4.4 Standard echocardiography, 18 years and over

Why is this important?

Standard (or transthoracic) echocardiography is used for accurate diagnosis and treatment planning in people with symptoms suggestive of heart failure, structural heart diseases and other heart conditions. It is an important clinical tool, but a rapid increase in use of standard echocardiography has raised concerns that some use is not appropriate.

There are also concerns that standard echocardiography is not always available where it is needed most. The burden of cardiovascular disease is higher in regional and remote areas of Australia, and equitable access to standard echocardiography is important for improving cardiac care and outcomes for people living in these areas.

What did we find?

Rates of standard echocardiography vary up to about four-fold across local areas, and are higher in major cities and inner regional areas than in outer regional and remote areas.

What can be done?

Aligning the Medicare Benefits Schedule (MBS) item descriptors for standard echocardiography items with best-practice guidelines, as recommended by the MBS Review Taskforce, could improve the appropriateness of use.

A centralised system for storing images and reports in Australia could reduce unnecessary repeat requests because of difficulties accessing previous results. A combination of education, audit and feedback may be another viable strategy to reduce potential low-value echocardiography use and increase adherence to best-practice guidelines.

Reducing financial and geographic barriers to access is important for increasing equity of use of standard echocardiography. Barriers to access outside major cities include higher out-of-pocket costs for patients living in these areas.

Standard echocardiography, 18 years and over

Context

This data item examines the use of standard (or transthoracic) echocardiography, an ultrasound examination of the heart. The data presented for this item include echocardiography provided in the primary care and hospital settings. Use of stress echocardiography is discussed separately (see Section 4.2 'Stress echocardiography, 18 years and over', page 201).

Guidelines recommend echocardiography to investigate:

- Suspected heart failure or structural heart disease[1,2]
- Suspected or known ventricular hypertrophy or dysfunction[2]
- Valvular disease[3]
- Pulmonary hypertension[4]
- Congenital heart disease[5]
- Suspected or confirmed acute rheumatic fever.[6]

The most common of these is investigation of suspected heart failure or structural heart disease.[7] The clinical indications for the use of MBS-subsidised cardiac ultrasound services are specified in the item descriptors in the Health Insurance (Diagnostics Imaging Services Table) Regulations 2018.[8]

Echocardiography is an important clinical tool, but a rapid increase in use has led to concerns about inappropriate use in several countries.[9] Between 2012 and 2017, the number of echocardiography services grew by an average of 7% each year in Australia.[9] In the United Kingdom (UK), the rate increased by 7% each year between 2007 and 2013.[10] In the United States (US), the rate of echocardiography among Medicare beneficiaries increased by 8% per year in the early 2000s, prompting a number of measures to improve appropriateness of requests, including appropriate use criteria.[11-13]

Two Australian hospital-based studies have assessed reasons for echocardiography referrals against the US appropriate use criteria. The proportion of 'inappropriate' echocardiography referrals was 20% at a regional hospital, and 10% at a large tertiary hospital.[7,14] In the regional hospital, inappropriate echocardiography referrals were more common for outpatients than for inpatients (24.4% versus 9.6%). The most common inappropriate indication at both hospitals was for routine surveillance as part of regular follow-up in patients with stable chronic cardiac conditions, such as heart failure and coronary artery disease, with no change in clinical status.[7,14]

There have not been any similar analyses of Australian echocardiography referrals in community settings.

Comparison of international rates of echocardiography is limited by differences in data collection methods. Considerable variation in the use of echocardiography has been noted between different areas within Australia[15] previously, and within the US[12] and the UK.[10]

Cardiovascular disease deaths are the greatest contributor to the mortality gap between Aboriginal and Torres Strait Islander Australians and other Australians.[16] Aboriginal and Torres Strait Islander Australians have higher rates of heart failure and rheumatic heart disease (which damages heart valves) than other Australians[17-19] and would be expected to have greater need for echocardiography.

Cardiovascular disease is a greater contributor to fatal disease burden among Aboriginal and Torres Strait Islander adults living in remote areas compared with those living in non-remote areas.[19] Poor access to echocardiography in regional and remote areas is likely to disproportionately affect Aboriginal and Torres Strait Islander Australians living in these areas.

About the data

Data are sourced from the MBS dataset. This dataset includes information on MBS claims processed by the Australian Government Department of Human Services. It covers a wide range of services (attendances, procedures, tests) provided across primary care and hospital settings.

The dataset does not include:

- Services for publicly funded patients in hospitals
- Services for patients in hospital outpatient clinics where claims are not made to the MBS
- Services covered under Department of Veterans' Affairs arrangements.

Rates are based on the number of MBS-subsidised services for standard echocardiograms per 100,000 people aged 18 years and over in 2016–17.

Because an MBS claim is included for each service rather than for each patient, patients who receive any of the services listed in this data item more than once in the financial year will have more than one MBS claim counted.

The analysis and maps are based on the residential address of the patient recorded in the MBS claim and not the location of the service.

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 MBS data at the time of publication.

What do the data show?

Magnitude of variation

In 2016–17, there were 945,056 MBS-subsidised services for standard echocardiography, representing 4,599 services per 100,000 people aged 18 years and over (the Australian rate).

The number of MBS-subsidised services for standard echocardiography across 328* local areas (Statistical Area Level 3 – SA3) ranged from 2,279 to 7,957 per 100,000 people aged 18 years and over. The rate was **3.5 times as high** in the area with the highest rate compared to the area with the lowest rate. The number of services varied across states and territories, from 2,624 per 100,000 people aged 18 years and over in Tasmania to 5,309 in New South Wales (Figures 4.20–4.23).

After the highest and lowest 10% of results were excluded and 264 SA3s remained, the number of services per 100,000 people aged 18 years and over 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 standard echocardiography were higher in major cities and inner regional areas than in outer regional and remote areas. There was no clear pattern according to socioeconomic status (Figure 4.24).

* There are 340 SA3s. For this item, data were suppressed for 12 SA3s due to one or more of a small number of services or population in an area, or potential identification of individual patients, practitioners or business entities.

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.

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

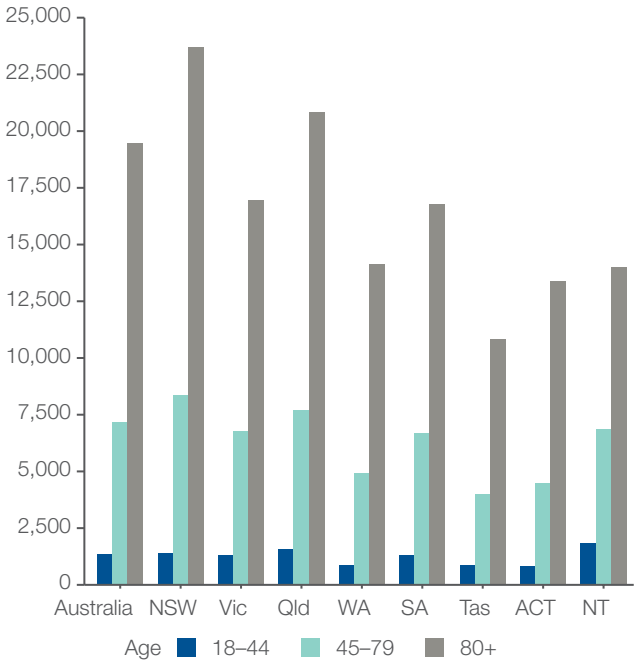
Standard echocardiography, 18 years and over

Analysis by age group

Rates of standard echocardiography were highest for the 80 years and over age group. The national rate for this age group was 19,469 services per 100,000 people and varied from 10,829 services per 100,000 people in Tasmania to 23,703 services per 100,000 people in New South Wales.

The national rate for tests performed on the 80 years and over age group was 2.7 times as high as the rate for the 45–79 years age group (which had the next highest rate). This pattern was consistent across all states and territories (Figure 4.19).

Figure 4.19: Number of MBS-subsidised services for standard echocardiography per 100,000 people by age group, age and sex standardised, by state and territory of patient residence, by age group, 2016–17



The data for Figure 4.19 are available at www.safetyandquality.gov.au/atlas

Interpretation

In addition to overarching reasons for variation discussed under 'Cardiac stress tests and imaging, 18 years and over' on page 188, variation in rates of use of MBS-subsidised standard echocardiography is likely to be due to geographical differences in the factors discussed below.

Rates of underlying disease

Variation is warranted and desirable when it reflects variation in the underlying need for care. Groups with higher rates of cardiovascular disease have greater need for cardiac tests, which should influence the variation in rates of use of these tests. The need for echocardiography is likely to be higher in areas with higher rates of heart failure and other relevant conditions, such as rheumatic heart disease. Rates of cardiovascular disease increase with age and socioeconomic disadvantage.[17]

Rates of heart failure and rheumatic heart disease are also higher among Aboriginal and Torres Strait Islander Australians than among other Australians.[18,19] Areas with larger proportions of Aboriginal and Torres Strait Islander people would be expected to show higher rates of echocardiography. The Northern Territory Rheumatic Heart Disease Control Program may account for higher rates of echocardiography in some areas of the Northern Territory.[20]

Access to services

Variation in echocardiography rates is likely to reflect differences in geographical and financial access to services, both for referral and for performance of echocardiography.[15] A previous analysis of outpatient cardiac imaging in Australia found that the local availability of doctors was the strongest correlate of echocardiography rates.[15]

Notes:
For further information about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Medicare Benefits Schedule and ABS Estimated Resident Population 30 June 2016.

In the same study, greater socioeconomic advantage was also correlated with higher use of echocardiography.[15] Out-of-pocket costs for imaging are likely to be a barrier for socioeconomically disadvantaged populations. The average out-of-pocket cost for standard echocardiography in Australia was $102 in 2014.[21]

Clinical decision-making

Clinicians' differing thresholds for echocardiography referral may contribute to variation. For example, greater use of repeat testing by clinicians for individual patients may influence the patterns seen. In a recent study of Australian doctors' decision-making about cardiac imaging, greater experience and training were flagged as an important factor in selecting appropriate patients for echocardiography.[22]

Availability of previous echocardiography results

In a qualitative study of Australian hospital doctors, lack of availability of previous test results, even if recent, was cited as a common reason for requesting an echocardiogram.[22] It has been suggested that requesting of repeat tests contributes to the higher echocardiography rates in large Australian cities, where there are several referral centres.[15]

Funding models

As is the case for cardiac stress tests and imaging, the funding models of echocardiography services available in an area, and the relative accessibility of these services to patients, may influence the variation seen. For example, the rates of cardiac testing seen in the Northern Territory and remote Western Australia may be low because a higher proportion of tests in these areas is done for public patients in hospital outpatient clinics (which are not counted in this data item). In contrast, the rates in New South Wales may be high because there are many locations in New South Wales where services and investigations undertaken in public hospital outpatient clinics are claimed through the MBS under specialist medical practitioner rights of private practice arrangements.

Patient and referrer expectations

According to a sample of Australian doctors who request echocardiograms, patients often expect a test to be done.[22] Doctors interviewed for the study thought that patient expectations were influenced by information found on the internet, the level of patients' private insurance cover and referral to a cardiologist.[22]

Addressing variation

Strategies for addressing variation in the use of echocardiography are discussed below.

The Cardiac Services Clinical Committee of the MBS Review Taskforce recently recommended to the Australian Government that MBS items for echocardiography be restructured into six new items that align with best-practice guidelines.[8] The committee also recommended including these items in an online checker tool to determine eligibility of requests for echocardiography.[8] A previous poor-quality echocardiogram is a common indication for a repeat echocardiogram. The Cardiac Services Clinical Committee recommended that the MBS item descriptors be revised to reflect the Cardiac Society of Australia and New Zealand's position statement for training and performance in adult echocardiography.[9,23]

Other strategies that have been proposed to better target use of echocardiography to patient need in Australia include US-style appropriateness criteria; a combination of education, audit and feedback; a centralised system for storage of imaging reports; and reducing financial and geographic barriers to access. These strategies are discussed below.

In response to a rapid increase in use of echocardiography in the early 2000s, the American College of Cardiology and others published appropriate use criteria for echocardiography in 2007, followed by an update in 2011.[24-27] US Medicare reimbursement cuts for echocardiography were also made in the US in 2005 and 2007.[28] Rates of echocardiography among Medicare beneficiaries plateaued from 2007.[12]

Standard echocardiography, 18 years and over

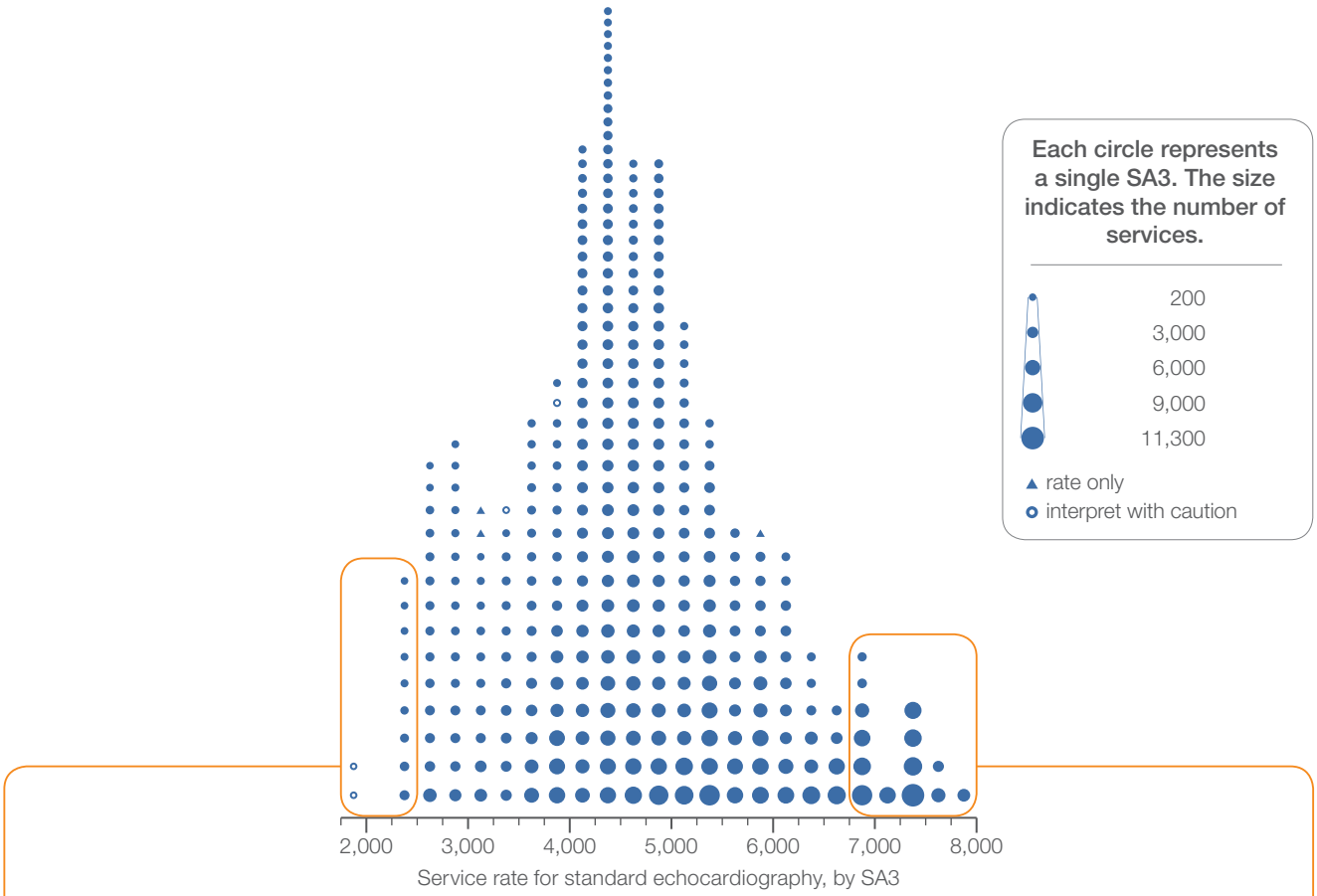
Some have suggested that incorporating the US appropriate use criteria for echocardiography into Australian practice has the potential to improve patient outcomes, contain costs and reduce variation.[29] However, Australian practice relies heavily on US and European guidelines, and inconsistencies between these guidelines and the US appropriate use criteria should be addressed before considering their application in Australia.[29] In addition, Australian research into the decision-making process of doctors requesting cardiac imaging argues against using appropriateness criteria, as other factors are stronger influences.[22] These factors include training, experience, management of patient expectations, and accessibility of services.[22] Investigating aspects of bulk-billing practices and cardiology practice models that influence rates of cardiac testing, and the choice of tests, could point to other system-level changes to improve appropriate use.

A centralised system for storing images and reports in Australia could reduce unnecessary repeat requests because of difficulties accessing previous results.[8] Repeat echocardiograms within the same year account for 11% of MBS echocardiography services, and repeats within a five-year window account for 40% of services.[8] An Australian qualitative study has reported that requesting of repeat echocardiograms occurs because a patient's recent echocardiogram results could not be obtained.[22]

A combination of education, audit and feedback may be another viable strategy to reduce potential low-value echocardiography use and increase adherence to best-practice guidelines.[30,31] Also, given the burden of disease in Aboriginal and Torres Strait Islander Australians, collecting accurate MBS data on services to these groups would be valuable for gaining further understanding of where improvements are most needed.

Rates by local area

Figure 4.20: Number of MBS-subsidised services for standard echocardiography 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	Services
East Pilbara	WA	**1,785***	203
West Pilbara	WA	**1,906***	248
Mundaring	WA	**2,279**	865
West Coast	Tas	**2,329**	378
Bayswater - Bassendean	WA	**2,335**	1,670
Belmont - Victoria Park	WA	**2,375**	1,293
Meander Valley - West Tamar	Tas	**2,388**	567
Swan	WA	**2,390**	2,054
Esperance	WA	**2,396**	352
Huon - Bruny Island	Tas	**2,446**	497
Central Highlands (Tas)	Tas	**2,469**	256

Highest rate areas

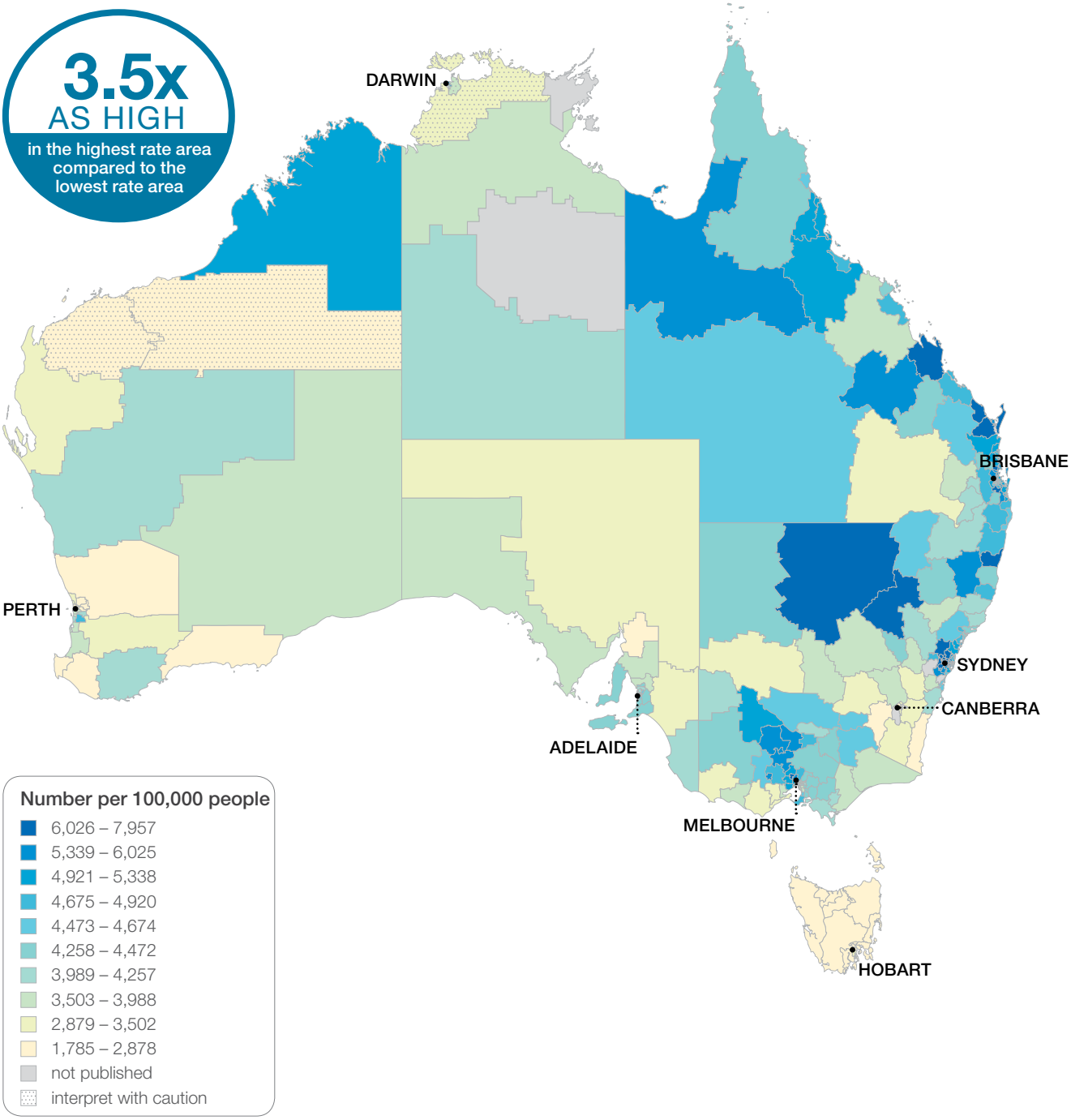
SA3	State	Rate	Services
Blacktown - North	NSW	**7,957**	4,079
Dubbo	NSW	**7,626**	5,083
St Marys	NSW	**7,625**	2,855
Blacktown	NSW	**7,426**	7,566
Fairfield	NSW	**7,277**	11,282
Penrith	NSW	**7,269**	7,265
Merrylands - Guildford	NSW	**7,268**	8,241
Bundaberg	Qld	**7,051**	6,842
Mount Druitt	NSW	**6,999**	5,136
Rouse Hill - McGraths Hill	NSW	**6,976**	1,450
Canterbury	NSW	**6,966**	7,660
Rockhampton	Qld	**6,898**	6,902
Dural - Wisemans Ferry	NSW	**6,839**	1,776
Bankstown	NSW	**6,792**	9,606

Notes:
Hollow circles (○) and asterisks (*) indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
Triangles (▲) indicate SA3s where only rates are published. The numbers of services are not published for confidentiality reasons.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Medicare Benefits Schedule data and ABS Estimated Resident Population 30 June 2016.

Standard echocardiography, 18 years and over

Rates across Australia

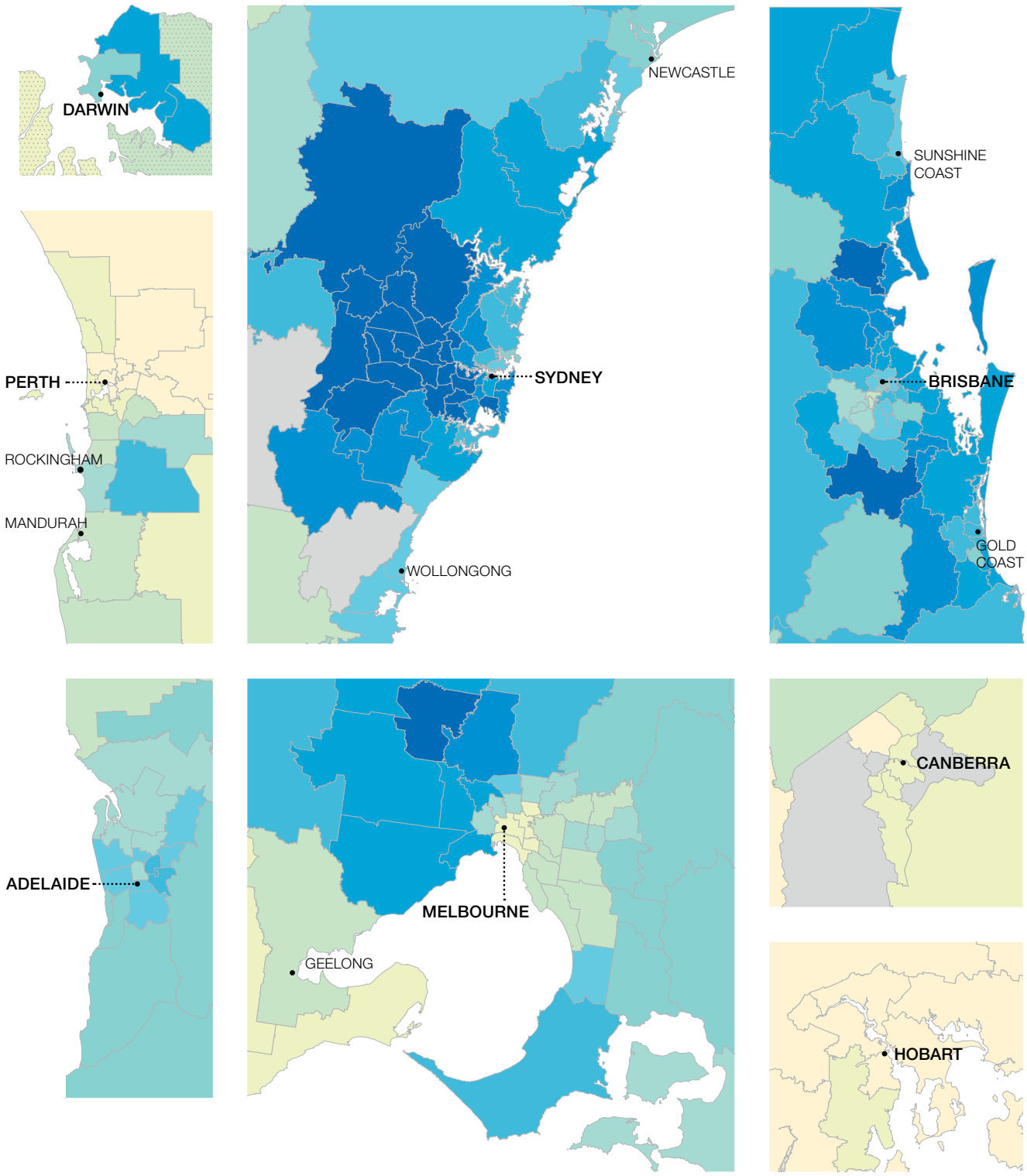
Figure 4.21: Number of MBS-subsidised services for standard echocardiography per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



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 Medicare Benefits Schedule data and ABS Estimated Resident Population 30 June 2016.

Rates across capital city areas

Figure 4.22: Number of MBS-subsidised services for standard echocardiography per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



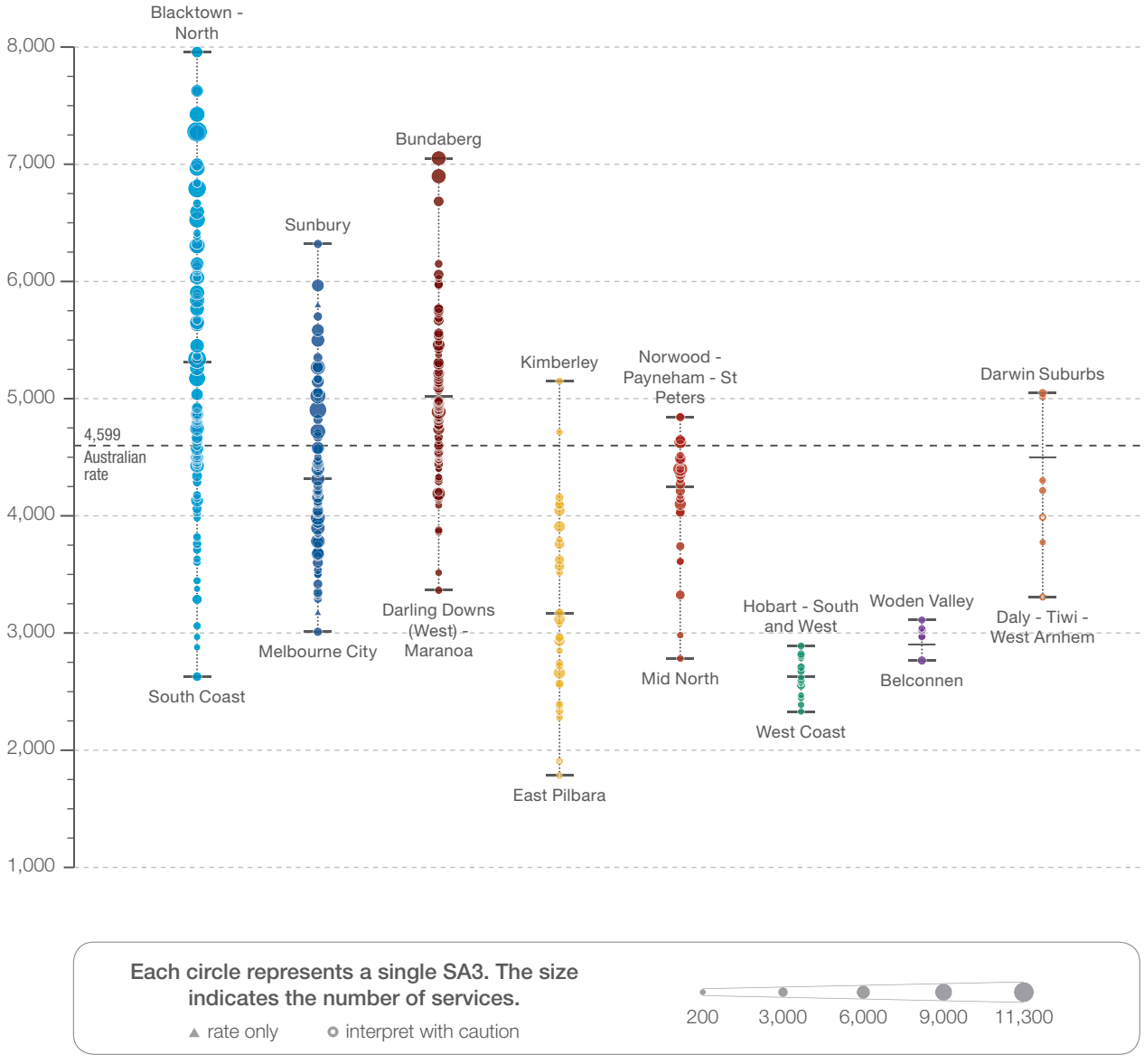
Notes:
Dotted areas indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Medicare Benefits Schedule data and ABS Estimated Resident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

Standard echocardiography, 18 years and over

Rates by state and territory

Figure 4.23: Number of MBS-subsidised services for standard echocardiography per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17

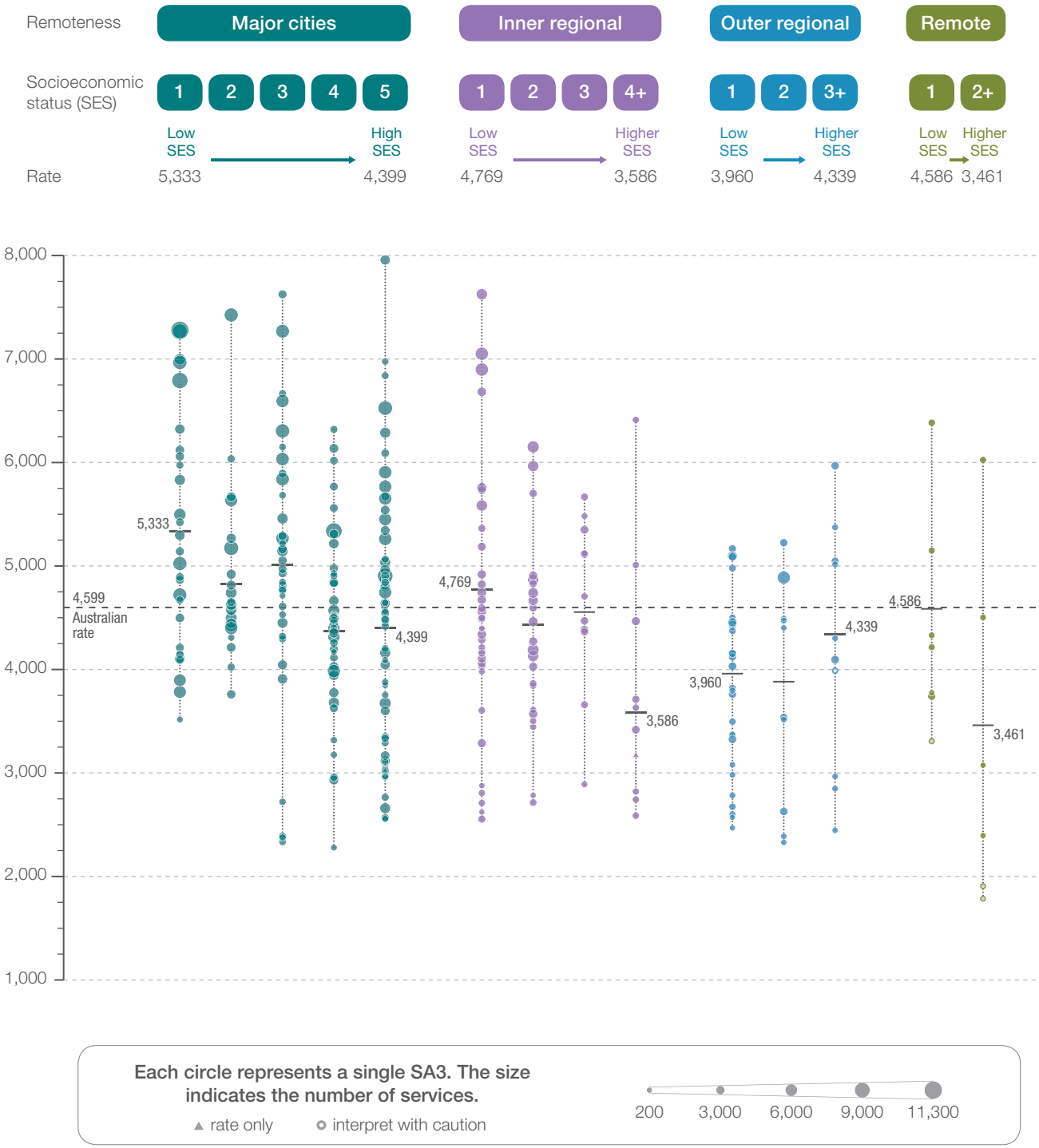
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Highest rate	7,957	6,320	7,051	5,149	4,843	2,890	3,111	5,048
State/territory	5,309	4,316	5,016	3,167	4,250	2,624	2,902	4,499
Lowest rate	2,628	3,010	3,365	1,785*	2,783	2,329	2,765	3,307*
No. services	359,202	224,211	200,703	64,222	68,247	13,211	8,590	6,582



Notes:
Hollow circles (o) and asterisks (*) indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
Triangles (▲) indicate SA3s where only rates are published. The numbers of services are not published for confidentiality reasons.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Medicare Benefits Schedule data and ABS Estimated Resident Population 30 June 2016.

Rates by remoteness and socioeconomic status

Figure 4.24: Number of MBS-subsidised services for standard echocardiography 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.
Triangles (▲) indicate SA3s where only rates are published. The numbers of services are not published for confidentiality reasons.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Medicare Benefits Schedule data and ABS Estimated Resident Population 30 June 2016.

Standard echocardiography, 18 years and over

Resources

- *Therapeutic Guidelines: Cardiovascular*[32] (for electronic version, visit https://tgldcdp.tg.org.au/etgcomplete)
- US appropriate use criteria for echocardiography[27]
- British Society of Echocardiography, clinical indications for echocardiography[33]
- American Society of Echocardiography, clinical guidelines on use of echocardiography in various conditions.[34]

Australian initiatives

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

- MBS Review Taskforce Cardiac Services Clinical Committee, review including recommendations about cardiac tests[9]
- The Better Cardiac Care for Aboriginal and Torres Strait Islander People project.

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

- Implementation of initiatives in New South Wales to improve cardiovascular care for Aboriginal and Torres Strait Islander people
  - NSW Ministry of Health provides echocardiography machines for loan through the Poche Centre for Indigenous Health at the University of Sydney, for clinicians visiting Aboriginal health services
  - NSW Ministry of Health is part of the national Better Cardiac Care for Aboriginal and Torres Strait Islander People (Better Cardiac Care) initiative
- Implementation of the Victorian cardiac services plan – *Design, Service and Infrastructure Plan for Victoria's Cardiac System*.[35]

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