitioners (GPs) are effectively able to request a gastroscopy without further review from a specialist. Statewide triage systems for endoscopy, such as those in Western Australia and Victoria, may increase access to gastroscopy for urgent indications, but also reduce access for use that is not supported by evidence.

Gastroscopy hospitalisations, all ages

Rates of private health insurance

Access to gastroscopy is likely to be greater for people with private health insurance. This may explain the lower rate of use in areas of socioeconomic disadvantage in major cities.

Other factors

Differences in clinical opinion on management where evidence is unclear may also contribute to variation. Many clinicians are uncertain about the value of gastroscopy in screening and surveillance for Barrett's oesophagus, and this may be contributing to the variation seen. Although the risk of someone with Barrett's oesophagus developing oesophageal cancer is at least 30 times as high as that for the general population, the absolute risk of developing cancer for a patient with non-dysplastic Barrett's oesophagus is low; recent studies suggest rates close to 0.22% per year.[35]

In suspected coeliac disease, gastroscopy is necessary to obtain a biopsy for confirmation of the diagnosis.[36] Coeliac disease affects approximately 1 in 100 Australians, and is often unrecognised.[37,38] It is not clear what proportion of gastroscopies in Australia are requested for investigating suspected coeliac disease.

Variation in rates of gastroscopy between areas 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.

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

Unwarranted variation in use of gastroscopy would be addressed by reducing the rate of inappropriate gastroscopies and increasing access in areas that are currently under-served. Australia's finite health resources should be directed to high-value care, and away from low-value care such as gastroscopy in situations where it will not change management. Reducing the number of inappropriate referrals for gastroscopy could free up resources to help reduce waiting times for public colonoscopy services in Australia.

Improving preventive care could also reduce unwarranted variation. For example, risk factors for gastro-oesophageal reflux include obesity, dietary factors and smoking. Addressing these risk factors as the first step could reduce the incidence of reflux, reduce the incidence of symptoms that do not respond to treatment and the risk of developing Barrett's oesophagus, and reduce the need for gastroscopy.

Review of MBS item descriptions

Aligning MBS item descriptions for gastroscopy with evidence- and consensus-based criteria, and likely yield, and auditing against the revised items, are important strategies that could be used to reduce inappropriate use of gastroscopy. Most patients with upper gastrointestinal symptoms can be effectively managed without gastroscopy, and long-term follow-up shows that most patients with these symptoms have a benign course.[34,39] United States guidelines recommend reserving gastroscopy for specific indications, including:

- Upper abdominal symptoms that persist despite an appropriate trial of therapy
- Upper abdominal symptoms associated with other symptoms or signs suggesting structural disease (for example, weight loss) or new-onset symptoms in patients over 50 years of age
- Difficulty swallowing
- Persistent vomiting of unknown cause.[40]

Education and clinical audit

An Australian study of GPs found that participation in clinical self-audit against Gastroenterological Society of Australia recommendations improved management of GORD.[9] Referral for gastroscopy fell from 48% to 45% of patients during the audit program, and other aspects of management improved – for example, identification of risk factors for exacerbations (including medications), and recommendations for lifestyle modifications such as weight loss and dietary changes.[9] Clinical audit is a valuable tool, which could be used more widely to increase appropriate use of gastroscopy in Australia.

Using guidelines to assess the appropriateness of referrals for gastroscopy could increase the diagnostic yield, according to a New Zealand study of an open access gastroscopy service.[41] The study was prompted by concerns about an increase in inappropriate referrals with a low positive yield, and a consequent increase in waiting times for patients with potentially serious disease.[41] The analysis found that 42% of referrals were inappropriate, according to American Society of Gastroenterology criteria.[41] For hospital-based consultants, surveillance of healed benign lesions was the most common inappropriate reason to request gastroscopy (31% of consultant requests); for GPs, symptoms considered functional were the most common inappropriate reason (25% of GP requests).[41]

Targeting both gastroenterologists and GPs for educational programs could improve the appropriateness of requests for gastroscopy. Education could include information about the low yield of gastroscopy for simple upper gastrointestinal symptoms, and when surveillance is appropriate. Structured referral forms listing the appropriate indications for gastroscopy could serve two purposes: educating referrers and providing a basis for rejecting inappropriate referrals. Education for consumers and GPs about the limited role for gastroscopy in reflux and functional dyspepsia could also improve appropriateness of use. Similarly, consumer education about lifestyle changes to reduce the risk of gastro-oesophageal reflux would be valuable.

Concurrent gastroscopy and colonoscopy

The high rate of patients undergoing gastroscopy and colonoscopy during the same hospitalisation warrants closer scrutiny. Both investigations are indicated in only a limited number of conditions, so the high rates reported suggest some inappropriate use. The MBS Review Taskforce recommended that the Gastroenterological Society of Australia consider the need for guidelines on the appropriate concurrent use of upper and lower gastrointestinal endoscopy.[42] See page 81 for analysis of colonoscopy services in Australia.

Concurrent gastroscopy and colonoscopy is used to investigate the cause of iron deficiency in patients, including premenopausal women.[43] Improving management of heavy menstrual bleeding, and adherence to the Heavy Menstrual Bleeding Clinical Care Standard[31], may reduce the number of women presenting with iron deficiency, and reduce the number unnecessarily investigated with gastroscopy and colonoscopy. Similarly, better management of functional gastrointestinal conditions could reduce unnecessary gastroscopy and colonoscopy.

Barrett's oesophagus surveillance

There is a low level of evidence to support surveillance gastroscopy for patients with Barrett's oesophagus to prevent oesophageal cancer.[44,45] The cost-effectiveness of this strategy has been questioned, given the very low risk of progression to cancer in some patients.[46,47] Stopping surveillance in subgroups of patients with a very low risk of progression to cancer could result in more effective use of healthcare resources.[46] This should be complemented by addressing risk factors such as smoking, obesity and uncontrolled gastro-oesophageal reflux symptoms. A variety of biomarkers for identifying patients with Barrett's oesophagus who are most at risk of developing oesophageal cancer are currently under investigation.[47]

Gastroscopy hospitalisations, all ages

Appropriate prioritisation of colonoscopy and gastroscopy

Gastroscopies and colonoscopies are often performed by the same specialists and on the same procedural list. Resources for endoscopy may be better used by prioritising patients for gastroscopy or colonoscopy according to urgency within the combined patient group, rather than within the two separate groups. Colonoscopy for patients with a positive faecal occult blood test (and therefore a relatively high risk of cancer) could then be prioritised over gastroscopy for patients with a low likelihood of findings that would change management. Bowel cancer is much more common than cancer of the upper gastrointestinal tract, but gastroscopies currently may be inappropriately prioritised over more clinically important colonoscopies, thus contributing to access problems. One way to examine whether this is happening at a local level would be to explore the volume of each procedure being undertaken and the pathology yield rates for both colonoscopy and gastroscopy.

Western Australia and Victoria have introduced triage systems to improve use of endoscopy services.[48-50] Queensland has also introduced clinical prioritisation criteria for many clinical areas, including gastroenterology, to triage patients referred to public specialist outpatient services.[51] Wider use of such systems could result in more appropriate prioritisation of gastroscopy and colonoscopy.

Consumer education

Informing younger patients of their very low risk of stomach and oesophageal cancer may reduce the demand for inappropriate gastroscopy. In men under 50 years of age, the incidence of stomach cancer is less than 7 per 100,000, and the incidence of oesophageal cancer is less than 4 per 100,000.[12] In women under 50 years of age, the incidence of stomach cancer is less than 4 per 100,000, and the incidence of oesophageal cancer is less than 1 per 100,000.[12]

Consumer education for women about the importance of excluding heavy menstrual bleeding in the management of anaemia may reduce unnecessary gastroscopy in this group.

Reducing risk factors

Reducing risk factors for upper gastrointestinal cancer would reduce the burden of disease, and reduce the overall need for gastroscopy. Intensifying public health initiatives to reduce smoking, obesity and excessive alcohol consumption in high-risk groups should be a priority.

Aboriginal and Torres Strait Islander Australians and gastroscopy

Aboriginal and Torres Strait Islander Australians[13]:

- Are 1.5 times as likely as other Australians to be diagnosed with stomach cancer and 1.8 times as likely to die from it
- Are 2.2 times as likely as other Australians to be diagnosed with oesophageal cancer and 1.8 times as likely to die from it
- Have, on average, a 20% chance of surviving for five years after being diagnosed with stomach cancer, compared with an average 28% chance for other Australians.

Improving access to gastroscopy for Aboriginal and Torres Strait Islander Australians with symptoms suggesting stomach or oesophageal cancer could potentially improve survival after diagnosis. Aboriginal and Torres Strait Islander Australians have a lower rate of procedures when hospitalised, than other Australians (62% versus 81%).[52] This disparity is likely to reflect a range of factors, such as[52]:

- Lack of private health insurance
- Comorbidities
- Clinical judgements about post-procedural compliance
- Communication and cultural issues.

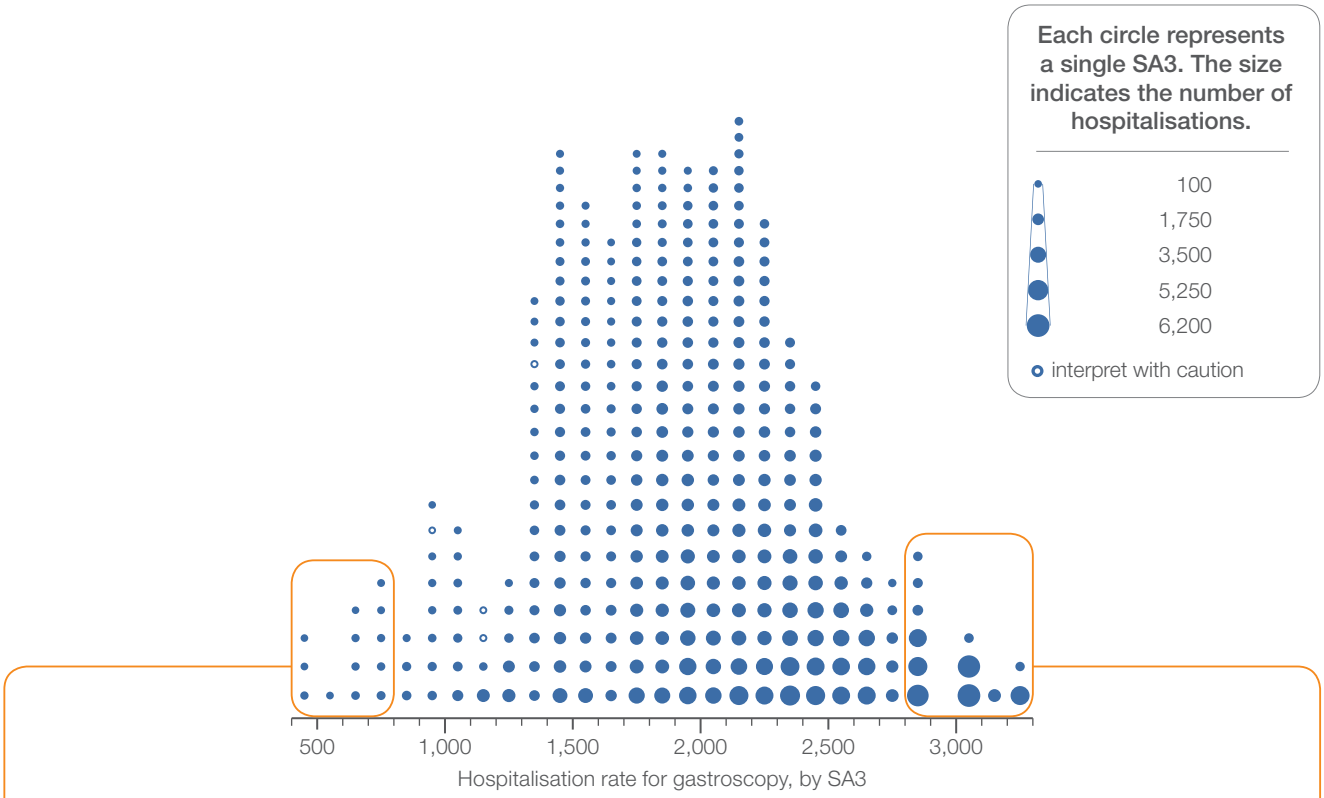
To better understand the reasons for lower rates of procedures such as gastroscopy for Aboriginal and Torres Strait Islander Australians, detailed analysis is needed to understand the population's needs and potential solutions in specific settings.[53] This could be done, for example, through hospital-level research that fulfils the criteria for Action 1[28] in the Governance standard of the National Safety and Quality Health Service Standards (second edition).[54]

Increasing appropriate publicly funded access to gastroscopy, as well as culturally safe care, should be prioritised to improve care for Aboriginal and Torres Strait Islander Australians with symptoms requiring gastroscopy. Improving prevention through reducing risk factors is also fundamental to reducing rates of stomach and oesophageal cancer in Aboriginal and Torres Strait Islander Australians.

Gastroscopy hospitalisations, all ages

Rates by local area

Figure 2.12: Number of hospitalisations for gastroscopy per 100,000 people of all ages, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



Lowest rate areas

SA3	State	Rate	Hospitalisations
Weston Creek	ACT	**444**	118
Woden Valley	ACT	**450**	172
Tuggeranong	ACT	**471**	406
South Canberra	ACT	**533**	158
Eyre Peninsula and South West	SA	**602**	417
Baw Baw	Vic	**625**	381
Port Douglas - Daintree	Qld	**632**	89
Limestone Coast	SA	**682**	551
Murray and Mallee	SA	**722**	668
Queanbeyan	NSW	**737**	446
North Canberra	ACT	**774**	377
Far North	Qld	**797**	230
Outback - North and East	SA	**799**	232

Highest rate areas

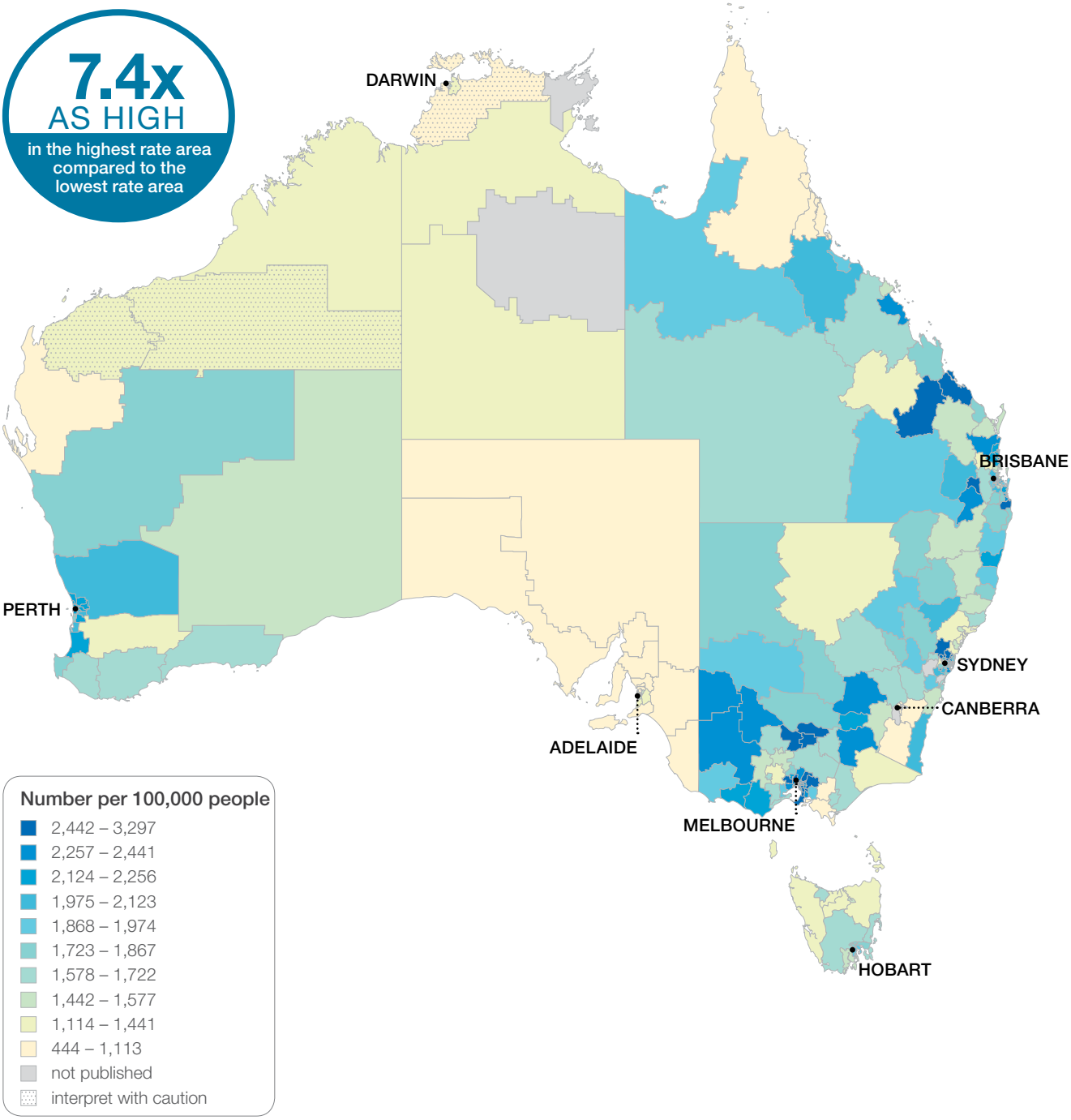
SA3	State	Rate	Hospitalisations
Eastern Suburbs - North	NSW	**3,297**	4,705
Hawkesbury	NSW	**3,208**	832
Shepparton	Vic	**3,142**	2,232
Dandenong	Vic	**3,039**	6,195
Monash	Vic	**3,036**	6,061
Rouse Hill - McGraths Hill	NSW	**3,021**	924
Campaspe	Vic	**2,892**	1,358
Frankston	Vic	**2,853**	4,304
Mornington Peninsula	Vic	**2,823**	5,764
Yarra Ranges	Vic	**2,822**	4,731
Richmond - Windsor	NSW	**2,808**	1,076
Dural - Wisemans Ferry	NSW	**2,800**	869

Notes:
Hollow circles (○) indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
Data from a number of ACT private hospitals, which undertake some gastroscopies, were not provided to the National Hospital Morbidity Database. For this reason, data for the ACT should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Gastroscopy hospitalisations, all ages

Rates across Australia

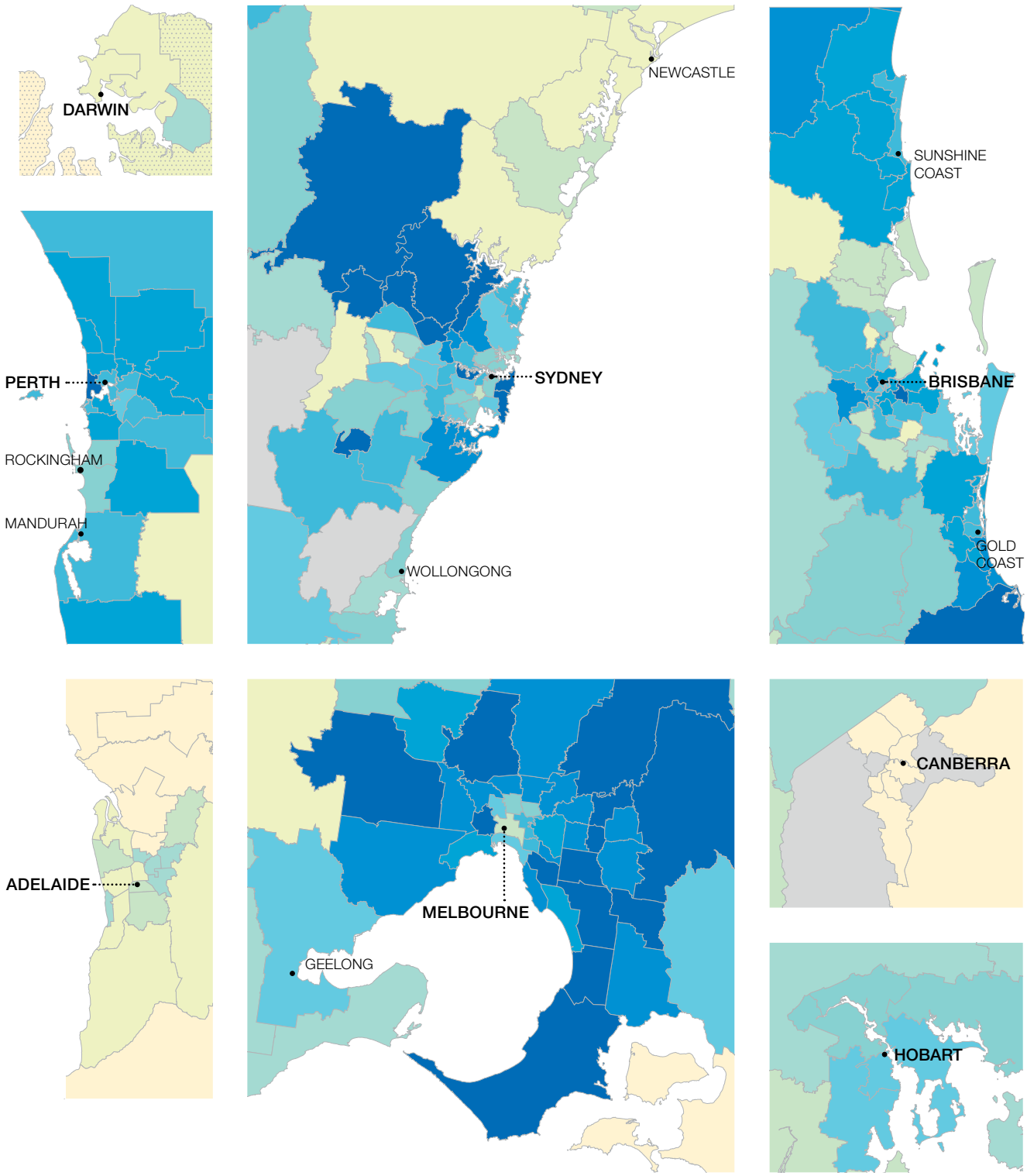
Figure 2.13: Number of hospitalisations for gastroscopy per 100,000 people of all ages, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



Notes:
Dotted areas indicate rates that are considered more volatile than other published rates and should be interpreted with caution. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.
Data from a number of ACT private hospitals, which undertake some gastroscopies, were not provided to the National Hospital Morbidity Database. For this reason, data for the ACT should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Rates across capital city areas

Figure 2.14: Number of hospitalisations for gastroscopy per 100,000 people of all ages, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



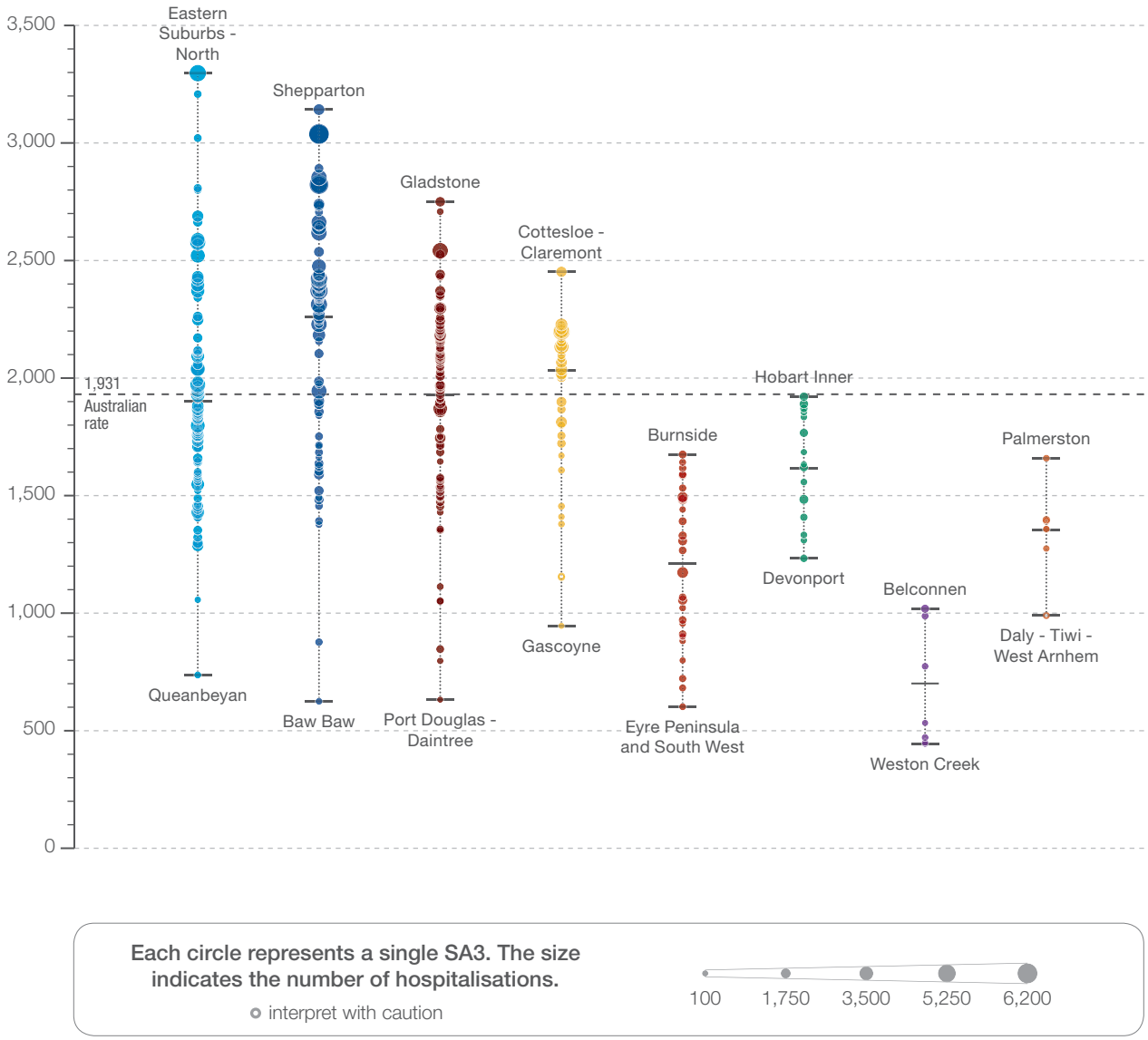
Notes:
Dotted areas indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
Data from a number of ACT private hospitals, which undertake some gastroscopies, were not provided to the National Hospital Morbidity Database. For this reason, data for the ACT should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Gastroscopy hospitalisations, all ages

Rates by state and territory

Figure 2.15: Number of hospitalisations for gastroscopy per 100,000 people of all ages, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17

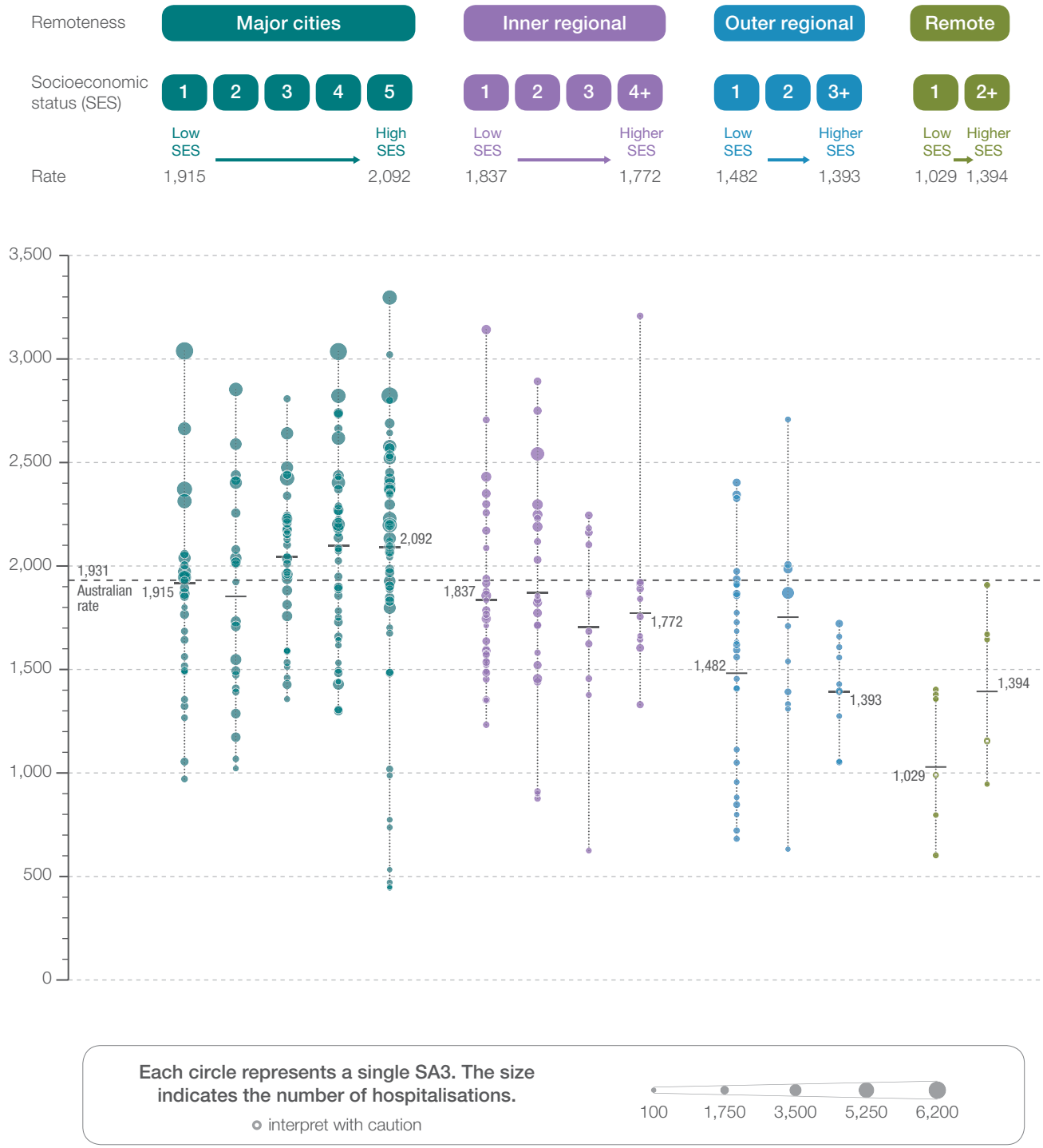
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Highest rate	3,297	3,142	2,750	2,452	1,675	1,921	1,019	1,659
State/territory	1,903	2,259	1,927	2,031	1,211	1,618	701	1,355
Lowest rate	737	625	632	946	602	1,233	444	990*
No. hospitalisations	161,454	149,455	100,437	54,039	24,009	10,077	2,784	2,822



Notes:
Hollow circles (○) and asterisks (*) indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
Data from a number of ACT private hospitals, which undertake some gastroscopies, were not provided to the National Hospital Morbidity Database. For this reason, data for the ACT should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Rates by remoteness and socioeconomic status

Figure 2.16: Number of hospitalisations for gastroscopy per 100,000 people of all ages, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



Notes:
Hollow circles (○) indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of National Hospital Morbidity Database and ABS Estimated Resident Population 30 June 2016.

Gastroscopy hospitalisations, all ages

Resources

- Gastroenterological Society of Australia, *Gastro-oesophageal Reflux in Adults: Clinical update*[6]
- Cancer Council Australia, Australian clinical practice guideline for diagnosis and management of Barrett's oesophagus[44]
- National Institute for Health and Care Excellence (NICE), *Gastro-oesophageal Reflux Disease and Dyspepsia in Adults: Investigation and management* (clinical guideline)[7]
- NICE, Section 1.2: Upper gastrointestinal tract cancers, in *Suspected Cancer: Recognition and referral* (NICE guideline)[10]
- Australian Health Ministers' Advisory Council, *Aboriginal and Torres Strait Islander Health Performance Framework 2017 Report*, performance measure 3.06: access to hospital procedures.[52]

Australian initiatives

The information in this chapter will complement work already under way to improve the use of gastroscopy in Australia. At a national level, this work includes:

- Gastroenterological Society of Australia, Choosing Wisely recommendation 5: Do not perform a follow-up endoscopy less than three years after two consecutive findings of no dysplasia from endoscopies with appropriate four quadrant biopsies for patients diagnosed with Barrett's oesophagus[55]
- Royal Australasian College of Surgeons, Choosing Wisely recommendation 4: Do not use endoscopy for investigation in gastric band patients with symptoms of reflux[56]
- Australian Health Ministers' Advisory Council, monitoring of access to hospital procedures within the Aboriginal and Torres Strait Islander Health Performance Framework.[52]

Many states and territory initiatives are also in place to address access to gastroscopy, including:

- Queensland Health, Endoscopy Action Plan[57]
- Queensland Health, referral criteria and guidelines for gastroenterology[48]
- Queensland Health, clinical prioritisation criteria for gastroenterology[51]
- Department of Health, Western Australia, referral guidelines for direct access gastrointestinal endoscopic procedures[49]
- Department of Health, Western Australia, urgency categorisation and access policy for public direct access adult gastrointestinal endoscopy services.[50]

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Gastroscopy hospitalisations, all ages

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2.3 Proton pump inhibitor medicines dispensing, 18 years and over

Why is this important?

Proton pump inhibitor (PPI) medicines are among the most commonly used medicines in Australia, and most use is for gastro-oesophageal reflux disease (GORD). Although PPI medicines are highly effective at controlling symptoms of gastro-oesophageal reflux in adults, there is good evidence that they are overused, that opportunities for lifestyle interventions are not maximised and that many people are inappropriately using PPI medicines for long periods of time. There are some concerns about side effects with long-term use.

What did we find?

The Atlas found that the rate of PPI medicines dispensing varies up to five-fold between local areas in Australia. Fifteen per cent of the adult population had at least one prescription for a PPI medicine dispensed in the year.

What can be done?

Interventions should focus on consumer education about modifiable lifestyle factors that increase the risk of GORD, on appropriate prescribing when adults are first placed on a PPI medicine, and on deprescribing. Multifaceted approaches directed at both clinicians and consumers have been found to be effective. These could include information for consumers, information for general practitioners encouraging 'stepping-down' PPI therapy for GORD and a list of their patients taking ongoing PPI therapy, and information for pharmacists. Quality improvement interventions in hospitals could improve appropriateness of care in this setting. This could then have a flow-on effect to prescribing in the community, as hospital recommendations for PPI medicines use may influence PPI medicines use after discharge.[1]

Proton pump inhibitor medicines dispensing, 18 years and over

Context

PPIs are a group of medicines that reduce acid production in the stomach.[2] Medicines in the PPI group include omeprazole, pantoprazole, lansoprazole, rabeprazole and esomeprazole.[3] This data item analyses PPI medicines use in adults (aged 18 years and over). See page 71 for analysis of PPI medicines use in infants (aged 1 year and under).

The most common reasons for PPI therapy for adults in Australia are gastro-oesophageal reflux (68%) and, less frequently, oesophagitis (15%).[4] Both conditions are associated with exposure of the gullet (oesophagus) to stomach acid. PPI medicines are also often prescribed for prophylaxis in people taking non-steroidal anti-inflammatory drugs. A trial of PPI therapy may be worthwhile in people with functional dyspepsia if the main symptom is epigastric burning.[5]

PPI medicines are the most potent acid suppression therapy available. They are therefore attractive as first-line therapy because they give fast symptom relief.[6,7] Many patients are not appropriately 'stepped down' to less potent therapy such as a low-dose PPI medicine, histamine 2 antagonist or, least potent of all, antacids. Many people have mild or intermittent symptoms and do not require PPI medicines or regular treatment. Long-term treatment with PPI medicines is appropriate for people with complicated GORD or a small number of other conditions, and for prophylaxis in people treated with medicines that can cause upper gastrointestinal problems such as gastric bleeding.[7]

Pharmaceutical treatment does not address the underlying promoters of reflux and oesophageal cancer (an uncommon long-term complication of poorly controlled GORD). Lifestyle measures such as dietary changes, smoking cessation and weight loss can reduce reflux and reduce oesophageal cancer risk.[6-8] There is good evidence that these factors are given insufficient attention in the Australian population. While smoking rates have declined overall in Australia, other risk factors for GORD have increased. In 2014–15, the national rate of overweight and obesity in Australia was 63.4% (equivalent to 11.2 million Australian adults), up from 56.3% in 1995.[6-8]

PPI medicines are among the most commonly used medicines in the world. The issue of their widespread and possibly inappropriate long-term use has been raised as a problem in several countries.[9,10] International studies suggest that approximately half of prescriptions for PPI medicines are inappropriate according to guidelines; recent estimates of the proportion of inappropriate prescribing of PPI medicines in Australia range from 22% to 63%.[11-13]

PPI medicines became available in Australia in the early 1990s, and their use increased by 1,300% from 1995 to 2006.[9] The rate of increase then slowed, rising by 5% between 2007 and 2017, but PPI medicines have remained among the top 10 prescribed drugs in Australia since the 2000s.[14] In 2015–16, an estimated 12% of the Australian population were taking a PPI medicine or had in the past year.[4] Similar patterns have been seen in other countries. For example, in the United Kingdom, PPI medicine prescriptions increased from 26 million in 2006 to 58 million in 2016, and 15% of the population were estimated to be taking a PPI medicine in 2014.[15-17] PPI medicines are also available over the counter in Australia and are advertised to consumers; however, figures for this supply are not readily available.

Although PPI medicines are generally well tolerated, concerns have been raised about rare, but serious, risks associated with long-term PPI medicines use. For example, PPI medicines alter the gut microbiome and there is some evidence that this may increase the risk of enteric infections with *Clostridium difficile* and other pathogens, as well as bone fractures, chronic kidney disease and interstitial nephritis.[7,10,13,18,19] Most of this evidence is from observational studies, and strong evidence of a causal link is lacking.[10,20]

About the data

Data are sourced from the Pharmaceutical Benefits Scheme (PBS) dataset, which includes all prescriptions dispensed under the PBS or the Repatriation Pharmaceutical Benefits Scheme. This includes prescriptions with co-payment that do not receive an Australian Government subsidy and prescriptions dispensed under the Closing the Gap scheme.

The dataset does not include prescriptions dispensed for patients during their admission to public hospitals, discharge prescriptions dispensed from public hospitals in New South Wales and the Australian Capital Territory, direct supply of medicines to remote Aboriginal health services, over-the-counter purchase of medicines, doctor's bag medicines or private prescriptions.

Rates are based on the number of prescriptions dispensed for PPI medicines per 100,000 people aged 18 years and over in 2016–17.

The analysis and maps are based on the residential address of the patient recorded in the PBS prescription claim and not the location of the prescriber or the dispensing pharmacy.

Rates are age and sex standardised to allow comparisons between populations with different age and sex structures.

This analysis was not undertaken by Aboriginal and Torres Strait Islander status because this information was not available for the PBS data at the time of publication.

What do the data show?

Magnitude of variation

In 2016–17, there were 21,768,718 PBS prescriptions dispensed for PPI medicines, representing 105,294 prescriptions per 100,000 people aged 18 years and over (the Australian rate).

The number of PBS prescriptions dispensed for PPI medicines across 333* local areas (Statistical Area Level 3 – SA3) ranged from 34,489 to 172,780 per 100,000 people aged 18 years and over. The rate was **5.0 times as high** in the area with the highest rate compared to the area with the lowest rate. The number of prescriptions dispensed varied across states and territories, from 63,230 per 100,000 people aged 18 years and over in the Northern Territory to 127,993 in Tasmania.

After the highest and lowest 10% of results were excluded and 267 SA3s remained, the number of prescriptions dispensed per 100,000 people aged 18 years and over was 1.6 times as high in the area with the highest rate compared to the area with the lowest rate.

* There are 340 SA3s. For this item, data were suppressed for 7 SA3s due to a small number of prescriptions dispensed and/or population in an area.
Notes:
Some of the published SA3 rates were considered more volatile than others. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.
For further detail about the methods used, please refer to the Technical Supplement.

Proton pump inhibitor medicines dispensing, 18 years and over

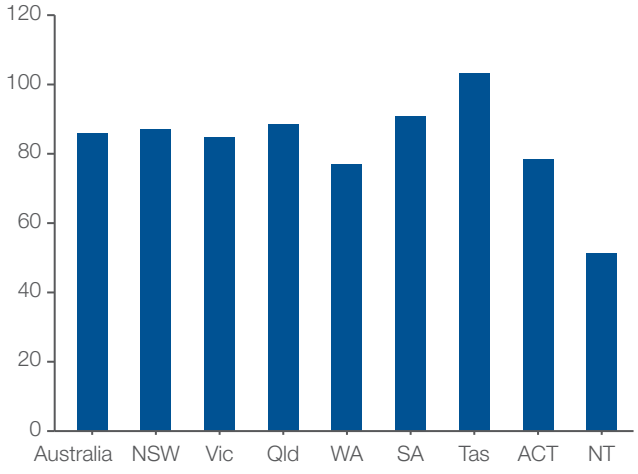
Analysis by remoteness and socioeconomic status

Rates of PPI medicines dispensing were higher in inner regional and outer regional areas than in other areas. There was a pattern of an increasing rate of PPI medicines dispensing with socioeconomic disadvantage in major cities, and inner regional and outer regional areas (Figure 2.23).

Rate of defined daily doses

The number of defined daily doses (DDD)† of PPI medicines per 1,000 people aged 18 years and over dispensed on any given day was 85.95 – this is equivalent to 8.6% of the adult population receiving a PPI medicine on any given day of 2016–17. The DDD rate varied across states and territories from 51.15 per 1,000 people per day in the Northern Territory to 103.32 in Tasmania (Figure 2.17).

Figure 2.17: Number of defined daily doses of proton pump inhibitor medicines per 1,000 people aged 18 years and over per day, age and sex standardised, by state and territory of patient residence, 2016–17

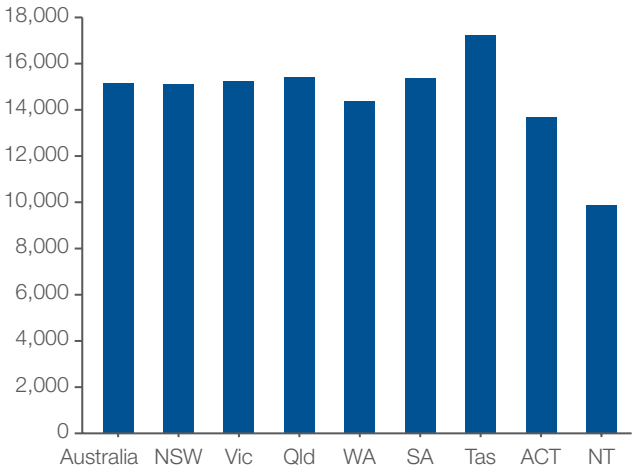


The data for Figure 2.17 are available at www.safetyandquality.gov/atlas

People dispensed at least one prescription

The number of people aged 18 years and over who had at least one prescription for a PPI medicine dispensed in 2016–17 was 15,135 per 100,000 people – that is 15% of the adult population (Figure 2.18).

Figure 2.18: Number of patients dispensed at least one proton pump inhibitor medicine per 100,000 people aged 18 years and over, age and sex standardised, by state and territory of patient residence, 2016–17



The data for Figure 2.18 are available at www.safetyandquality.gov/atlas

Interpretation

Variation in rates of PPI medicines dispensing is likely to be due to geographical differences in the factors discussed below. In addition, variation in use of over-the-counter PPI medicines may influence rates of prescription PPI medicines dispensing. Affordability of over-the-counter PPI medicines may contribute to some of the variation seen in PBS-subsidised dispensing, including the lower rates of dispensing seen in less disadvantaged areas.

† A defined daily dose (DDD) is a measure of medicines use that allows comparison between different therapeutic groups, and between countries. The DDD is based on the average dose per day of the medicine when used for its main indication by adults.

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

Sources: AIHW analysis of Pharmaceutical Benefits Scheme data and ABS Estimated Resident Population 30 June 2016.

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.

Rates of underlying disease

Variation is warranted and desirable when it reflects variation in the underlying need for care. Rates of PPI medicines use may vary according to rates of GORD risk factors in adults (such as obesity, smoking and alcohol intake) and other indications for PPI medicines use, such as *Helicobacter pylori* infection (when PPI medicines are used as an adjunct to antibiotic therapy) and use of medicines that increase the risk of gastrointestinal bleeding.[6] GORD is more common among people with lower levels of education and other elements of socioeconomic disadvantage, and the higher rates of PPI medicines use in areas of socioeconomic disadvantage are consistent with this pattern.[21,22] Higher rates of obesity and smoking may contribute to the higher rates of GORD in socioeconomically disadvantaged areas.[23]

Clinical decision-making

Clinician and consumer willingness to discuss lifestyle risk factors and to act to reduce their impact may affect PPI prescribing rates. Variation in adherence to guidelines for prescribing PPIs in adults and infants is also likely to influence the pattern of use – for example, rates of prescribing PPIs for simple gastro-oesophageal reflux, which is not recommended.[6] Differences in participation in national interventions to increase appropriateness of PPI prescribing for adults, such as academic detailing for general practitioners (GPs), audit and feedback, and a multifaceted program for veterans, may also influence rates of use.[24]

Access to medical care

Access to GPs and gastroenterologists may influence the likelihood of consumers seeking care for gastro-oesophageal reflux and GORD for themselves or their children, and therefore affect rates of PPI use.[25]

Variation in rates of PPI medicines dispensing between areas 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 large numbers of practising clinicians.

Addressing variation

The number of prescriptions for PPI medicines dispensed in 2016–17 equates to every person in Australia aged 18 years and over receiving at least one prescription for a PPI medicine annually.

The quality of evidence on long-term risks of PPI medicines is generally low, but these possible risks are important when seen in the context of large-scale inappropriate use.[10] Limiting use to appropriate indications would also reduce waste of health resources and patient costs.[10,20]

Despite recommendations to reserve long-term use for select situations, the average duration of PPI therapy is 3.8 years in Australia.[4] Almost all of the serious side effects associated with PPI medicines occur in people on long-term therapy, so periodic review of the need for ongoing PPI therapy and minimising the duration of therapy could greatly reduce the risk of harm.[13] Australian Choosing Wisely recommendations advise not using PPI medicines long term in patients with uncomplicated disease without regular attempts at reducing the dose or ceasing therapy.[26,27] PPI therapy should also be discontinued in patients with functional dyspepsia if it does not improve symptoms.[5]

Proton pump inhibitor medicines dispensing, 18 years and over

Interventions that simply identify patients as having potentially inappropriate PPI therapy and highlight them as possible candidates for deprescribing (for example, by a discharge letter) have been unsuccessful.[28] Interventions that not only identified inappropriate PPI medicines prescription but also focused on knowledge translation and close stakeholder engagement have had greater success.[28] Any deprescribing also needs to be carefully targeted, to avoid adverse effects from inappropriate discontinuation of PPI therapy.

A multifaceted series of initiatives conducted in the Australian veterans population exemplified this approach. The initiatives ran between 2004 and 2012, and resulted in a 21% relative decrease in use of PPI medicines.[24] The program included repeating the following interventions, several years apart:

- Information to consumers
- Information encouraging 'stepping-down' PPI therapy for GORD to all GPs caring for veterans taking a PPI medicine, and a list of their patients taking ongoing PPI therapy
- Information to community pharmacies and pharmacists accredited to perform home medicines reviews.

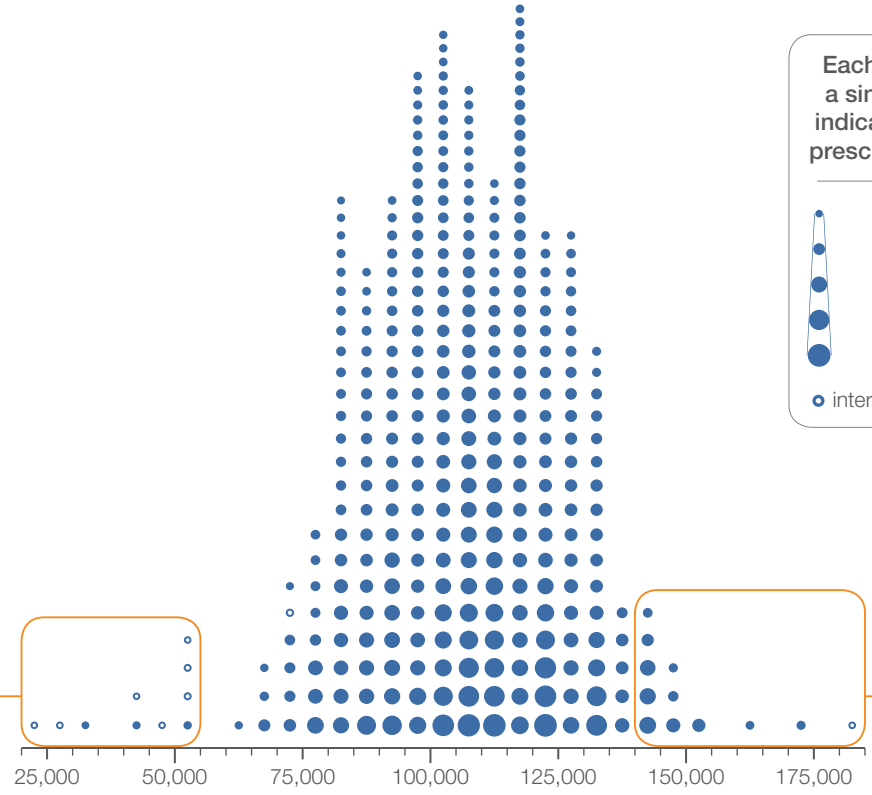
Over the same period, a national program to improve the quality of PPI medicines use was conducted with all GPs at three points. Elements of the program included academic detailing, prescribing recommendations, audit and feedback, and peer meetings including presentations.[24]

The combination and repetition of these strategies were thought to be key to the success in the veterans population.[24] Using a similar multifaceted approach, with repetition, in a wider population of adult PPI medicine users and their health professionals could be effective in improving appropriate use of PPI medicines in Australia.

Quality improvement interventions in hospitals could improve appropriateness of care in this setting, and could have a flow-on effect to prescribing in the community, as hospital recommendations for PPI medicines use may influence PPI medicines use after discharge.[1]

Rates by local area

Figure 2.19: Number of PBS prescriptions dispensed for proton pump inhibitor medicines per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



Lowest rate areas

SA3	State	Rate	Prescriptions
East Arnhem	NT	**21,765***	1,389
Daly - Tiwi - West Arnhem	NT	**28,709***	2,540
Katherine	NT	**34,489**	3,833
Christmas Island	OT	**40,006***	458
Kimberley	WA	**43,023**	8,465
Barkly	NT	**48,081***	1,357
East Pilbara	WA	**52,214***	5,883
Alice Springs	NT	**52,876**	11,836
Norfolk Island	OT	**52,947***	1,160
West Pilbara	WA	**54,586***	7,170

Highest rate areas

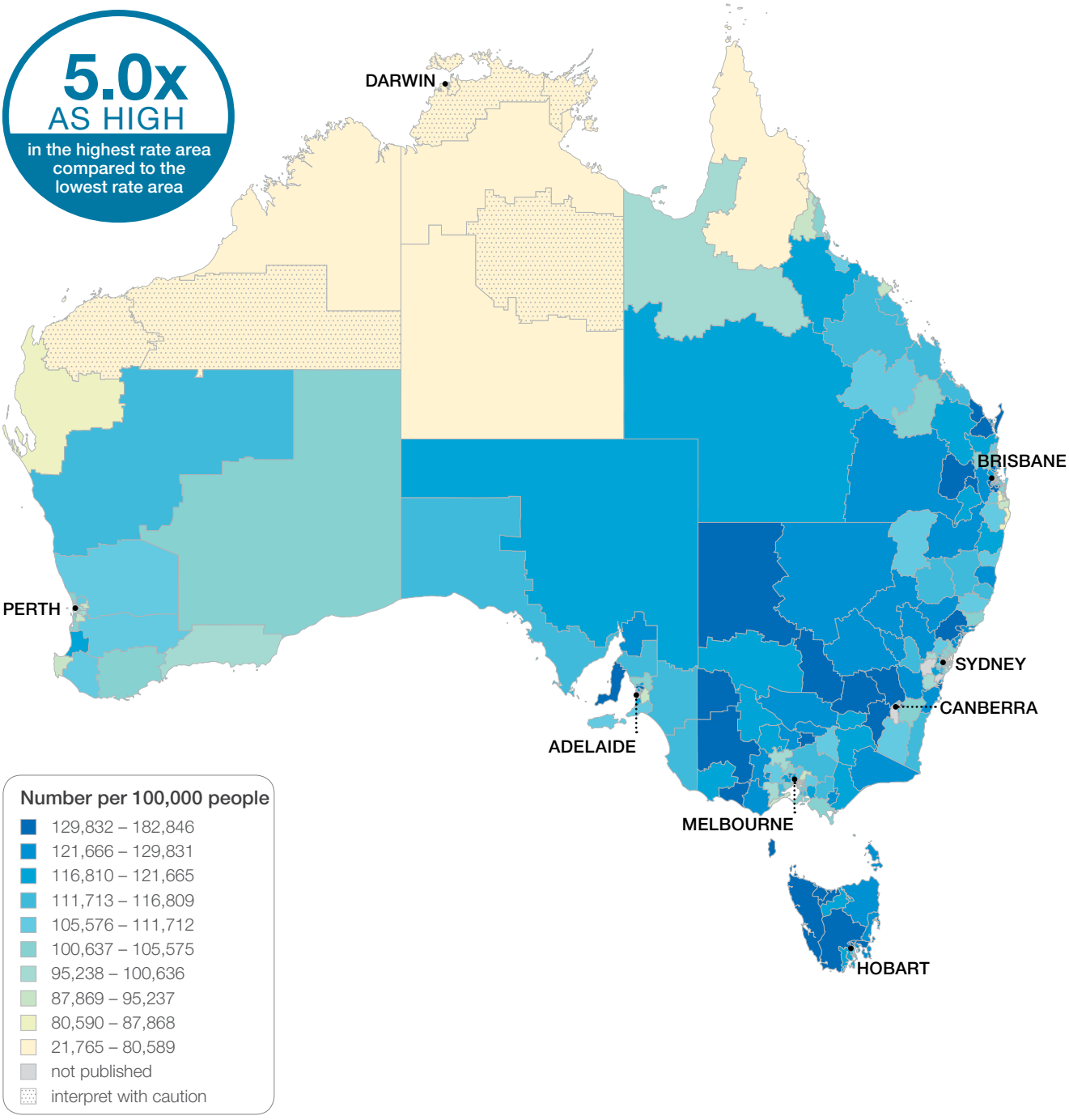
SA3	State	Rate	Prescriptions
Canberra East	ACT	**182,846***	1,923
Brighton	Tas	**172,780**	21,338
Central Highlands (Tas.)	Tas	**163,948**	16,813
Hobart - North West	Tas	**154,053**	75,396
Jimboomba	Qld	**147,767**	39,397
Sorell - Dodges Ferry	Tas	**147,423**	22,622
Maitland	NSW	**145,767**	87,845
Wagga Wagga	NSW	**143,082**	124,185
Ipswich Inner	Qld	**141,639**	116,319
Griffith - Murrumbidgee (West)	NSW	**141,624**	62,654
Broken Hill and Far West	NSW	**141,460**	29,573
Lower Hunter	NSW	**140,953**	107,185

Notes:
Hollow circles (○) and asterisks (*) indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
OT represents other territories.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Pharmaceutical Benefits Scheme data and ABS Estimated Resident Population 30 June 2016.

Proton pump inhibitor medicines dispensing, 18 years and over

Rates across Australia

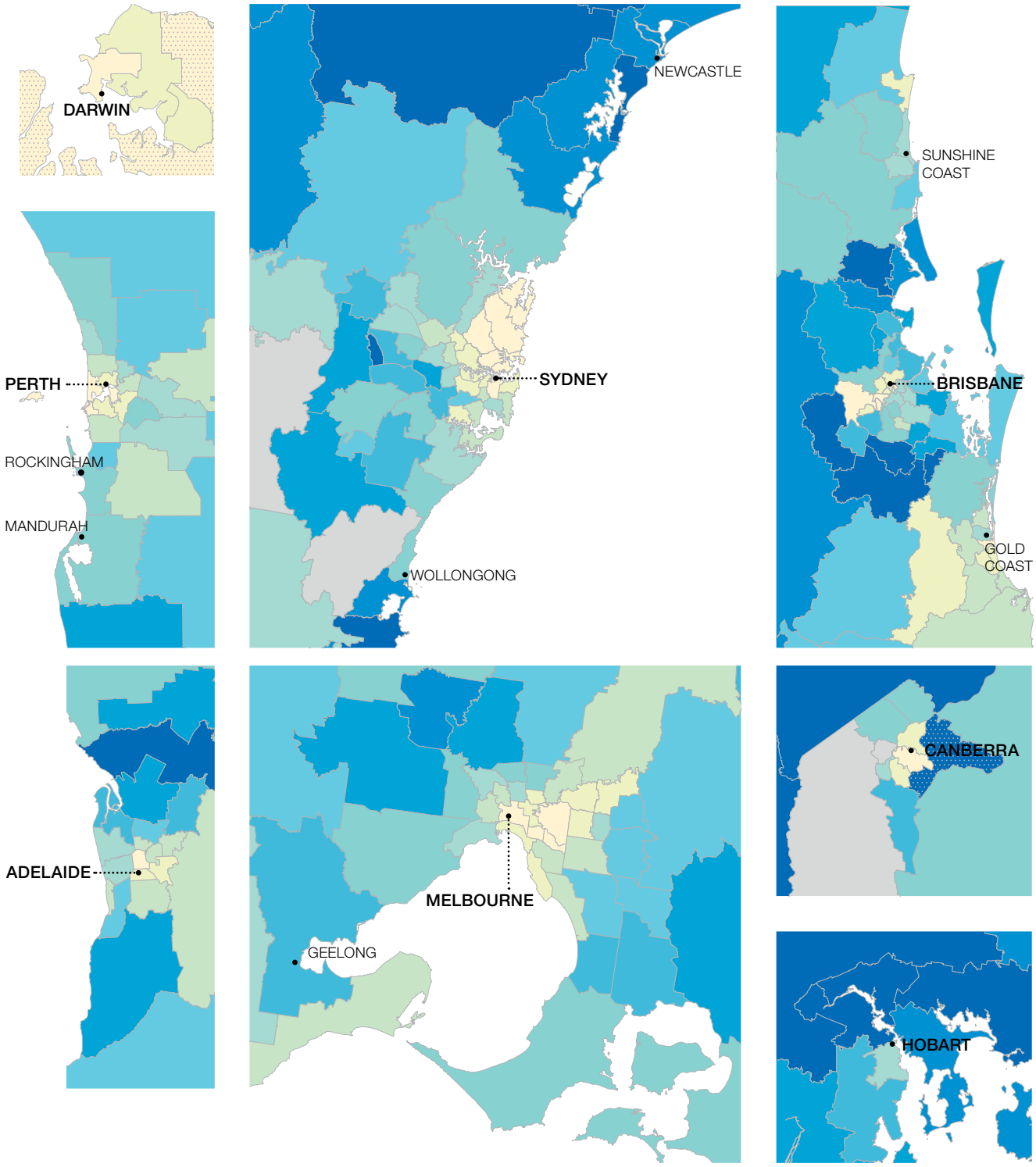
Figure 2.20: Number of PBS prescriptions dispensed for proton pump inhibitor medicines per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



Notes:
Dotted areas indicate rates that are considered more volatile than other published rates and should be interpreted with caution. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Pharmaceutical Benefits Scheme data and ABS Estimated Resident Population 30 June 2016.

Rates across capital city areas

Figure 2.21: Number of PBS prescriptions dispensed for proton pump inhibitor medicines per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



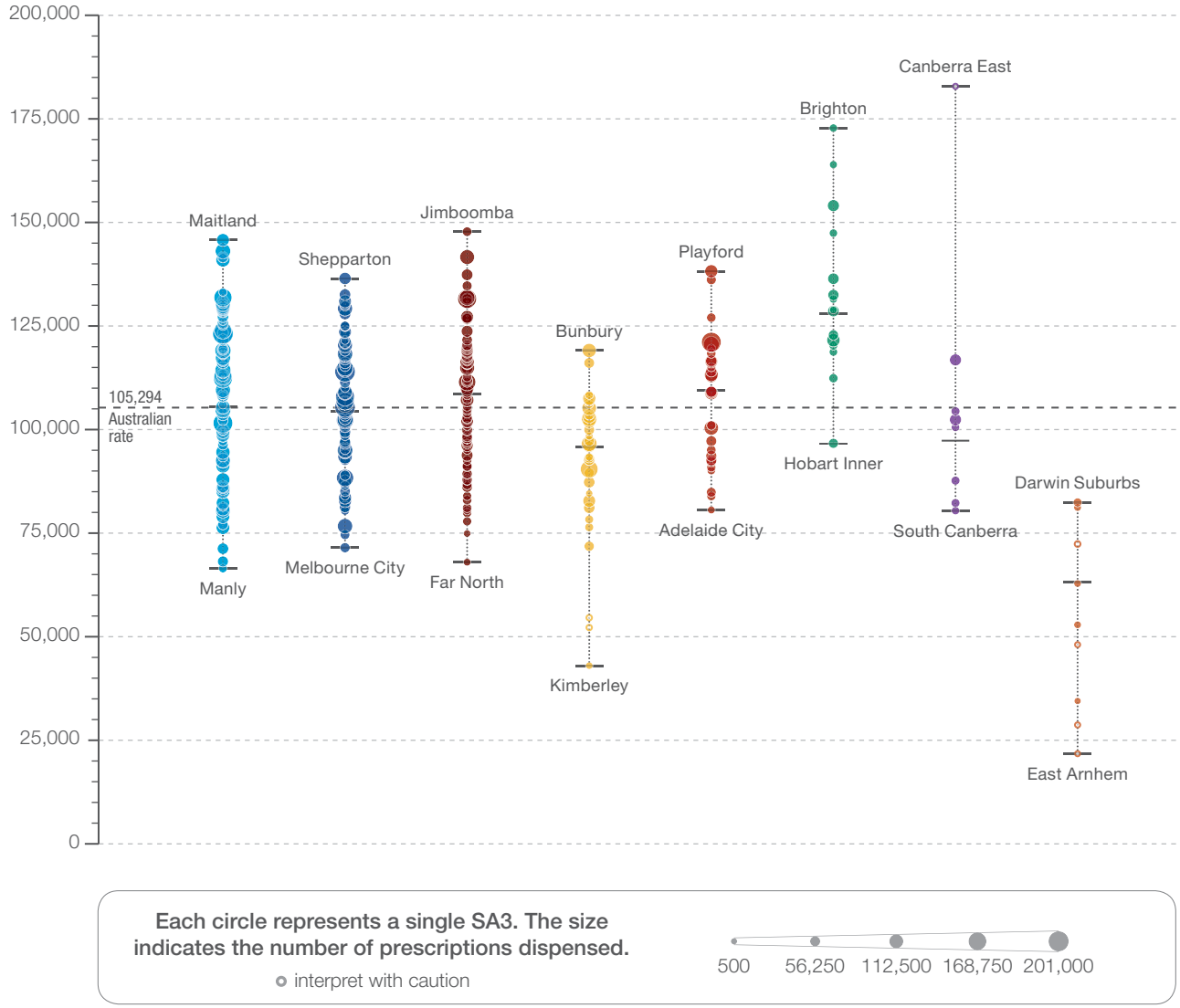
Notes:
Dotted areas indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Pharmaceutical Benefits Scheme data and ABS Estimated Resident Population 30 June 2016.

Proton pump inhibitor medicines dispensing, 18 years and over

Rates by state and territory

Figure 2.22: Number of PBS prescriptions dispensed for proton pump inhibitor medicines per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17

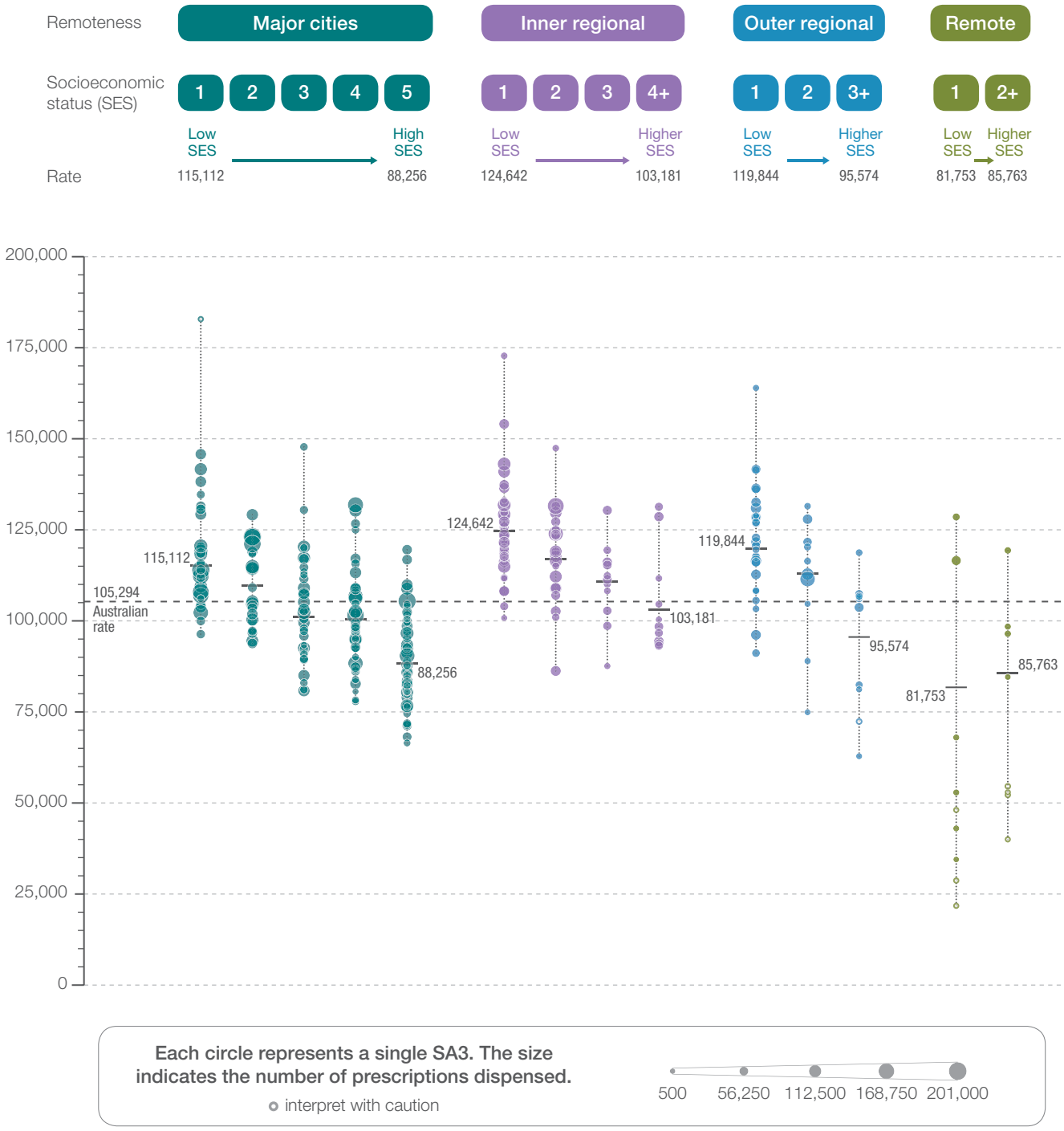
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Highest rate	145,767	136,475	147,767	119,093	138,226	172,780	182,846*	82,423
State/territory	105,543	104,408	108,660	95,806	109,527	127,993	97,312	63,230
Lowest rate	66,462	71,488	67,992	43,023	80,589	96,691	80,420	21,765*
No. prescriptions	7,159,289	5,482,136	4,384,675	1,948,629	1,770,298	646,894	288,088	83,684



Notes:
Hollow circles (○) and asterisks (*) indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Pharmaceutical Benefits Scheme data and ABS Estimated Resident Population 30 June 2016.

Rates by remoteness and socioeconomic status

Figure 2.23: Number of PBS prescriptions dispensed for proton pump inhibitor medicines per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



Notes:
Hollow circles (○) indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Pharmaceutical Benefits Scheme data and ABS Estimated Resident Population 30 June 2016.

Proton pump inhibitor medicines dispensing, 18 years and over

Resources

- NPS MedicineWise, 'Starting, stepping down and stopping medicines – PPIs' program, includes educational visiting program for GPs, online clinical audit[29], information for prescribers[30] and a consumer resource *Managing Your Medicine for Reflux and Heartburn*[31]
- Primary Health Tasmania, *A Guide to Deprescribing Proton Pump Inhibitors*[3]
- Veterans' MATES (Medicines Advice and Therapeutics Education Services), information for consumers and health professionals[32]
- *Therapeutic Guidelines: Gastointestinal*[6]
- Gastroenterological Society of Australia, *Gastro-oesophageal Reflux in Adults: Clinical update*[8]
- National Institute for Health and Care Excellence, Gastro-oesophageal Reflux Disease and Dyspepsia in Adults: Investigation and management (clinical guideline).[33]

Australian initiatives

The information in this chapter will complement work already under way to improve the appropriateness of PPI medicine use in Australia. At a national level, this work includes:

- NPS MedicineWise, 'Starting, stepping down and stopping medicines – PPIs' program (includes educational visiting program for GPs, online clinical audit[29], information for prescribers[30] and a consumer resource *Managing Your Medicine for Reflux and Heartburn*[31])
- Veterans' MATES, Department of Veterans' Affairs, series of initiatives to improve PPI use[24]
- Royal Australian College of General Practitioners, Choosing Wisely recommendation 1: Don't use PPIs long term in patients with uncomplicated disease without regular attempts at reducing dose or ceasing[27]
- Gastroenterological Society of Australia, and Choosing Wisely recommendation 3: Do not continue prescribing long term PPI medication to patients without attempting to reduce the medication down to the lowest effective dose or cease the therapy altogether[26]
- Pharmaceutical Benefits Advisory Committee, recommendations in 2018 to change PBS restriction levels for some PPIs, including authority requirement for higher-dose esomeprazole and streamlined authority requirement for standard-dose PPIs, and reduction of the number of repeats for some PPIs to align with recommended duration of treatment.[34]

Many state and territory initiatives are also in place to improve the appropriateness of PPI medicines use, including:

- Primary Health Tasmania, *A Guide to Deprescribing Proton Pump Inhibitors*[3], deprescribing workshops for a number of medicines including PPIs, and Health Pathways for dyspepsia and heartburn/GORD
- Western Australia, Choosing Wisely initiative conducted in five hospitals.

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