3.1 Thyroid function testing

Thyroid stimulating hormone tests

Thyroid function tests

Why is this important?

The number of people having thyroid function testing in Australia has increased faster than the rate of population growth. Between 2012 and 2017, the number of people with Medicare Benefits Scheduled (MBS) claims for thyroid function testing increased by 5.7% per year, compared with 1.6% per year growth in the population.[1,2] The fast growth of thyroid function testing in Australia suggests that there is over-testing.

Measuring thyroid stimulating hormone (TSH) is recommended as the single first-line test for possible thyroid dysfunction.[3] Thyroid function tests (TFTs) – measuring TSH plus free tri-iodothyronine (T3) and/or free thyroxine (T4) – are recommended only if TSH is abnormal or for investigation of certain conditions.[3]

What did we find?

The ability to examine variation in thyroid function testing is restricted by episode coning* (a funding arrangement that applies to MBS data), and MBS data confidentiality requirements.

In 2016–17, 5.5 million TSH tests and 2.3 million TFTs (TSH plus T3 and/or T4) were recorded in the MBS dataset in Australia. The data do not capture the full extent of testing in the community because of episode coning. The Atlas found the rates of both TSH tests and TFTs vary up to about three-fold between local areas in Australia. This is likely to be an underestimate of the true variation across Australia, due to the impact of confidentiality rules on reporting.

What can be done?

Improved policies and arrangements for collection and reporting of MBS data would allow a better understanding of thyroid function testing across Australia. The appropriateness of testing and the benefits gained from these tests could be increased by audit and feedback to clinicians on requesting of tests; increasing access to previous test results with a central repository; changing protocols for further laboratory testing after an initial TSH measurement; and educating general practitioners and consumers.

* Episode coning is a funding arrangement that applies to some MBS pathology items; data confidentiality requirements are rules for protecting the confidentiality of patients and providers. See 'About the data' for more information.

Thyroid function testing

Context

This section includes data on the use of thyroid function testing in adults. It examines two items:

- Thyroid stimulating hormone (TSH) tests: TSH alone†
- Thyroid function tests (TFTs): TSH in combination with free tri-iodothyronine (T3) and/or free thyroxine (T4).

These tests are used to diagnose thyroid dysfunction, such as hypothyroidism (underactive thyroid) and hyperthyroidism (overactive thyroid), and to monitor the response to treatment. They are also used to monitor patients taking other medicines that affect thyroid function.[3]

Thyroid dysfunction is common; the prevalence of hypothyroidism is 3.1% to 5.6%, and the prevalence of hyperthyroidism is 0.4% to 1.3%, in the adult population.[4-6] Thyroid function testing can be used to investigate common problems that may indicate underlying thyroid disease, such as unexplained weight change, fertility problems, menstrual changes, goitre, depression and anxiety, as well as non-specific symptoms such as tiredness.[3] Thyroid function testing may also be performed as part of investigations for older patients with symptoms of dementia or other behavioural changes. The most common reasons for Australian general practitioners (GPs) to request thyroid function testing are hypothyroidism (13.4%) and hyperthyroidism (4.3%), weakness or tiredness (9.4%), and general check-ups (4.9%).[7]

Some variation in the rate of thyroid function testing due to differences in clinical judgement is expected.[8] Symptoms prompting investigation of thyroid disease can be non-specific and subtle.[3,9] However, population screening of asymptomatic patients for thyroid dysfunction is not recommended.[10]

Measuring TSH alone is recommended as the first-line test in most situations to investigate possible thyroid dysfunction.[3] If the TSH level is abnormal, measurement of T4 and possibly T3 may be appropriate to provide further information.[3] In some situations (for example, known or suspected pituitary disease), initial measurement of TSH plus either T3 or T4 is appropriate.[3]

The number of people having thyroid function testing in Australia has increased faster than the rate of population growth. The number of people with MBS claims for thyroid function testing grew by 5.7% per year, compared with approximately 1.6% per year growth in population, between 2012 and 2017.[1,2] GPs request the majority of TSH tests and TFTs in Australia. In 2014–15, they requested approximately 90% of TSH tests and 75% of TFTs.[1] Variation in GPs' requesting rates for thyroid tests has been noted previously, as a small number of GPs have a substantially higher rate of requesting than the average. In 2014–15, the average rate of TSH testing by GPs in Australia was 7 per 100 patients; however, a group of 310 GPs had a rate of between 40 and 173 TSH tests per 100 patients.[1]

Few directly comparable rates of TSH testing are available from other countries, but a study in the United Kingdom found that 12% of patients in a general practice had TSH testing in 2012.[8] Only 2% of the patients had an abnormal result, suggesting that testing could be better targeted without missing diagnoses.[8] Rising rates of thyroid function testing, and large variation in use, have been noted in several countries, and inappropriate requests for tests have been suggested as an important cause.[8,11] Interventions to improve the quality of requesting for thyroid function testing have also been implemented around the world.[12]

† Includes MBS item numbers for TSH tests that do not include testing for T3 or T4.

The MBS Review Taskforce recently recommended a number of changes to MBS items to support appropriate thyroid function testing, as well as education programs for GPs and consumers on appropriate use of TSH tests.[1] The Choosing Wisely initiative includes a Royal Australian College of General Practitioners 'Do not do' recommendation for GPs: 'Don't test thyroid function as population screening for asymptomatic patients'.[10]

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 TSH tests or TFTs 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 MBS data at the time of publication.

Episode coning

MBS items for TSH tests and TFTs are subject to episode coning. Episode coning is an MBS funding arrangement that applies to GPs outside hospitals requesting multiple tests for the same patient on the same day. If more than three items are requested by a GP per patient attendance, benefits are paid only for the three items with the highest fees. The arrangement means that, if a test is requested with three other more expensive tests, it is 'coned out' and may not be included in the MBS dataset. As the MBS fee for TFTs is higher than for TSH tests, TFT data are less affected by this arrangement.

Data suppression

For all MBS items in the Atlas, some data have been suppressed to manage volatility and confidentiality. This process takes into account the Australian Government Department of Health's requirements for reporting MBS data (see the Technical Supplement).

The process has resulted in particularly marked data suppression for MBS items for thyroid function testing. This is indicated on the maps in grey. Most local areas (Statistical Area Level 3 – SA3) were suppressed to prevent identification of the provider (practitioner or business entity). The effect of data suppression was greatest in outer regional and remote areas.

Thyroid function testing

For TSH tests:

- Overall, 53 SA3s were suppressed, which represents 16% of all SA3s and 10% of all services
- 43 SA3s were suppressed to prevent identification of the provider
- The proportion of SA3s suppressed in each remoteness category was 7% in major cities, 24% in inner regional areas, 26% in outer regional areas and 37% in remote areas.

For TFTs:

- Overall, 79 SA3s were suppressed, which represents 23% of all SA3s and 18% of all services
- 67 SA3s were suppressed to prevent identification of the provider
- The proportion of SA3s suppressed in each remoteness category was 16% in major cities, 26% in inner regional areas, 36% in outer regional areas and 47% in remote areas.

What do the data show?

Thyroid stimulating hormone tests

Magnitude of variation

In 2016–17, there were 5,539,805 MBS-subsidised services for TSH tests, representing 28,742 services per 100,000 people aged 18 years and over (the Australian rate).

The number of MBS-subsidised services for TSH tests across 287[§] local areas (Statistical Area Level 3 – SA3) ranged from 15,735 to 40,814 per 100,000 people aged 18 years and over. The rate was **2.6 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 20,106 per 100,000 people aged 18 years and over in Tasmania to 30,640 in New South Wales (Figures 3.4–3.7).

After the highest and lowest 10% of results were excluded and 231 SA3s remained, the number of services 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.

Analysis by remoteness and socioeconomic status

Rates of TSH tests were higher in major cities and in inner regional areas than in outer regional and remote areas. Rates were higher in areas with lower socioeconomic status in major cities, inner regional areas and outer regional areas. The pattern was less clear in remote areas (Figure 3.8).

[§] There are 340 SA3s. For this item, data were suppressed for 53 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.

Thyroid function tests

Magnitude of variation

In 2016–17, there were 2,344,089 MBS-subsidised services for TFTs, representing 12,116 services per 100,000 people aged 18 years and over (the Australian rate).

The number of MBS-subsidised services for TFTs across 261[#] local areas (Statistical Area Level 3 – SA3) ranged from 6,425 to 16,077 per 100,000 people aged 18 years and over. The rate was **2.5 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 8,868 per 100,000 people aged 18 years and over in the Northern Territory to 13,866 in the Australian Capital Territory (Figures 3.9–3.12).

After the highest and lowest 10% of results were excluded and 209 SA3s remained, the number of services 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.

Analysis by remoteness and socioeconomic status

Rates of TFTs were markedly lower in remote areas than in other areas. There was no clear pattern according to socioeconomic status. Suppressed data are included in the calculation of overall rates by remoteness and socioeconomic status (Figure 3.13).

Analysis by sex

Rates of TFTs were 3.2 times as high in females as in males.

In 2016–17, there were 558,142 MBS-subsidised services for TFTs for males aged 18 years and over, representing 5,656 services per 100,000 males (the Australian rate). The number of services varied across states and territories, from 4,072 per 100,000 males in the Northern Territory to 6,527 per 100,000 males in Queensland (Figure 3.1).

In 2016–17, there were 1,785,947 MBS-subsidised TFTs for females aged 18 years and over, representing 18,341 services per 100,000 females (the Australian rate). The number of services varied across states and territories, from 13,490 services per 100,000 females in the Northern Territory to 21,449 per 100,000 females in the Australian Capital Territory (Figure 3.1).

Figure 3.1: Number of MBS-subsidised services for thyroid function tests per 100,000 people aged 18 years and over, age standardised, by state and territory of patient residence, by sex, 2016–17

The data for Figure 3.1 are available at www.safetyandquality.gov.au/atlas

[#] There are 340 SA3s. For this item, data were suppressed for 79 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.

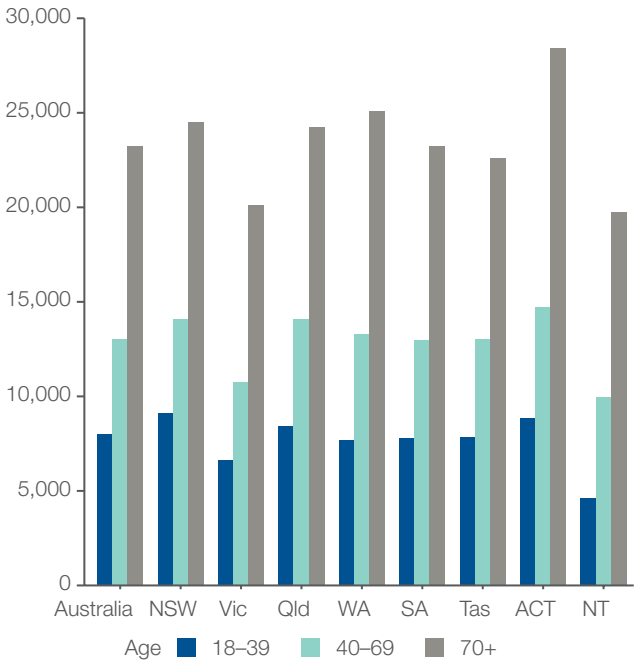
Notes:
Some of the published SA3 rates were considered more volatile than others. These rates are excluded from the calculation of the difference between the highest and lowest SA3 rates in Australia.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Medicare Benefits Schedule data and ABS Estimated Resident Population 30 June 2016.

Thyroid function testing

Analysis by age group

Rates of TFTs were highest for the 70 years and over age group (23,258 services per 100,000 people). The number of services for this age group varied across states and territories, from 19,735 per 100,000 people in the Northern Territory to 28,407 per 100,000 people in the Australian Capital Territory. The rate for the 70 years and over age group was 1.8 times as high as the rate for the 40–69 years age group and 2.9 times as high as the rate for the 18–39 years age group (Figure 3.2).

Figure 3.2: Number of MBS-subsidised services for thyroid function tests per 100,000 people in specific age group, age and sex standardised, by state and territory of patient residence, 2016–17

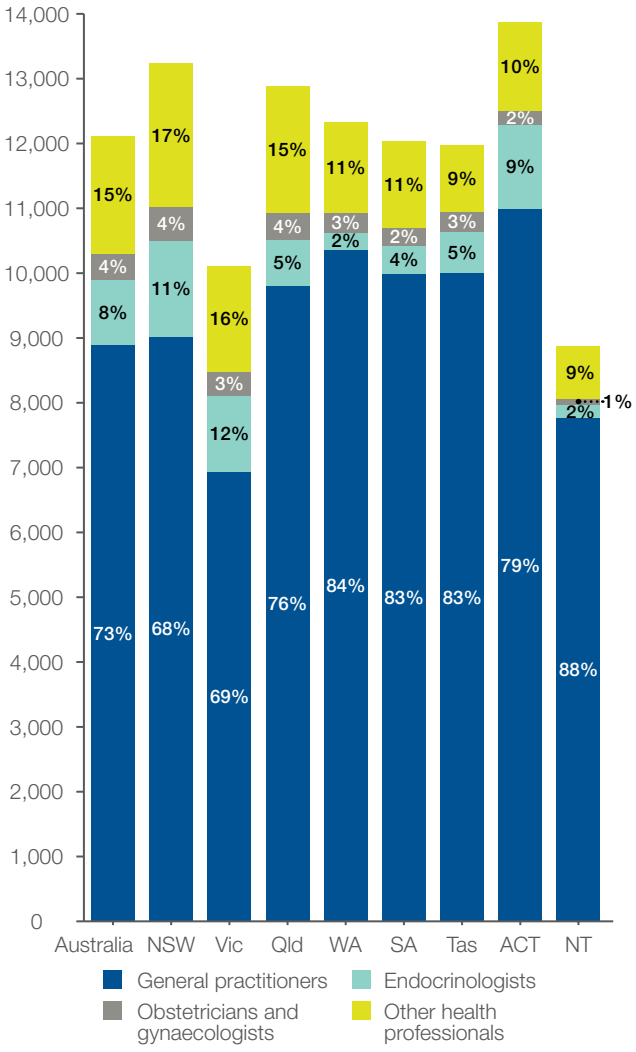


The data for Figure 3.2 and 3.3 are available at www.safetyandquality.gov.au/atlas

Analysis by referrer type

GPs ordered 73% of TFTs in Australia, endocrinologists ordered 8%, obstetricians and gynaecologists ordered 4%, and other health professionals ordered 15%. The proportion ordered by GPs varied from 68% in New South Wales to 88% in the Northern Territory (Figure 3.3).

Figure 3.3: Number of MBS-subsidised services for thyroid function tests per 100,000 people aged 18 years and over, age and sex standardised, by state and territory of patient residence, by referrer type, 2016–17



Notes:
Specialty of referrer was derived for some records for which this information was unknown.
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.

Interpretation

Variation in rates of thyroid function testing is likely to be due to geographical differences in the factors discussed below.

Clinical decision-making

Rates of thyroid function testing will be influenced by clinicians' adherence to guidelines – for example, different approaches to screening patients with TFTs, or the frequency and appropriateness of repeat testing for certain conditions. Clinicians' decision-making, and how clinicians respond to patient requests for testing, also influence requesting of tests.[13]

Clinical information systems may affect the choice of tests. For example, if a short-cut menu in GP software lists TSH tests in combination with TFTs, then it is likely that fewer standalone TSH tests will be ordered.

Rates of underlying disease

Variation is warranted and desirable when it reflects variation in the underlying need for care. Areas with higher rates of thyroid disease, conditions that affect the thyroid such as diabetes, and other symptoms for which TFTs are indicated, are expected to have higher rates of thyroid function testing. Rates of thyroid dysfunction are affected by the local prevalence of iodine deficiency, as iodine is essential for production of thyroid hormones.[14] Tasmania had the highest rate of iodine deficiency in Australia in 2011–12, and Western Australia had the lowest.[14] Iodine deficiency was also more common in inner regional areas of Australia than in major cities (15.4% compared with 11.9%).[14]

Health conditions that are more common in areas of socioeconomic disadvantage, such as obesity, depression and anxiety, may have contributed to the higher rates of TSH testing seen in these areas. TSH testing is recommended for patients with unexplained weight change and tiredness.[3,15]

Access to services

Population groups with more frequent GP visits, and those with greater geographic access to a GP and the ability to pay out-of-pocket costs may be more likely to have thyroid function testing.

Availability of previous test results

Difficulty in accessing previous results of thyroid function testing may contribute to requests for repeat tests.[13] MBS data from 2014 showed that 38% of patients had a repeat TSH test within 12 months of their first test.[1] Ease of access to previous results in computerised record systems may vary and influence local rates of testing.

Episode coning

There are no published data on the extent of episode coning for TSH tests and TFTs. It is also unclear if the proportion of tests 'coned out' varies across the country. Refer to 'About the data' for more information on episode coning.

Pathology provider practices

Differences in pathology provider practices may be a source of variation. For example, recommendations about repeat testing may vary between pathology providers.

Thyroid function testing

Promoting appropriate care

High rates of thyroid function testing in Australia, and the variation between practitioners noted by the MBS Review Taskforce, suggest that standardising practice could have benefits for sustainability of the health system. Successful interventions to improve the quality of requesting for thyroid function testing have included audit and feedback, guidelines, changes to funding policy and educational programs.[12]

The MBS Review Taskforce recently recommended that several of these interventions be put in place to improve the quality of thyroid function testing in general practice: education programs for GPs and consumers, and an audit and feedback program for GPs.[1] The MBS Review Taskforce also recommended changing MBS item descriptors to align with guidelines.[1]

Other strategies that have been suggested for improving the quality of TFT use include a role for laboratories in managing the timing of follow-up TSH testing, improving access to previous test results and narrowing the range of TSH levels that would trigger testing of T4.[13,16,17]

Timing of repeat testing

The appropriateness of repeat TSH testing may deserve particular focus in education. Analysis of TSH testing in Tasmania between 1995 and 2013 showed that the rate of initial testing remained stable, but the rate of follow-up TSH tests increased four-fold.[18] The timing of repeat testing requested by GPs may not align well with guidelines.[17] In a study of people taking levothyroxine therapy in the United Kingdom, the frequency of repeat TSH testing was too short, on average, for patients with normal initial TFT results, and too long for patients with abnormal test results.[17] Direct requesting of follow-up thyroid tests by laboratories (with the facility for override by clinicians) has been suggested as a way to bring patients more quickly to target TSH levels and reduce unnecessary testing.[17]

Access to previous results

Results of previous thyroid function testing requested within a practice, and by clinicians in other practices or in hospital, can be difficult to access.[13] Use of a central repository for test results, such as My Health Record, could reduce unnecessary repeat testing and duplicate requesting of pathology tests.

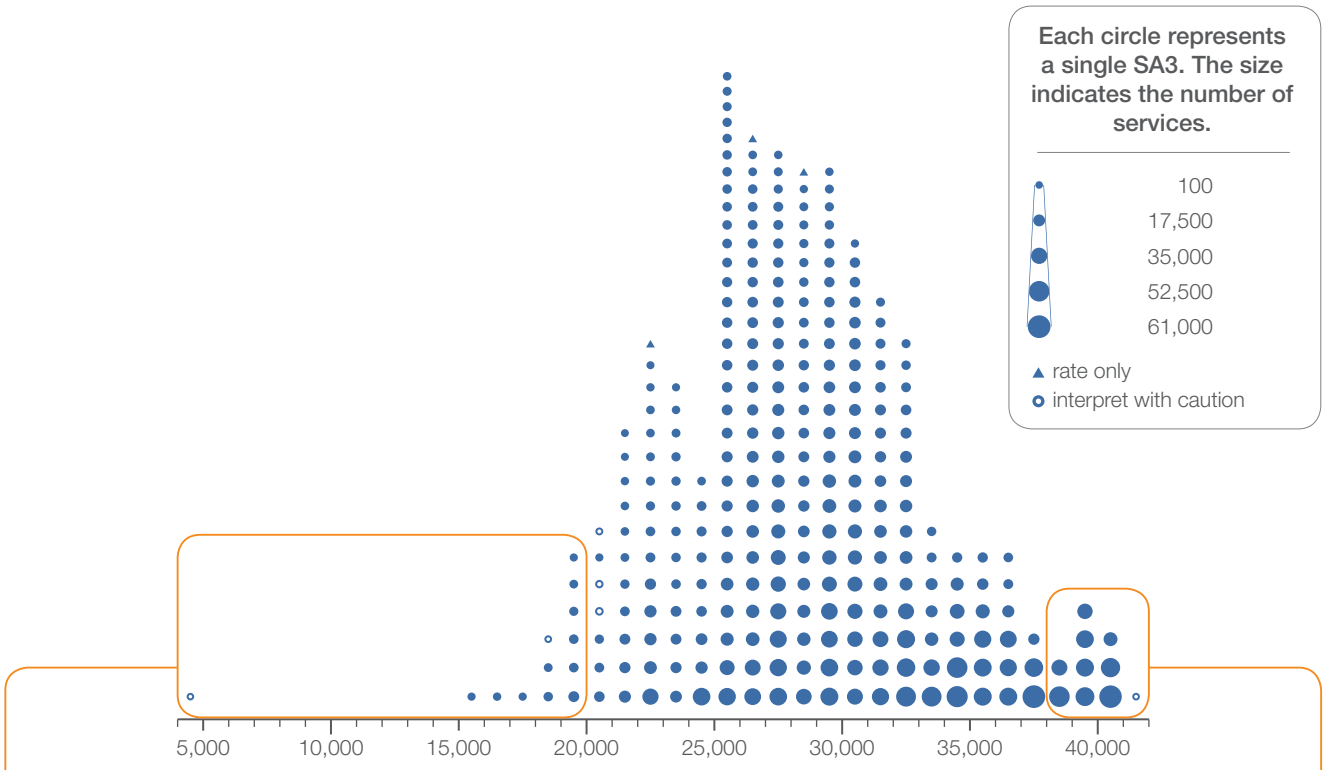
Cut-off levels for reflex testing

Laboratories often measure TSH alone in initial assessment of thyroid function, and measure T4 only if the TSH level is outside the reference range (reflex testing).[16] This means that T4 is measured only when an abnormal result is reasonably likely.[16] There is some evidence that changing the cut-off level of TSH that would trigger reflex testing could reduce the number of T4 tests without adversely affecting patient care.[16]

Thyroid stimulating hormone tests

Rates by local area

Figure 3.4: Number of MBS-subsidised services for thyroid stimulating hormone tests 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
Norfolk Island	OT	**4,438***	76
Whitsunday	Qld	**15,735**	2,676
Far North	Qld	**16,950**	3,568
Snowy Mountains	NSW	**17,456**	2,906
Hobart Inner	Tas	**18,037**	7,802
Barkly	NT	**18,119***	666
Alice Springs	NT	**18,685**	5,264
Hobart - South and West	Tas	**19,048**	5,039
Hobart - North East	Tas	**19,053**	8,400
Tablelands (East) - Kuranda	Qld	**19,071**	6,690
Hobart - North West	Tas	**19,669**	8,472
Sorell - Dodges Ferry	Tas	**19,822**	2,623
Launceston	Tas	**19,995**	13,569

Highest rate areas

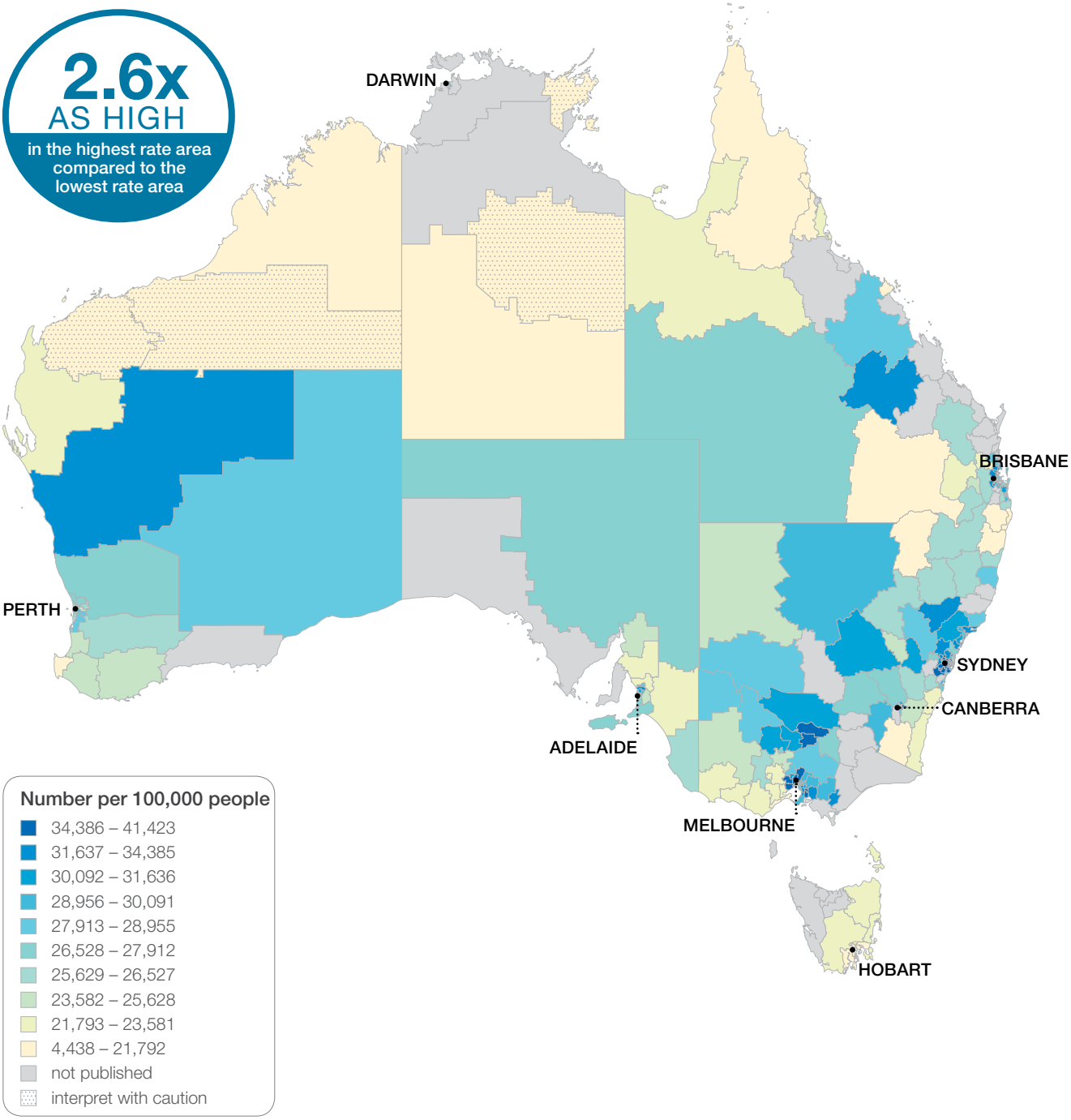
SA3	State	Rate	Services
Canberra East	ACT	**41,423***	421
Blacktown - North	NSW	**40,814**	25,640
Fairfield	NSW	**40,033**	60,113
Tullamarine - Broadmeadows	Vic	**40,033**	47,297
Mount Druitt	NSW	**39,753**	31,600
Merrylands - Guildford	NSW	**39,646**	45,486
Blacktown	NSW	**39,481**	41,021
Canterbury	NSW	**39,290**	42,061
Bankstown	NSW	**38,944**	52,385
Liverpool	NSW	**38,631**	33,999

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.
OT represents other territories.
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.

Thyroid stimulating hormone tests

Rates across Australia

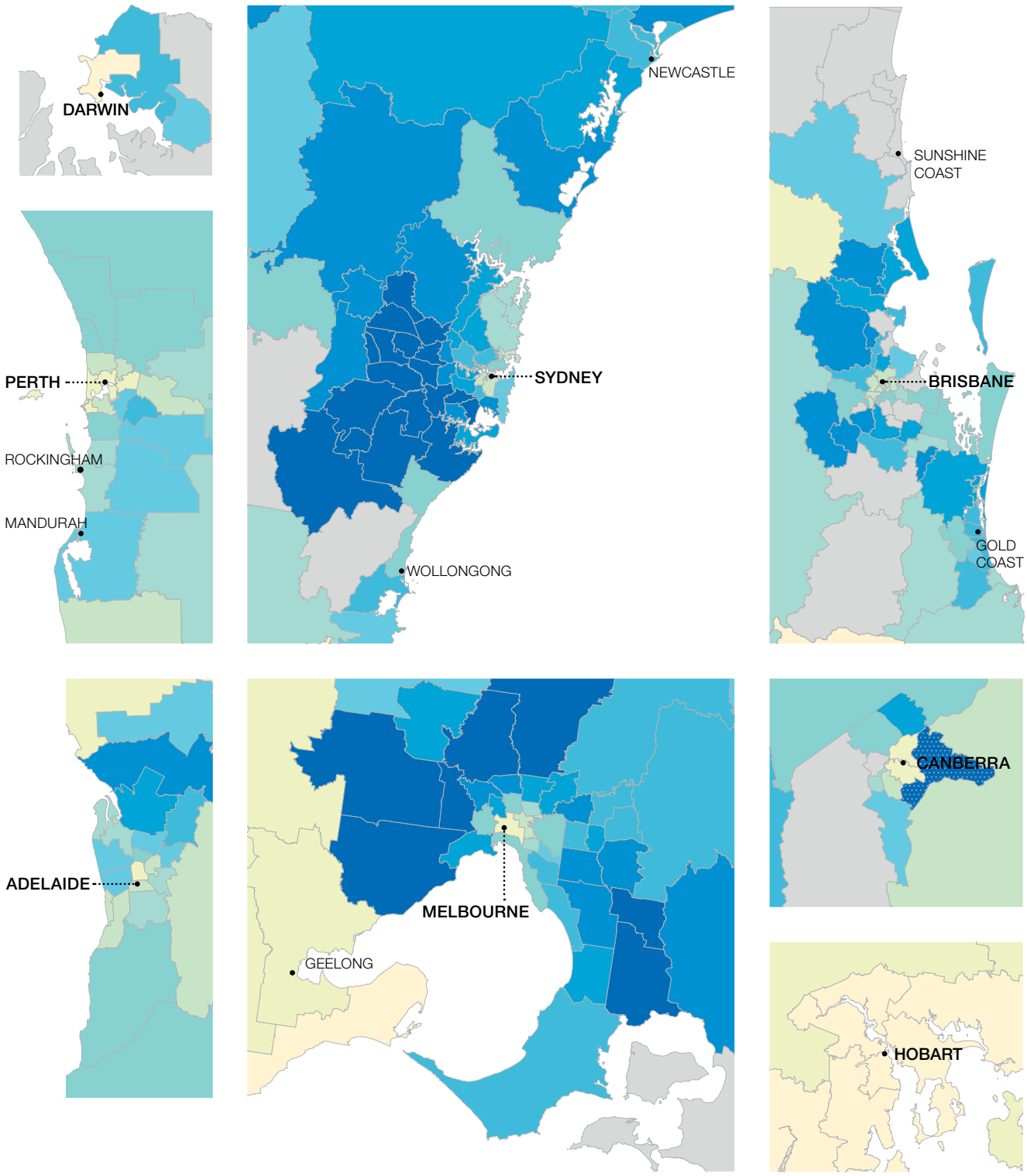
Figure 3.5: Number of MBS-subsidised services for thyroid stimulating hormone tests per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



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 3.6: Number of MBS-subsidised services for thyroid stimulating hormone tests per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



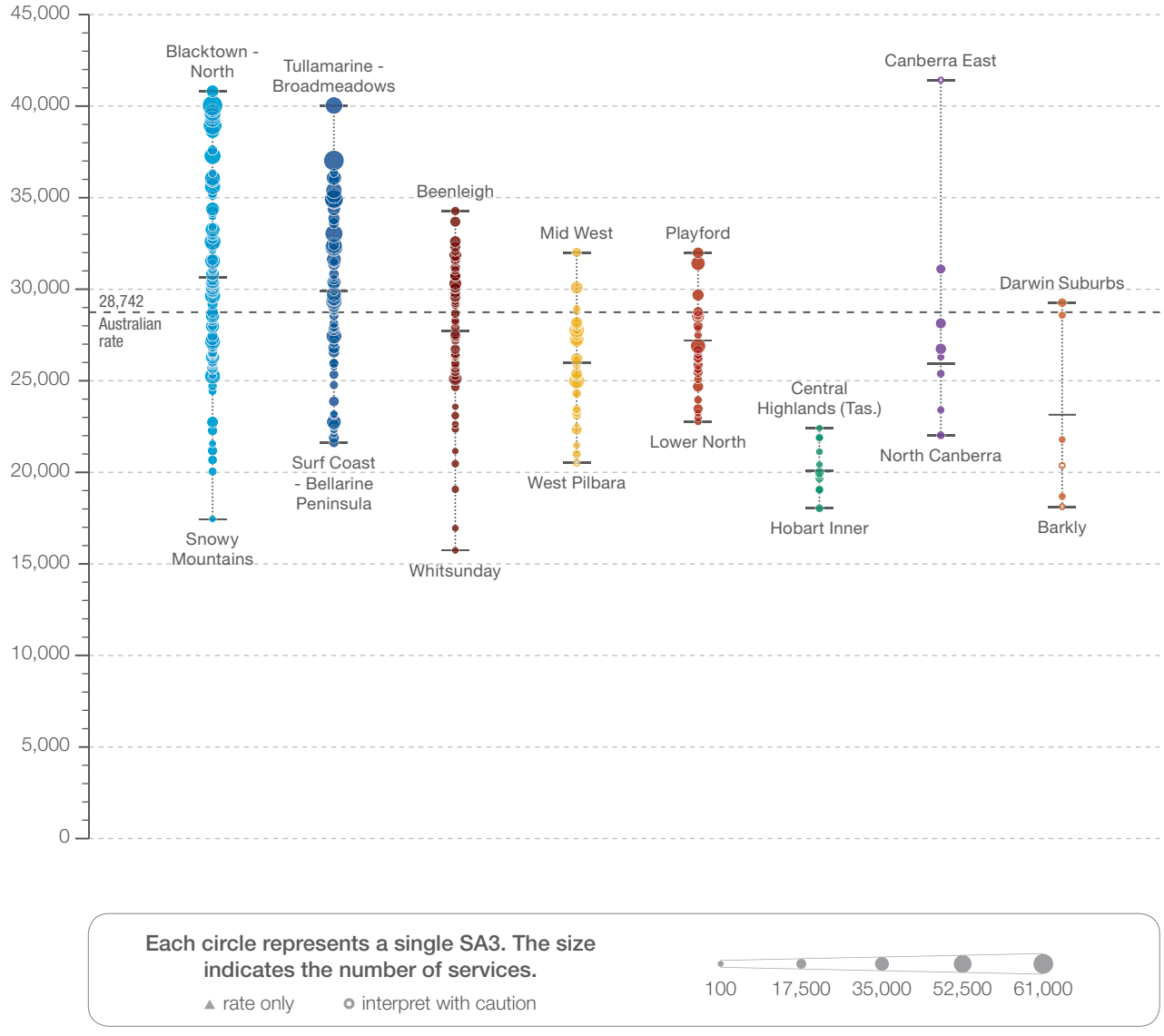
Notes:
Dotted areas indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Medicare Benefits Schedule data and ABS Estimated Resident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

Thyroid stimulating hormone tests

Rates by state and territory

Figure 3.7: Number of MBS-subsidised services for thyroid stimulating hormone tests per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17

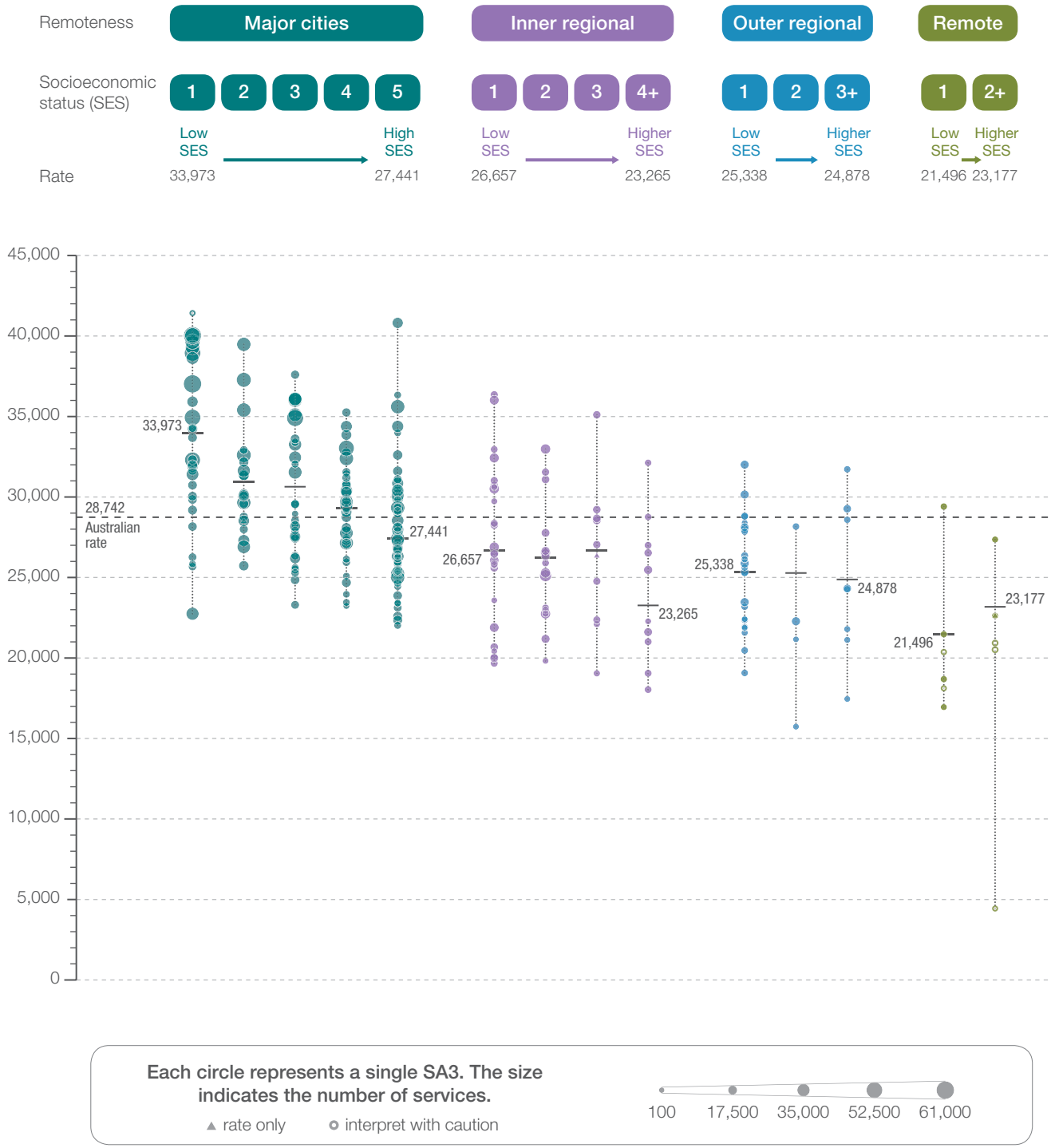
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Highest rate	40,814	40,033	34,270	32,010	31,987	22,417	41,423*	29,270
State/territory	30,640	29,899	27,712	25,988	27,176	20,106	25,920	23,145
Lowest rate	17,456	21,613	15,735	20,515*	22,765	18,037	22,024	18,119*
No. services	1,906,486	1,471,039	1,055,392	514,853	386,639	87,638	79,354	37,837



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 3.8: Number of MBS-subsidised services for thyroid stimulating hormone tests per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



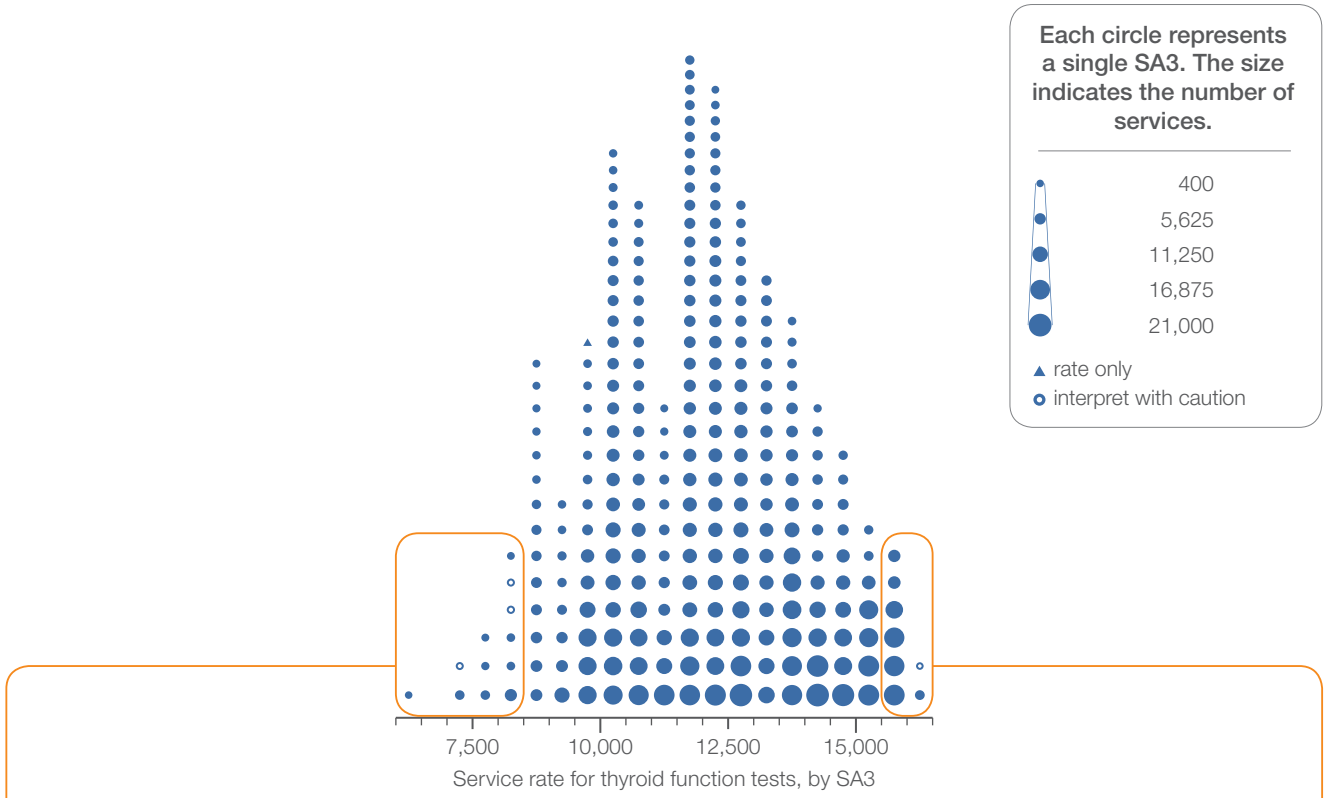
Notes:
Hollow circles (○) indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
Triangles (▲) indicate SA3s where only rates are published. The numbers of services are not published for confidentiality reasons.
For further detail about the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

Thyroid function testing

Thyroid function tests

Rates by local area

Figure 3.9: Number of MBS-subsidised services for thyroid function tests 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
Gascoyne	WA	**6,425**	459
Litchfield	NT	**7,470***	1,097
Gippsland - East	Vic	**7,487**	3,229
Upper Murray exc. Albury	NSW	**7,531**	3,143
Esperance	WA	**7,634**	1,005
Darwin City	NT	**7,664**	1,473
East Pilbara	WA	**8,051***	1,166
Maryborough - Pyrenees	Vic	**8,092**	1,930
Melbourne City	Vic	**8,107**	6,733
Kimberley	WA	**8,230**	1,861
West Pilbara	WA	**8,243***	1,421
Loddon - Elmore	Vic	**8,428**	853

Highest rate areas

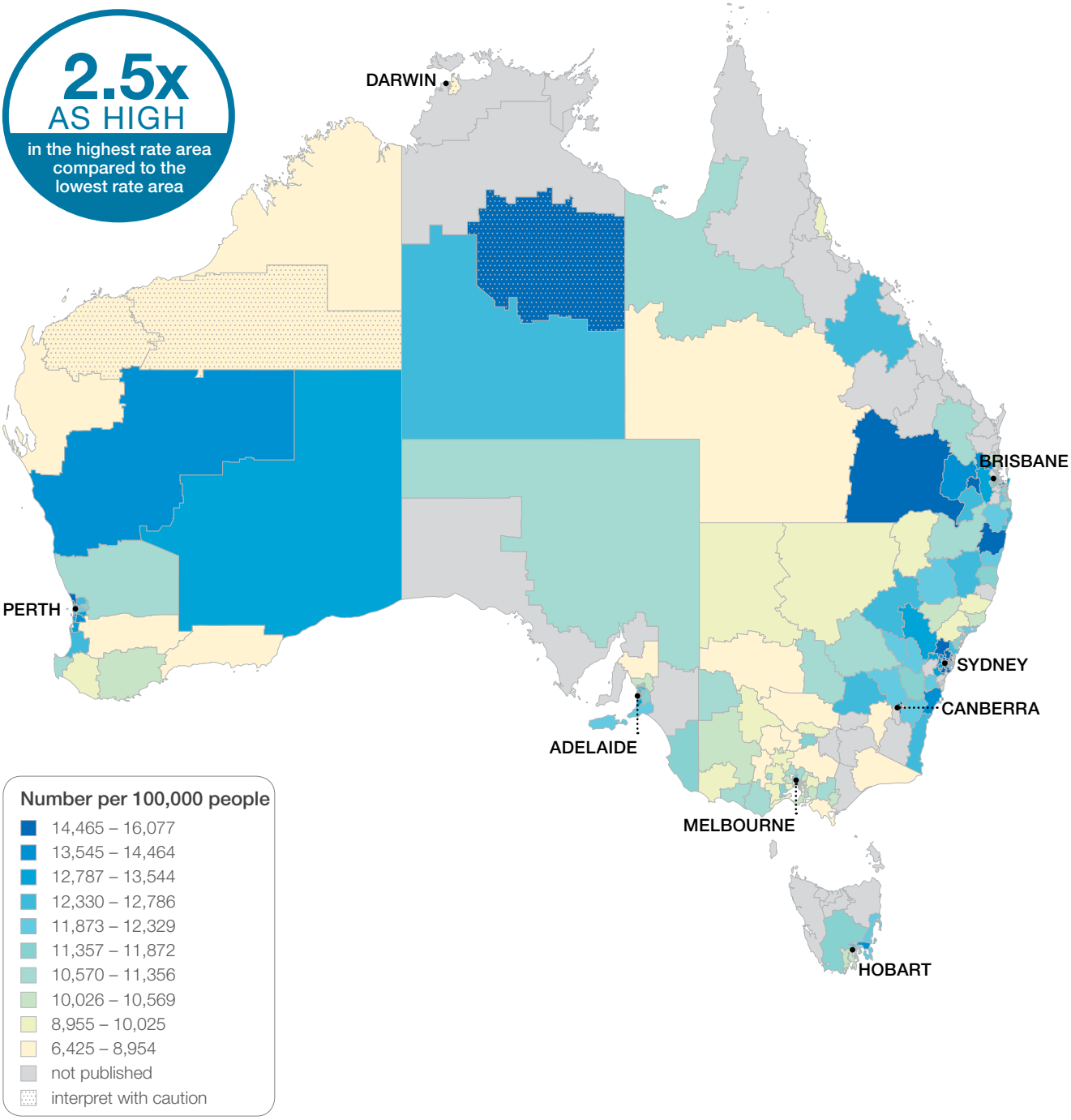
SA3	State	Rate	Services
Dural - Wisemans Ferry	NSW	**16,077**	3,504
Barkly	NT	**16,038***	509
Gungahlin	ACT	**15,983**	6,935
Sutherland - Menai - Heathcote	NSW	**15,927**	14,081
Baulkham Hills	NSW	**15,897**	18,342
Parramatta	NSW	**15,778**	17,670
Clarence Valley	NSW	**15,598**	7,337
Merrylands - Guildford	NSW	**15,587**	17,807

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.

Thyroid function tests

Rates across Australia

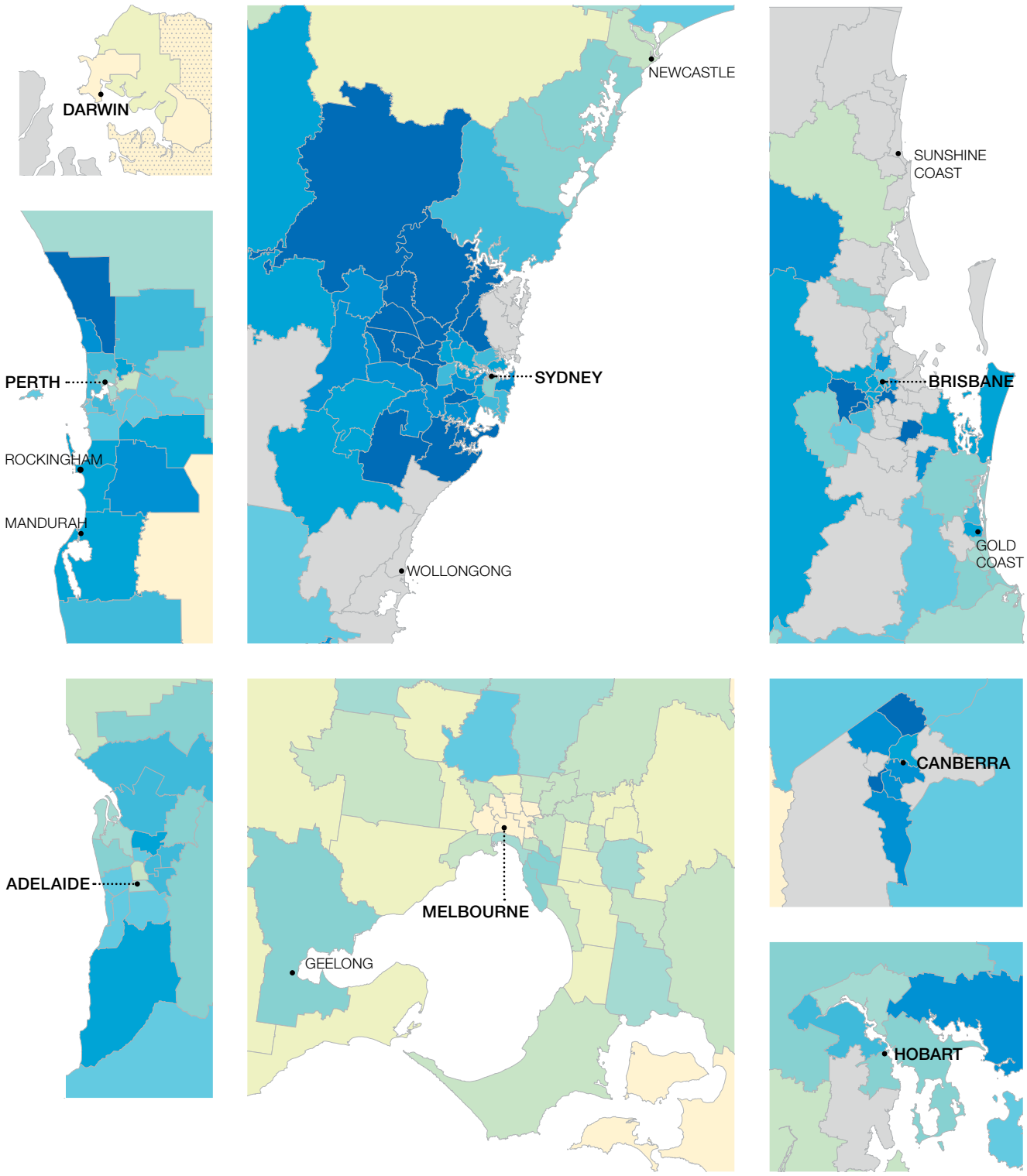
Figure 3.10: Number of MBS-subsidised services for thyroid function tests per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17



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



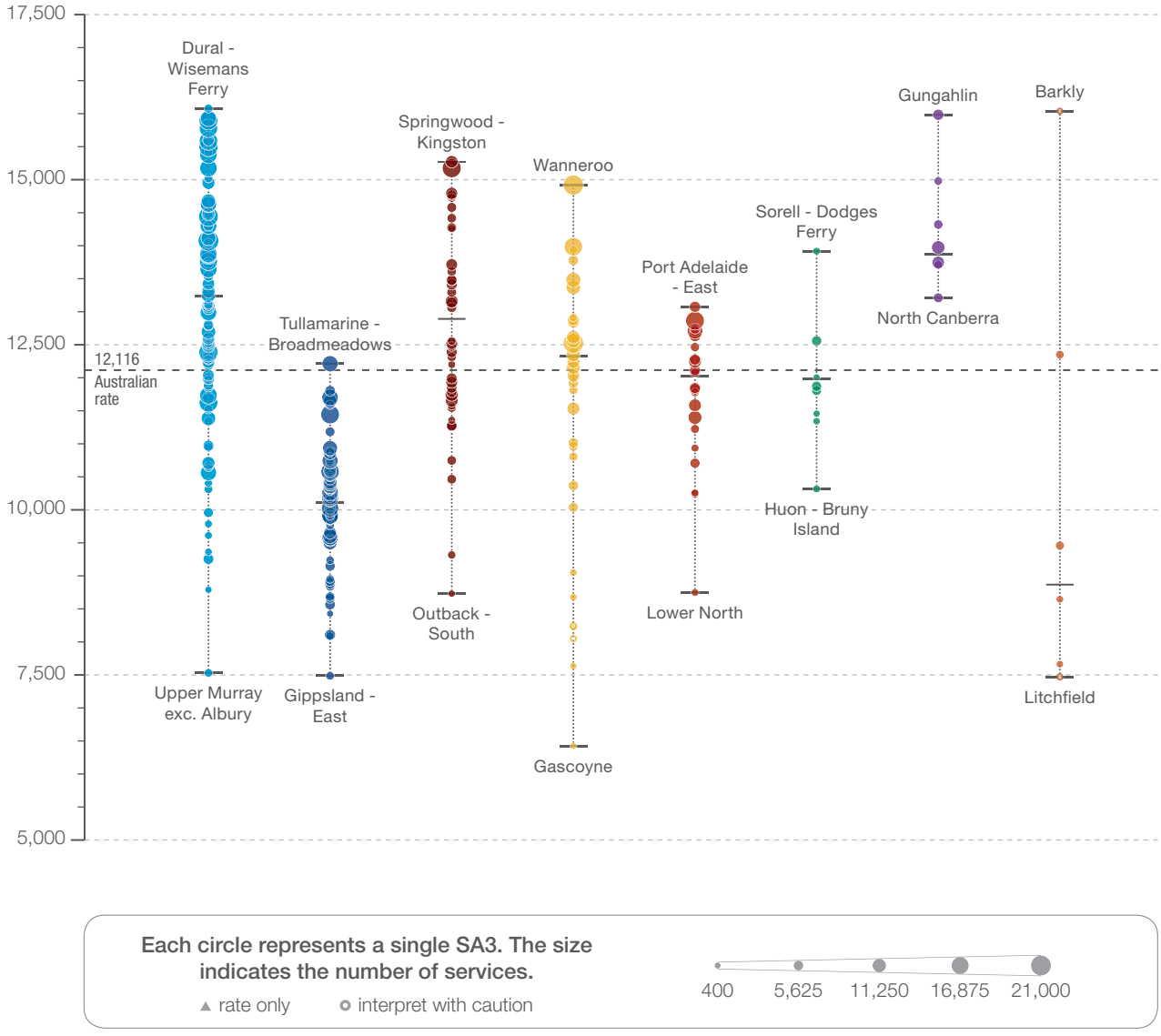
Notes:
Dotted areas indicate rates that are considered more volatile than other published rates and should be interpreted with caution.
For further detail about the methods used, please refer to the Technical Supplement.
Sources: AIHW analysis of Medicare Benefits Schedule data and ABS Estimated Resident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

Thyroid function tests

Rates by state and territory

Figure 3.12: Number of MBS-subsidised services for thyroid function tests per 100,000 people aged 18 years and over, age and sex standardised, by Statistical Area Level 3 (SA3) of patient residence, 2016–17

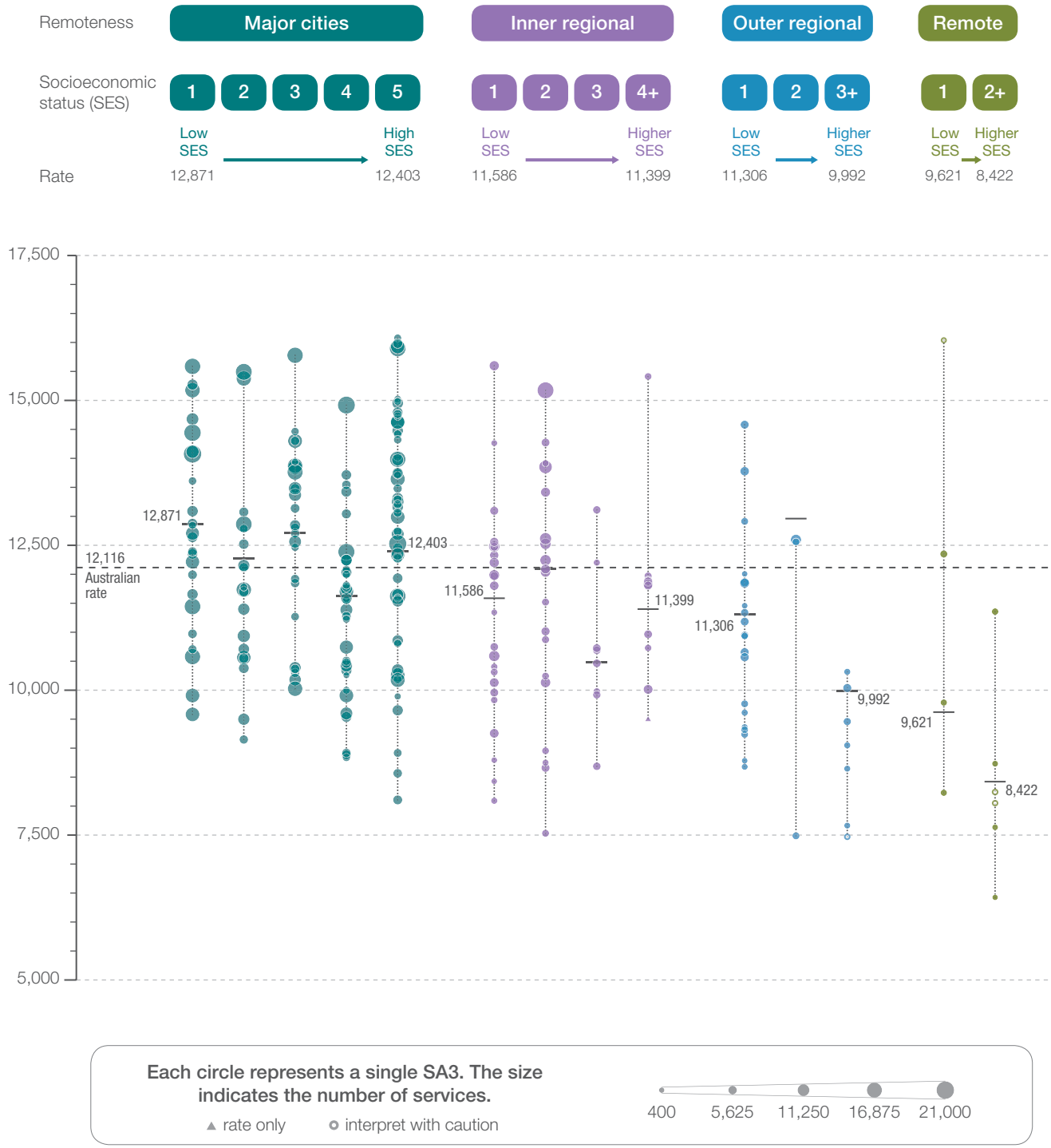
	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Highest rate	16,077	12,214	15,273	14,919	13,074	13,917	15,983	16,038*
State/territory	13,234	10,105	12,892	12,324	12,027	11,978	13,866	8,868
Lowest rate	7,531	7,487	8,732	6,425	8,749	10,317	13,211	7,470*
No. services	824,854	500,080	492,076	243,925	173,540	53,280	42,246	13,879



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 3.13: Number of MBS-subsidised services for thyroid function tests 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.

Thyroid function testing

Resources

- Royal Australian College of General Practitioners, *Guidelines for Preventive Activities in General Practice* (9th edition), Section 15: Screening tests of unproven benefit[19]
- Royal College of Pathologists of Australasia, position statement: Thyroid function testing for adult diagnosis and monitoring, July 2017[3]
- *Therapeutic Guidelines: Endocrinology* (for electronic version, visit http://tgldcdp.tg.org.au/etgcomplete).[20]

Australian initiatives

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

- Royal Australian College of General Practitioners. Choosing Wisely recommendation 10: Don't test thyroid function as population screening for asymptomatic patients[10]
- Endocrine Society of Australia, Choosing Wisely recommendation 5: Don't order a total or free T3 level when assessing thyroxine dose in hypothyroid patients[21]
- Royal Australian and New Zealand College of Obstetricians and Gynaecologists, testing of serum TSH levels in pregnant women.[22]

State and territory initiatives are also in place to improve the appropriateness of thyroid function testing, including:

- Tasmanian Health Pathways, thyroid investigations.

References

1. Medicare Benefits Schedule Review Taskforce. First report from the pathology clinical committee: endocrine tests. Canberra: Australian Government Department of Health; 2017.
2. Australian Bureau of Statistics. Australian demographic statistics [Internet]. Canberra: ABS; 2018 [cited 2018 Sep 6]. Available from: www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0
3. Royal College of Pathologists of Australasia. Thyroid function testing for adult diagnosis and monitoring (position statement). Sydney: RCPA; 2017. www.rcpa.edu.au/getattachment/7bed9076-bcd5-44ac-9d12-ed9a1f69852a/Thyroid-Function-Testing-for-Adult-Diagnosis-and-M.aspx (accessed Dec 2017).
4. Garmendia Madariaga A, Santos Palacios S, Guillen-Grima F, Galofre JC. The incidence and prevalence of thyroid dysfunction in Europe: a meta-analysis. J Clin Endocrinol Metab 2014;99(3):923–31.
5. Hollowell JG, Staehling NW, Flanders WD, Hannon WH, Gunter EW, Spencer CA, et al. Serum TSH, T(4), and thyroid antibodies in the United States population (1988 to 1994): National Health and Nutrition Examination Survey (NHANES III). J Clin Endocrinol Metab 2002;87(2):489–99.
6. O'Leary PC, Feddema PH, Michelangeli VP, Leedman PJ, Chew GT, Knuiman M, et al. Investigations of thyroid hormones and antibodies based on a community health survey: the Busselton thyroid study. Clin Endocrinol (Oxf) 2006;64(1):97–104.
7. Bayram C, Valenti L, Britt H. Orders for thyroid function tests: changes over 10 years. Aust Fam Physician 2012;41(8):555.
8. Werhun A, Hamilton W. Thyroid function testing in primary care: overused and under-evidenced? A study examining which clinical features correspond to an abnormal thyroid function result. Fam Pract 2015;32(2):187–91.
9. Association for Clinical Biochemistry, British Thyroid Association, British Thyroid Foundation. UK guidelines for the use of thyroid function tests. Harrogate, England: British Thyroid Association; 2006. www.british-thyroid-association.org/sandbox/bta2016/uk_guidelines_for_the_use_of_thyroid_function_tests.pdf (accessed Dec 2017).
10. Choosing Wisely Australia. Royal Australian College of General Practitioners: tests, treatments and procedures clinicians and consumers should question – recommendation 10 [Internet]. Sydney: NPS MedicineWise; 2016 [updated 2016 Mar; cited 2018 Jun 26]. Available from: www.choosingwisely.org.au/recommendations/racgp
11. NHS RightCare. The NHS atlas of variation in diagnostic services. London: Public Health England; 2013.
12. Zhelev Z, Abbott R, Rogers M, Fleming S, Patterson A, Hamilton WT, et al. Effectiveness of interventions to reduce ordering of thyroid function tests: a systematic review. BMJ Open 2016;6(6):e010065.
13. Hardwick R, Heaton J, Griffiths G, Vaidya B, Child S, Fleming S, et al. Exploring reasons for variation in ordering thyroid function tests in primary care: a qualitative study. Qual Prim Care 2014;22(6):256–61.
14. Australian Bureau of Statistics. Australian Health Survey: biomedical results for nutrients, 2011–12. Feature article: iodine. Canberra: ABS; 2013.
15. Australian Bureau of Statistics. National Survey of Mental Health and Wellbeing: summary of results. Canberra: ABS; 2007.
16. Henze M, Brown SJ, Hadlow NC, Walsh JP. Rationalizing thyroid function testing: which TSH cutoffs are optimal for testing free T4? J Clin Endocrinol Metab 2017;102(11):4235–41.
17. Scargill JJ, Livingston M, Holland D, Khan A, Duff CJ, Fryer AA, et al. Monitoring thyroid function in patients on levothyroxine: audit findings and suggested change in practice. Int J Clin Pract 2017;71(1). doi: 10.1111/ijcp.12877.
18. Hong A, Stokes B, Otahal P, Owens D, Burgess JR. Temporal trends in thyroid-stimulating hormone (TSH) and thyroid peroxidase antibody (ATPO) testing across two phases of iodine fortification in Tasmania (1995–2013). Clin Endocrinol (Oxf) 2017;87(4):386–93.
19. Royal Australian College of General Practitioners. 15 – Screening tests of unproven benefit. In: Guidelines for preventive activities in general practice. 9th ed [Internet]. Melbourne: RACGP; 2016 [cited 2018 Jun 26]. Available from: https://www.racgp.org.au/clinical-resources/clinical-guidelines/key-racgp-guidelines/view-all-racgp-guidelines/red-book/screening-tests-of-unproven-benefit
20. Therapeutic guidelines: endocrinology. Version 5. Melbourne: Therapeutic Guidelines Limited; 2014.
21. Choosing Wisely Australia. The Endocrine Society of Australia: tests, treatments and procedures clinicians and consumers should question – recommendation 5 [Internet]. Sydney: NPS MedicineWise; 2016 [updated 2016 Mar; cited 2018 Jun 26]. Available from: www.choosingwisely.org.au/recommendations/esa
22. Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Testing for hypothyroidism during pregnancy with serum TSH. Melbourne: RANZCOG; 2015. https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical-Obstetrics/Testing-for-hypothyroidism-during-pregnancy-with-serum-TSH-(C-Obs-46)-Review-July-2015.pdf?ext=.pdf (accessed Jun 2018).