AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

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National Health Performance Authority

Australian Atlas of Healthcare Variation

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While the atlas has been created in consultation with many individuals and organisations, the Commission is responsible for developing the key findings and recommendations.

The Commission has consulted with the following colleges and organisations and gratefully acknowledges their contributions:

- The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG)
- The Royal Australian and New Zealand College of Ophthalmologists (RANZCO)
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- The Royal Australasian College of Surgeons (RACS)
- The Royal Australian College of General Practitioners (RACGP)
- Pain Australia

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Atlas Advisory Group

The Atlas Advisory Group has representatives from relevant clinical colleges and provided clinical advice.

- **Chair: Professor Anne Duggan**
  Senior Gastroenterologist, Hunter New England Local Health District NSW; Conjunct Professor, School of Medicine and Public Health, University of Newcastle; Senior Medical Advisor, Australian Commission on Safety and Quality in Health Care
- **Ms Janet Anderson**
  August 2014 – August 2015; previously First Assistant Secretary, Acute Care Division, Australian Government Department of Health
- **Dr Matthew Anstey**
  Emergency and intensive care physician, Sir Charles Gairdner Hospital WA; Medical Advisor, Australian Commission on Safety and Quality in Health Care
- **Dr Sarah Dalton**
  Representative of the Royal Australasian College of Physicians; Clinical Director, Clinical Excellence Commission; Paediatric Emergency Physician, The Children's Hospital at Westmead NSW
- **Associate Professor Adam Elshaug**
  June 2015 – present; HCF Research Foundation Principal Research Fellow, Menzies Centre for Health Policy, University of Sydney NSW
- **Ms Alanna Foster**
  September 2015 – present; First Assistant Secretary, Research Data and Evaluation Division, Australian Government Department of Health
- **Dr Steve Hambleton**
  General Practitioner QLD; Immediate Past President, Australian Medical Association; Chairman, National eHealth Transition Authority
- **Ms Jenny Hargreaves**
  Senior Executive, Hospitals, Resourcing and Classifications Group, Australian Institute of Health and Welfare
- **Mr Tony Lawson**
  Chair, Consumers Health Forum of Australia

Acknowledgements

- **Dr Lawrence Malisano**
  June 2015 – present; Representative of the Royal Australasian College of Surgeons; Orthopaedic Surgeon
- **Dr Liz Marles**
  General Practitioner; Immediate Past President of the Royal Australian College of General Practitioners; Director, Hornsby-Brooklyn GP Unit
- **Professor Villis Marshall AC**
  Chair, Australian Commission on Safety and Quality in Health Care
- **Dr Roderick McKay**
  Chair, Community Collaboration Committee, Royal Australian and New Zealand College of Psychiatrists; Director, Psychiatry and Mental Health Programs, New South Wales Institute of Psychiatry
- **Professor Michael Permezel**
  President, Royal Australian and New Zealand College of Obstetricians and Gynaecologists; Professor of Obstetrics & Gynaecology, Mercy Hospital for Women and University of Melbourne VIC
- **Associate Professor Ian Scott**
  Representative of the Royal Australasian College of Physicians; Department of Internal Medicine and Clinical Epidemiology, Princess Alexandra Hospital; School of Medicine, University of Queensland
- **Professor John Slavotinek**
  Representative of the Royal Australian and New Zealand College of Radiologists; Clinical Director, SA Medical Imaging; Clinical Head, Medical Imaging, Country Health SA, Flinders Medical Centre and Repatriation General Hospital
- **Associate Professor Peter Stewart**
  Representative of the Royal College of Pathologists of Australasia; Director, Pathology, Sydney South West Pathology
- **Mr Simon Williams**
  August 2014 – May 2015; Representative of the Royal Australasian College of Surgeons, Orthopaedic Surgeon and Clinical Director of Acute Services University Hospital Geelong

Jurisdictional Advisory Group

The Jurisdictional Advisory Group has a representative from each state and territory and provided advice on methods and content.

- **Chair: Dr Nigel Lyons**
  Chief Executive, Agency for Clinical Innovation, NSW
- **Professor Dinesh K Arya**
  Chief Medical Officer & Chief Health Officer, Department of Health NT
- **Ms Anna Burgess**
  Director, Clinical Networks & Cancer Program, Department of Health & Human Services VIC
- **Ms Lynne Cowan**
  Director System Design and Strategy, Policy and Commissioning Division, Department for Health and Ageing, Government of South Australia
- **Dr Audrey Koay**
  Acting Executive Director, Patient Safety and Quality, Clinical Services and Research Division, Department of Health WA
- **Dr Grant Sara**
  Director InforMH, Health System Information and Performance Reporting Branch, NSW Ministry of Health; University of Sydney NSW
- **Dr Kelly Shaw**
  Specialist Medical Advisor, Department of Health and Human Services TAS
- **Ms Kirstine Sketcher-Baker**
  Senior Director Patient Safety and Quality Improvement Service, Queensland Health
- **Associate Professor Girish Talaulikar**
  Medical Advisor, Health Quality and Safety Unit, ACT Health
- **Mr Peter Woodley**
  Assistant Secretary, Performance, Accountability and Evaluation Branch, Australian Government Department of Health

Expert Advisory Group on Knee Pain

The Expert Advisory Group on Knee Pain was established to support the Commission's work on healthcare variation.

- **Chair: Professor John North**
  Clinical Director, Queensland and Northern Territory Audits of Surgical Mortality, Royal Australasian College of Surgeons
- **Professor Rachelle Buchbinder**
  Rheumatologist, Monash University; Cabrini Institute VIC
- **Ms Wendy Favorito**
  Consumer Director, Arthritis Australia
- **Dr Howard Galloway**
  Representative of the Royal Australian and New Zealand College of Radiologists
- **Professor Ian Harris**
  Professor of Orthopaedic Surgery, UNSW Australia; Director of surgical specialties, South Western Sydney Local Health District NSW
- **Dr Anthony Hobbs**
  Principal Adviser, Strategic Policy and Innovation Group, Australian Government Department of Health
- **Dr Lawrence Malisano**
  July 2015 – present; Representative of the Royal Australasian College of Surgeons; Orthopaedic Surgeon
- **Dr Sandra Mejak**
  Sport and Exercise Medicine Physician; Australasian College of Sports Physicians; Sports Medicine Australia
- **Mrs Helen Mikolaj**
  Consumers Health Forum
- **Mr Tim Noblet**
  Consultant Musculoskeletal Physiotherapist; Professional Advisor, Australian Physiotherapy Association
- **Mr John Stubbs**
  CanSpeak Australia
- **Ms Lesley Thomas**
  Representative of the Australian & New Zealand Orthopaedic Nurses Association; Orthopaedic Nurse Practitioner, Queen Elizabeth Hospital, SA
- **Mr Simon Williams**
  December 2014 – June 2015; Representative of the Royal Australasian College of Surgeons; Orthopaedic Surgeon and Clinical Director of Acute Services University Hospital Geelong, VIC
- **Associate Professor Michael Yelland**
  Representative of the Royal Australian College of General Practitioners; Associate Professor in Primary Health Care, School of Medicine and Menzies Health Institute Griffith University; General and Musculoskeletal Medicine Practitioner

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- **Dr Shamasunder Acharya**
  Clinical Director, Diabetes, Hunter New England Local Health District; Senior Staff Specialist, General Medicine/Endocrinology NSW
- **Dr John Atherton**
  Director of Cardiology, Royal Brisbane and Women's Hospital; Associate Professor, School of Medicine, University of Queensland
- **Dr Ross Bradbury**
  Clinical Microbiologist and Infectious Diseases Consultant, Hornsby Ku-ring-gai Hospital, Dubbo Base Hospital; Consultant in Infectious Diseases, Sydney Adventist Hospital and Strathfield Private Hospital NSW
- **Ms Lesley Brydon**
  Chief Executive Officer, Pain Australia
- **Associate Professor Nick Buckmaster**
  Director of Internal Medicine, Gold Coast Hospital and Health Service QLD
- **Professor Jacqueline Close**
  Geriatrician, Prince of Wales Hospital, Randwick; NeuRA, UNSW Australia

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- **Dr Katherine Ellard**
  Gastroenterologist; Honorary Secretary, Gastroenterological Society of Australia
- **Professor Mark Frydenberg**
  Department of Surgery, Monash University; Department of Urology, Monash Health VIC
- **Dr Rohan Grimley**
  Geriatrician and Stroke Physician, Sunshine Coast Clinical School, University of Queensland; Chair Queensland stroke clinical network
- **Associate Professor Harriet Hiscock**
  Paediatrician, the Royal Children's Hospital; Co-Leader, Community Health Services Research, Murdoch Childrens Research Institute VIC
- **Mr Kelvin Hill**
  National Manager Clinical Programs, National Stroke Foundation
- **Dr Simon Holliday**
  General Practitioner; Chair, Pain Management Network, National Faculty of Specific Interests, Royal Australian College of General Practitioners; Staff Specialist, Drug and Alcohol Clinical Services, Hunter New England Local Health District NSW
- **Dr Caroline Johnson**
  General Practitioner
- **Professor Louisa Jorm**
  Director, Centre for Big Data Research in Health, UNSW Australia
- **Dr Nick Kowalenko**
  Chair, Faculty of Child and Adolescent Psychiatry, Royal Australian and New Zealand College of Psychiatrists; Senior Clinical Lecturer, University of Sydney NSW
- **Mr Peter Lazzarini**
  Senior Research Fellow (Podiatry), Metro North Hospital and Health Service; Queensland University of Technology QLD
- **Professor Daniel O'Connor**
  Professorial Fellow, Institute for Health and Ageing, Australian Catholic University; Professor Emeritus, Department of Psychiatry, Monash University VIC
- **Dr Nicole Organ**
  Vascular Surgeon, Director, Vascular Surgery, John Hunter Hospital, Hunter New England Local Health District NSW
- **Dr Nigel Roberts**
  Director of Obstetrics and Gynaecology, Manning Hospital, Hunter New England Local Health District NSW
- **Professor Libby Roughead**
  School of Pharmacy and Medical Sciences, University of South Australia
- **Dr Tim Semple**
  Specialist anaesthetist and pain medicine physician, Royal Adelaide Hospital SA
- **Dr Hannah Seymour**
  Consultant Geriatrician; Medical Co-Director, Fiona Stanley Hospital WA
- **Dr Gary Speck**
  Immediate Past National Chairman, Australian Society of Orthopaedic Surgeons
- **Professor Gerard Sutton**
  Douglas & Mary Douglas Chair Clinical Ophthalmology & Eye Health, Professor Corneal & Refractive Surgery, Save Sight Institute, Sydney Medical School, Sydney University; Medical Director, Lions NSW Eye Bank, Sydney Eye Hospital NSW
- **Professor Hugh R Taylor AC**
  Laureate Professor, Harold Mitchell Chair of Indigenous Eye Health, Melbourne School of Population and Global Health, University of Melbourne VIC
- **Professor John Turnidge**
  Emeritus Senior Staff Specialist, Microbiology and Infectious Diseases, SA Pathology; Senior Medical Advisor, Australian Commission on Safety and Quality in Health Care
- **Dr Neil A Vallance**
  Head of Department Otolaryngology, Head and Neck Surgery, Monash Health VIC

Commission staff

- **Adjunct Professor Debora Picone AM**
  Chief Executive Officer
- **Dr Heather Buchan**
  Director, Implementation Support
- **Dr Nicola Dunbar**
  Director, Strategy and Development
- **Ms Hayley Forbes**
  Project Officer
- **Ms Gillian Giles**
  Project Lead
- **Dr Robert Herkes**
  Clinical Director
- **Dr Niall Johnson**
  Senior Project Officer
- **Ms Catherine Katz**
  Director, Safety and Quality Improvement Systems and Inter-government Relations
- **Ms Julie Letts**
  Manager, Implementation Support
- **Ms Justine Marshall**
  Project Officer
- **Ms Kathy Meleady**
  Director, Commonwealth Programs
- **Ms Amanda Mulcahy**
  Senior Project Officer
- **Mr Luke Slawomirski**
  Manager, Implementation Support
- **Ms Kerryn Viana**
  Project Officer
- **Ms Coral Warren**
  Senior Project Officer

Authority staff

- **Dr Diane Watson**
  Chief Executive Officer
- **Ms Ainsley Burgess**
  Performance Reports Content Manager
- **Mr Glenn Draper**
  Health Data Analyst
- **Ms Katherine Faulks**
  Director, Healthy Communities Reports
- **Mr Michael Frost**
  Executive Director
- **Dr Tsun Ho**
  Senior Analyst
- **Ms Fiona Horn**
  Assistant Director, Hospitals Performance Reports
- **Dr Huibo Ji**
  Health Data Analyst/Biostatistician
- **Ms Robyn Kingham Edwards**
  Assistant Director, Performance Reports
- **Mr Andrew McMahon**
  Director, Performance Measurement and Improvement
- **Mr Terry Meng**
  Health Data Analyst
- **Mr Dan O'Halloran**
  Director, Financial Performance Reports
- **Mr Suraj Rasakulasingam**
  Health Data Analyst
- **Mr Ross Saunders**
  Health Data Analyst
- **Dr Jessica Stewart**
  Director, Hospitals and Healthy Communities Reports
- **Ms Melanie Taylor**
  Director, Information Management and Strategy Unit
- **Ms Kate van Exter**
  Graphic Designer
- **Mr William Watson**
  Cartographer

Table of contents

Foreword

The *Australian Atlas of Healthcare Variation* illuminates variation in health care provision across Australia. The atlas embodies our shared aim of providing information to improve the appropriateness of care for populations and individuals in Australia and increasing the value obtained from resources allocated to health.

While the atlas does not have all the answers about how to do this, its findings suggest some ways forward.

Variation in the use of healthcare services can be due to underlying differences in the need for care. Some variation in health care is warranted and even desirable, given differences in the health of populations. As the atlas indicates, variations may also reflect different patient preferences.

But sometimes variation in health care occurs when people with the same health conditions, concerns or problems do not receive the same care as other people with the same problems. Depending on where they live, or which health service or health professional they consult, their care may be managed differently. Unwarranted variation may mean that some people are receiving inappropriate or unnecessary care, while others may be missing out on care that might be beneficial.

We are delighted that the Commission's work on variation is already encouraging wider conversations about the appropriateness of healthcare interventions, and their potential benefits and harms.

The atlas is a powerful resource to inform efforts to identify and reduce unwarranted variation in health care, while also highlighting some population health concerns that warrant further investigation.

We are confident the atlas will stimulate clinical engagement, leadership and interest at local, state and territory, and national levels.

Professor Villis Marshall, AC
Chair

Australian Commission on Safety and Quality in Health Care

26 November 2015

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Overview

Antimicrobial dispensing

- Australia has very high overall rates of community antimicrobial use compared with some countries. In 2013–14, more than 30 million PBS prescriptions for antimicrobials were dispensed.

Diagnostic interventions

- Nearly 600,000 MBS-funded fibre optic colonoscopies were performed in Australia in 2013–14. Very large variations were seen across the country – the area with the highest rate was 30 times higher than that of the area with the lowest rate.
- In 2013–14, 314,000 MBS-funded computed tomography scans were performed on the lumbar spine with marked variation across the country. Inappropriate use of diagnostic imaging exposes patients to unnecessary radiation.

Modern medicine is characterised by an increasing expectation that people will receive care that is evidence based. Despite this expectation the safety and quality of health care varies, both across geographic areas and among individual clinicians. Understanding this variation is critical to improving the quality, value and appropriateness of health care. Some variation is desirable and warranted – it reflects differences in people's need for health care. But where variation is unwarranted, it signals that people are not getting appropriate care. Examining variation is an important first step in identifying and addressing unwarranted variation.

The Australian Commission on Safety and Quality in Health Care (the Commission) has collaborated with the Australian, state and territory governments, specialist medical colleges, clinicians and consumer representatives to develop the *Australian Atlas of Healthcare Variation* (the atlas).

For many years, Australia has been reporting on aspects of healthcare variation for performance and statistical purposes at both state[1] and national levels.[2,3,4] This is the first time that data from the Medicare Benefits Schedule (MBS), Pharmaceutical Benefits Scheme (PBS) and Admitted Patient Care National Minimum Data Set (APC NMDS) have all been used to explore variation across different healthcare settings. In addition, this is the first Australian atlas where healthcare variation across the country has been presented alongside national recommendations for action.

We now have a clear picture of substantial variation in healthcare use across the country, and across many areas of health care. Some of this observed variation will be warranted and associated with need-related factors such as underlying differences in the health of specific populations, or personal preferences.

Surgical interventions

- Rates of MBS-funded knee arthroscopy in people aged 55 and over were seven times higher in some areas of Australia than in others. Despite the evidence that knee arthroscopy is of little benefit for people with osteoarthritis, and may in fact cause harm, more than 33,000 operations were performed in Australia.
- Women living in regional areas of Australia were up to five times more likely to undergo a hysterectomy or endometrial ablation for abnormal uterine bleeding than those living in cities.
- Patients in some areas of Australia were seven times more likely to undergo MBS-funded cataract surgery than those in some other areas, with more than 160,000 operations recorded in 2013–14.

Opioid dispensing

- In 2013–14, nearly 14 million prescriptions were dispensed through the PBS for opioid medicines. The number of prescriptions dispensed was 10 times higher in the area with the highest rate compared to the area with the lowest rate. There is no apparent explanation for this, although the availability of other options for treatment of non-cancer pain may be a factor.

Interventions for chronic diseases

- In remote areas, hospital admission rates for adults were markedly higher than in metropolitan areas for:
  - heart failure
  - asthma and chronic obstructive pulmonary disease
  - diabetes-related lower limb amputation.
- While Australians have higher rates of asthma compared with other countries, hospitalisation rates are low. From 2010–11 to 2012–13, on average around 15,000 children and young people were admitted to hospital for asthma in Australia each year. This may reflect a strong emphasis on using asthma management plans in primary care.

However, the weight of evidence in Australia and internationally suggests that much of the variation documented in the atlas is likely to be unwarranted.[5] It may reflect differences in clinicians' practices, in the organisation of health care, and in people's access to services. It may also reflect poor-quality care that is not in accordance with evidence-based practice. This unwarranted variation may mean that some people are missing out on health care that could have helped them – such as cataract surgery – while others are having interventions that are unlikely to be of benefit. Overuse of some interventions – such as unnecessary antimicrobials – may cause harm. Recognition is growing internationally that more health care is not necessarily better health care.

The atlas has identified opportunities for improving the health care Australians receive. Importantly, it identifies a number of geographic and clinical areas where marked variation in practice is occurring. The important relationship between socioeconomic disadvantage and illness is reflected in the findings of many of the analyses. In disadvantaged areas, people tend to have poorer health and thus a greater need for health care. People in disadvantaged areas may also have less access to healthcare services, which can compound the existing disadvantage. For example, one reason for the variation in the dispensing of psychotropic medicines may be a lack of access to affordable, accessible mental health services in rural or disadvantaged areas, with limited availability of psychosocial interventions as alternatives to medical treatments.

Some interventions are used more in areas of higher socioeconomic status, or are mainly provided in private settings. These are therefore less accessible for people who do not have private health insurance. For example, rates of cataract surgery are lowest in areas of low socioeconomic status and increase with rising socioeconomic status. The atlas suggests that it would be worthwhile examining this issue further by looking at provision in both the public and private sectors and the extent to which variation in interventions for some conditions is linked to access to private health insurance.

In addition to the general theme of socioeconomic status and equity, specific issues relate to the health of Aboriginal and Torres Strait Islander peoples. The findings add to the weight of evidence about the urgent need to address the determinants of Indigenous health inequality. Given the importance of improving the health and wellbeing of Indigenous people, unwarranted variation is unacceptable. It is vital that efforts to address unwarranted variation prioritise this population's needs and concerns.

While the atlas highlights variation in a range of different procedures and treatments, it does not provide information about what the ideal rates for these interventions should be. The average rates displayed in the atlas are not necessarily the ideal; and high or low rates are not necessarily good or bad. More work is needed to assess the outcomes of interventions, to help identify appropriate treatment rates, and what level of variation is warranted.

International comparisons can help put Australian results into context. Although inconsistent data collection methods and indicators make it difficult to draw direct comparisons, a number of other countries have analysed healthcare variation – for example, the pioneering Dartmouth Atlas project in the United States,[6] the *NHS Atlas of Variation in Healthcare* series in England,[7] and the New Zealand Health Quality and Safety Commission's *Atlas of Healthcare Variation*.[8] International comparisons have been referenced throughout the atlas.

This atlas is the first in a series, and while it represents a significant step forward, much more work is needed. The atlas should be seen as a catalyst for generating action, with the ultimate aim of improving people's care and outcomes, through improving the efficiency and effectiveness of the healthcare system.

Six clinical areas are examined in the atlas, covering prescribing, diagnostic, medical and surgical interventions. Priority areas for investigation and action include the use of antimicrobials and psychotropic medicines; variation in rates of fibre optic colonoscopy, knee arthroscopy, hysterectomy and endometrial ablation; and inequitable access to cataract surgery.

Professor Anne Duggan
Chair

Atlas Advisory Group

26 November 2015

Interventions for mental health and psychotropic medicines

- A very high variation was seen in dispensing of psychotropic medicines for children and adolescents 17 years and under. More than 500,000 prescriptions were dispensed for attention deficit hyperactivity disorder medicines in Australia in 2013–14. The number of prescriptions per 100,000 people in the area with the highest rate was 75 times higher than in the area with the lowest rate.
- Australia is second only to Iceland in the use of antidepressants for OECD countries. Nearly 15 million PBS-funded prescriptions for antidepressant medicines were dispensed for people aged 18 to 64.
- More than 900,000 prescriptions for antipsychotic medicines were dispensed for people aged 65 and over. The number of prescriptions was seven times higher in the area with the highest rate compared to the area with the lowest rate. High and inappropriate prescribing of antipsychotic medicines has been documented in older people. These medicines may be prescribed outside guideline recommendations, such as for behavioural disturbances related to dementia or delirium, before secondary causes have been excluded and non-pharmacological measures have been tried.
- Also of significance in this age group was the variation in anticholinesterase medicines dispensing, illustrated in Chapter 6: Interventions for chronic diseases. The number of prescriptions dispensed for anticholinesterase medicines for people aged 65 and over was more than 15 times higher in the areas with the highest rate compared to the area with the lowest rate.

Key findings and recommendations

As the atlas indicates, variation in health care is a result of an intricate interplay of factors, including differences in the health and socioeconomic status of populations and their access to health care, as well as differences between systems, services and clinicians. Patient and clinician preferences also play an important role. Some of this variation is warranted and some is unwarranted. The challenge is identifying which variation is unwarranted. In some instances, regardless of variation, overall rates of use may be a concern.

The atlas has been developed with strong clinical input and offers suggestions on where to focus efforts to investigate variation and tackle any unwarranted variation. Strategies to address unwarranted variation are complex and require a multifaceted and trans-disciplinary approach.

When considering the key findings, it is important to note that not all dispensing is captured in remote Aboriginal Health Services due to the direct supply of some medicines. This should be recognised as more than a data limitation, because low levels of dispensing could be occurring in remote areas.

Primary health networks (PHNs) are currently developing their work plans and will be commissioning services based on their local health needs assessments and the key objectives of the PHN program. The data on variation presented here can inform these planning processes. PHNs with high or low outlier areas may consider the factors that are driving the observed rates and determine whether rates of intervention should be further analysed and monitored in order to improve appropriateness of care.

This section presents the key findings and the Commission's recommendations for action.

Recommendations

A strategy to address unwarranted clinical variation

1. The Commission works with the Australian Government Department of Health, state and territory health departments, clinical and consumer groups to develop a strategy for reducing unwarranted clinical variation.

2. The Commission will continue to collect information and publish details of geographic clinical variation in an atlas series.

Review of outliers

3. State and territory health departments, local health networks, primary health networks, clinical networks, and relevant state bodies responsible for quality and safety of health care determine the need to review high and low outliers presented in the atlas and develop local priority action plans for addressing atlas findings.

4. Primary health networks investigate primary care strategies for reducing unwarranted variation that have been successful in other regions.

5. State and territory health departments, local health networks, primary health networks and relevant state bodies responsible for quality and safety of health care identify appropriate additional data analyses to complement a local priority action plan.

6. Boards of public and private hospitals monitor, as part of their responsibilities under National Safety and Quality Health Services Standard 1, the effectiveness of the implementation of the relevant Clinical Care Standards.

Key findings and recommendations

1. Antimicrobial dispensing

Australia has very high overall rates of community antimicrobial use compared with some countries. In 2013–14, more than 30 million prescriptions for antimicrobials were dispensed. Many of these were unnecessary because antimicrobials are frequently used to treat infections for which they provide little or no benefit. The rate of total antimicrobial dispensing was over 11 times more in the area with the highest rate compared to the area with the lowest rate. High community use of antimicrobials increases the risk that bacteria will become resistant to these medicines and they will cease to be effective against serious life-threatening conditions. Even when the areas with highest and lowest rates were excluded, the rate was nearly twice as high in some parts of Australia than others. Western Australia appears to be much more successful than other parts of the country in keeping rates of antimicrobial dispensing relatively low – the highest rate for any area in Western Australia was lower than the Australian average rate.

Use of a specific class of antimicrobials called quinolones was low compared with other countries because their use is restricted in Australia. Nevertheless, more than 350,000 prescriptions were dispensed for these antimicrobials in 2013–14, and considerable variation was seen across Australia. The rates of quinolone dispensing were over 8 times more in the area with the highest rate compared to the area with the lowest rate. Even when the areas with the highest and lowest rates were excluded, rates of dispensing of quinolones were over 2.5 times more in some areas of Australia than in others.

There was variation in dispensing across the country for amoxycillin, the most commonly dispensed antimicrobial in Australia, and for amoxycillin-clavulanate, a modified version of amoxycillin. Combined, these two antimicrobials accounted for more than 10 million prescriptions dispensed under the PBS in Australia in 2013–14. The rates of amoxycillin dispensing were 20.5 times more in the area with the highest rate compared with the area with the lowest rate, and 2.7 times when the highest and lowest rates were excluded. The rates of amoxycillin-clavulanate dispensing were 16 times more in the area with the highest rate compared with the area with the lowest rate, and 2.2 times when the highest and lowest rates were excluded.

Data item	Range across local areas per 100,000	Times difference (excluding outliers)	Number per annum
1.1 Antimicrobial dispensing	14,895 to 171,841	1.9	30,355,539
1.2 Quinolone dispensing	281 to 2,339	2.6	354,403
1.3 Amoxycillin and amoxycillin-clavulanate dispensing	2,186 to 44,884	2.7	5,697,634
	1,998 to 32,058	2.2	4,621,154

Recommendations

1a. The Australian Government Department of Health develops national benchmarks for best practice prescribing of antimicrobial agents. Findings from the atlas should be used to identify variations from these benchmarks and target interventions to reduce inappropriate use.

1b. The Pharmaceutical Benefits Advisory Committee examines to the use of topical quinolones and access to amoxycillin-clavulanate on the PBS.

1c. Antimicrobial stewardship programs are implemented in general practice in line with recommendations in the National Antimicrobial Resistance Strategy to reduce the use of amoxycillin and amoxycillin-clavulanate.

1d. The relevant clinical colleges support incorporation of decision support software in prescribing software, and review the current default repeat prescriptions option.

1e. Primary health networks and local health networks track and compare antimicrobial prescribing rates where they do not do so already.

1f. National boards and the Australian Health Practitioner Regulation Agency consider what can be done to ensure relevant registered health practitioners have up-to-date knowledge of prescribing guidelines for antimicrobials.

2. Diagnostic interventions

Almost 600,000 MBS-funded fibre optic colonoscopies were performed in Australia in 2013–14, and the number of services is likely to rise as the National Bowel Cancer Screening Program increases its coverage. Very large variations were seen in colonoscopy rates across the country – the highest rate was 30 times that of the lowest. Even when highest and lowest rates were removed, the rate across local areas was more than four times higher in one local area compared with another. Rates were higher in high socioeconomic populations in metropolitan areas and decreased with distance from major cities. Participation in the National Bowel Cancer Screening Program follows similar trends, with higher participation in metropolitan areas.

Approaches to screening and initial treatment for prostate cancer are controversial. More than 25,000 MBS-funded prostate biopsies were performed in Australia in 2013–14, with considerable variation across the country.

Low back pain is a frequent reason for presentation to general practitioners, who may refer patients for diagnostic imaging. However, inappropriate use of diagnostic imaging exposes patients to unnecessary radiation. More than 314,000 MBS-funded computed tomography (CT) scans of the lumbar spine were performed in 2013–14, with marked variation around Australia, suggesting overuse of this investigation.

Data item	Range across local areas per 100,000	Times difference (excluding outliers)	Number per annum
2.1 Fibre optic colonoscopy	146 to 4,374	4.1	589,748
2.2 Prostate biopsies 40 years and over	150 to 1,357	2.7	25,869
2.3 Computed tomography of the lumbar spine	209 to 2,464	2.7	314,033

Recommendations

Fibre optic colonoscopy

2a. The MBS Review Taskforce reviews relevant MBS item(s) to align reimbursement with adherence to the existing National Health and Medical Research Council (NHMRC) clinical practice guidelines for surveillance colonoscopy.

2b. Primary health networks work with general practitioners to ensure colonoscopy referral practices align with applicable NHMRC guidelines and the Royal Australian College of General Practitioners' guidelines for preventive activities in general practice (the red book). In addition, general practitioners recommend faecal occult blood test screening to age-appropriate patients.

2c. The Australian Government Department of Health continues to use educational materials related to the National Bowel Cancer Screening Program to promote key health messages, in particular among lower socioeconomic and rural and remote populations, about faecal occult blood testing and the substantial benefits of early diagnosis on patient outcomes.

2d. The Commission hosts a roundtable of clinical, consumer, and Australian, state and territory government representatives to support specialty-led strategies to improve adherence to the relevant NHMRC guidelines for surveillance colonoscopy in bowel cancer screening.

Prostate biopsies 40 years and over

2e. Clinicians follow the clinical practice guidelines for prostate-specific antigen testing and early management of test-detected prostate cancer from the Prostate Cancer Foundation of Australia and Cancer Council Australia, and the Royal Australian College of General Practitioners' Guidelines for preventive activities in general practice (the red book).

2f. Clinicians use the prostate cancer screening decision support tool produced by the Royal Australian College of General Practitioners for patients who request screening.

2g. NPS MedicineWise, as part of its Choosing Wisely campaign, monitors effective implementation of the Royal College of Pathologists of Australasia recommendations on prostate-sensitive antigen testing.

Computed tomography of the lumbar spine

2h. The Commission reviews the need for updating the NHMRC guidelines on lumbar imaging in acute non-specific low back pain as part of the ongoing national guideline prioritisation processes.

2i. Relevant clinical colleges review the availability and quality of education and training materials, and continuing professional development courses, to improve clinicians' knowledge and skills in referring patients or using CT imaging of the lumbar spine.

2j. NPS MedicineWise, as part of its Choosing Wisely campaign, monitors effective implementation of the Royal Australian and New Zealand College of Radiologists recommendation that imaging should not be performed in patients with non-specific acute low back pain.

Key findings and recommendations

3. Surgical interventions

The atlas examined seven surgical interventions and found highly variable use across Australia. In some areas, people 55 years and over had rates of knee arthroscopy that were more than seven times those of people living elsewhere. Even when the areas with the highest and lowest rates were excluded, knee arthroscopy hospital admission rates were more than four times higher in one local area compared to another. Despite the evidence that knee arthroscopy is of limited value for people with osteoarthritis and may cause harm, more than 33,000 operations were performed on this age group during 2012–13. Many of these people will have degenerative disease in their knees and will not benefit from this intervention.

The number of patients undergoing MBS-funded cataract surgery was over seven times higher in some parts of Australia than in others. Even when the highest and lowest rates were excluded, the cataract surgery rate was almost three times higher in one local area compared to another.

From 2010–11 to 2012–13, there were 17,000 lumbar spine surgery admissions on average each year. This includes spinal fusion procedures. There is limited evidence to support lumbar spine fusion surgery for painful degenerative back conditions. The outcomes for patients who receive these interventions are unknown.

Women living in regional areas of Australia were over five times more likely to undergo a hysterectomy or endometrial ablation than those living in metropolitan areas. Even when the highest and lowest rates were excluded, the rate was almost three times higher in one local area compared to another.

The atlas includes two ear, nose and throat procedures, tonsillectomy and myringotomy. Even when the highest and lowest rates were excluded, tonsillectomy and myringotomy rates were around three times higher in one local area compared to another. Each procedure was performed more than 30,000 times during 2012–13, with people in some areas more than six times more likely to undergo the procedure. Australia does not have recent evidence-based guidelines for performing tonsillectomy and myringotomy.

Data item	Range across local areas per 100,000	Times difference (excluding outliers)	Number per annum
3.1 Knee arthroscopy hospital admissions 55 years and over	185 to 1,319	4.2	33,682
3.2 Cataract surgery 40 years and over	357 to 2,555	2.8	160,489
3.3 Lumbar spine surgery hospital admissions 18 years and over	36 to 173	2.3	17,305
3.4 Radical prostatectomy hospital admissions 40 years and over	69 to 282	2.2	8,496
3.5 Hysterectomy and endometrial ablation hospital admissions	131 to 687	3.3	34,181
3.6 Tonsillectomy hospital admissions 17 years and under	254 to 1,640	3.0	38,575
3.7 Myringotomy hospital admissions 17 years and under	205 to 1,398	3.3	34,065
3.8 Hip fracture hospital admissions 65 years and over	484 to 787	1.5	21,502
3.9 Hip fracture average length of stay in hospital by peer group – 65 years and over	5.3 to 16.9 days	2.1	14,744 admissions

Recommendations

Knee arthroscopy hospital admissions 55 years and over

3a. The Commission recommends to the MBS Review Taskforce that, given the lack of clinical evidence for the efficacy of knee arthroscopy for people with degenerative changes in the knee that the relevant MBS item(s) be amended to remove knee arthroscopy for this group.

3b. The Commission develops a Clinical Care Standard for investigating and managing osteoarthritic knee pain based on recommendations from the Commission's Knee Pain Expert Working Group.

3c. State and territory health departments consider mechanisms to improve coding, analytics and collection of outcome data for knee arthroscopy.

3d. Relevant clinical colleges ensure education and training material, as well as continuing professional development requirements, are in keeping with the applicable Clinical Care Standard for management of osteoarthritic knee pain.

3e. The Commission promotes the collection of patient-reported outcome measures for surgical interventions for knee pain.

Cataract surgery 40 years and over

3f. The Commission works with the relevant clinical colleges to develop a Clinical Care Standard for cataract surgery, including considering pre- and post-operative visual acuity scoring.

3g. The Commission undertakes a quality review of existing patient information about cataract surgery as part of developing supporting material for a Clinical Care Standard on cataract surgery.

3h. The MBS Review Taskforce reviews the relevant MBS item(s) for cataract surgery to require adherence to an applicable Clinical Care Standard for the surgery.

3i. State and territory health departments consider mechanisms to improve coding, analytics and collection of outcome data on cataract surgery.

3j. Relevant clinical colleges ensure education and training material, as well as continuing professional development requirements, are in keeping with the applicable Clinical Care Standard on cataract surgery.

3k. The Commission promotes the collection of patient-reported outcome measures for cataract surgery.

Lumbar spine surgery hospital admissions 18 years and over

3l. State and territory health departments consider mechanisms to improve coding, analytics and collection of outcome data on lumbar spine surgery in adults.

3m. The Commission promotes the collection of patient-reported outcome measures for lumbar spine surgery.

Radical prostatectomy hospital admissions 40 years and over

3n. State and territory health departments consider mechanisms to improve coding, analytics and collection of outcome data on radical prostatectomy.

3o. The Commission promotes the collection of patient-reported outcome measures for radical prostatectomy.

Key findings and recommendations

3. Surgical Interventions

Hysterectomy, endometrial ablation hospital admissions

3p. The Commission works with the Royal Australian and New Zealand College of Obstetricians and Gynaecologists and consumer groups to develop a Clinical Care Standard for managing menorrhagia.

3q. The Commission develops a patient decision support tool to increase women's knowledge of treatment options for menorrhagia and their benefits and risks. In addition, mechanisms are considered so that relevant clinical colleges can train clinicians to use this patient decision tool.

3r. Relevant clinical colleges ensure education and training material, as well as continuing professional development requirements, are in keeping with the applicable Clinical Care Standard for menorrhagia.

Tonsillectomy hospital admissions 17 years and under

3s. The Commission reviews the need for evidence-based clinical guidelines on tonsillectomy in children as part of the ongoing national guideline prioritisation processes.

3t. The Commission reviews current patient information about tonsillectomy in Australia, in conjunction with relevant clinical colleges and consumer groups, to determine the need for better patient and carer information, and shared decision making tools, and also the need to update existing materials.

Myringotomy hospital admissions 17 years and under

3u. The Commission reviews the need for evidence-based clinical guidelines on myringotomy in children as part of ongoing national guideline prioritisation processes.

3v. State and territory health departments, in conjunction with the National Aboriginal Community Controlled Health Organisation, monitor adherence to the guidelines for managing otitis media in Aboriginal and Torres Strait Islander children and implement improvement activities.

Hip fracture hospital admissions and average length of stay in hospital 65 years and over

3w. Primary health networks and state and territory health departments work together to increase access to evidence-based falls prevention programs in hospitals, care facilities and the community.

3x. Private and public hospitals ensure patients have access to care that aligns with the Clinical Care Standard for acute management of hip fracture.

3y. Public hospitals implement the Clinical Care Standard for acute management of hip fracture through best practice pricing.

3z. Relevant clinical colleges ensure educational and training material, as well as continuing professional development requirements, are in keeping with the Clinical Care Standard for acute management of hip fracture.

4. Interventions for mental health and psychotropic medicines

Almost half the Australian population aged 16 to 85 will experience mental illness at some point in their life.

General practitioners prepared more than 950,000 mental health treatment plans. The number of services for the preparation of treatment plans in the area with the highest rate was 21 times that of the area with the lowest rate, and 3.5 times when the highest and lowest areas were excluded.

The greatest variation was shown in dispensing of prescriptions for psychotropic medicines for children and young people 17 years and under. More than 500,000 prescriptions for attention deficit hyperactivity disorder (ADHD) medicines were dispensed in Australia in 2013–14. The number of prescriptions in the area with the highest rate was 75 times more than in the area with the lowest rate. Even when the areas with the highest and lowest rates were excluded, considerable variation persisted with more than seven times higher in one local area compared to another. New South Wales had the highest average rate of dispensing out of all the states and territories, and had eight of the 12 local areas with the highest rates. Variation in rates of dispensing of antidepressant medicines and antipsychotic medicines to children and young people also varied greatly. Some local areas in New South Wales and Queensland had high dispensing rates across the three medicines for people 17 years and under.

Overall, large numbers of antidepressant medicines were dispensed in Australia. In 2013–14, nearly 15 million PBS prescriptions for antidepressants were dispensed to people aged 18 to 64. In addition, more than 400,000 prescriptions were dispensed to children and young adults, and more than 6.5 million prescriptions were dispensed to people aged 65 and over. Considerable variation is seen from area to area in the dispensing rates for prescriptions for antidepressants.

High volumes of anxiolytic and antipsychotic prescriptions were also dispensed to Australian adults, with large variation from area to area. Rates were particularly high for people aged 65 and over, and warrant scrutiny, particularly given the variation in anticholinesterase medicines dispensed for this age group which is highlighted in Chapter 6.

More than 900,000 prescriptions for antipsychotic medicines were dispensed for people aged 65 and over. The number of prescriptions was seven times higher in the area with the highest rate compared to the area with the lowest rate, and nearly 2.5 times when the highest and lowest areas were excluded. High and inappropriate prescribing of antipsychotic medicines has been documented in older people.

Key findings and recommendations

4. Interventions for mental health and psychotropic medicines

Data item	Range across local areas per 100,000	Times difference (excluding outliers)	Number per annum
4.1 General practitioner mental health treatment plans	354 to 7,427	3.5	965,946
4.2 Antidepressant medicines dispensing 17 years and under	386 to 16,844	4.1	404,276
4.3 Antidepressant medicines dispensing 18–64 years	14,981 to 175,380	2.8	14,933,534
4.4 Antidepressant medicines dispensing 65 years and over	22,213 to 306,383	1.9	6,592,577
4.5 Anxiolytic medicines dispensing 18–64 years	1,079 to 41,473	4.8	2,508,346
4.6 Anxiolytic medicines dispensing 65 years and over	6,193 to 80,445	4.0	1,265,996
4.7 Antipsychotic medicines dispensing 17 years and under	306 to 6,895	7.1	104,697
4.8 Antipsychotic medicines dispensing 18–64 years	2,076 to 39,544	3.2	2,582,447
4.9 Antipsychotic medicines dispensing 65 years and over	8,043 to 57,130	2.4	919,026
4.10 Attention deficit hyperactivity disorder medicines dispensing 17 years and under	382 to 28,642	7.3	544,218

Recommendations

4a. The Commission refers the atlas findings on dispensing of mental health and psychotropic medications to the National Mental Health Commission for its recommendations on psychotropic drug prescribing including:

i. use of psychotropic drugs in people 17 years and under

ii. mechanisms for working with consumer groups to increase awareness of appropriate prescribing of antidepressant and anxiolytic medicines, as well as the benefits of non-pharmacological treatments.

4b. Clinicians adhere to current guidelines for treating behavioural and psychological symptoms in people with dementia, in particular those on the use of non-pharmacological strategies, and only prescribing medicines with demonstrated efficacy when necessary. Pharmacological treatment should target only those symptoms or behaviours that respond to medicines.

4c. The Australian Government Department of Health undertakes a national education campaign on the use of antipsychotic medicines for managing the behavioural and psychological symptoms of dementia. The campaign should ensure that clinicians and patients are aware that excessive or inappropriate use of antipsychotics in people aged 65 years and over has serious adverse effects.

4d. National boards and the Australian Health Practitioner Regulation Agency consider what actions could be taken to ensure relevant registered health practitioners have up-to-date knowledge of prescribing guidelines for antipsychotic drugs.

4e. The Australian Government Department of Health conducts an audit of antipsychotic medicines prescribing practices in the high outlier prescribing regions identified in the atlas findings.

5. Opioid medicines

In 2013–14, nearly 14 million prescriptions were dispensed through the PBS for opioids – medicines that relieve moderate to severe pain. These medicines are very effective in relieving acute pain and cancer pain, and in palliative care. However, studies have shown they are also being prescribed for chronic non-cancer pain. Current evidence does not support the long term efficacy and safety of opioid therapy for chronic non-cancer pain.

The number of prescriptions dispensed was more than 10 times higher in the area with the highest rate compared to the area with the lowest rate. However, even when the areas with the lowest and highest rates were excluded considerable variation was still seen in prescribing (2.9 times more in the areas with the highest rates than in the areas with lowest rates). No apparent explanation is available for this, although differences in access to alternative pain management options may be a factor.

Data item	Range across local areas per 100,000	Times difference (excluding outliers)	Number per annum
5.1 Opioid medicine dispensing	10,945 to 110,172	2.9	13,905,258

Recommendations

5a. The Australian Government Department of Health reviews the level of Medicare support available for effective multidisciplinary non-pharmacological treatment options and opioid dependency services, in particular for opioid prescribing for chronic non-cancer pain.

5b. State and territory health departments work with primary health networks to address the barriers in access to non-pharmacological treatments for people with chronic pain who are socioeconomically disadvantaged and those who live in rural and regional settings.

5c. State and territory health departments support Telehealth to enhance rural and remote consultations for assessment and management of chronic pain.

5d. Primary health networks and the Australian Government Department of Health progress implementation of information systems for real-time monitoring of opioid dispensing.

5e. National boards and the Australian Health Practitioner Registration Agency consider what actions could be taken to ensure relevant registered health practitioners have up-to-date knowledge of prescribing guidelines for opioid medicines.

Key findings and recommendations

6. Interventions for chronic diseases

Chronic diseases are the leading cause of illness, disability and death. Australia has higher rates of asthma compared with other countries, but the findings in the atlas demonstrate that hospitalisation is low. From 2010–11 to 2012–13, on average 15,111 children and young people were admitted to hospital for asthma in Australia each year. This may reflect a strong emphasis on the use of asthma management plans in primary care. Similarly, the number of admissions among adults was low but admission rates were higher in remote areas of Australia, which reflects the higher prevalence of asthma and chronic obstructive pulmonary disease (COPD) in Aboriginal and Torres Strait Islander peoples. Dispensing of medicines for asthma showed a strong socioeconomic trend, with dispensing rates highest in the lowest socioeconomic groups.

Similar to the patterns of hospital admissions noted for asthma and COPD, hospital admission rates for heart failure in people 40 years and over was markedly higher in remote areas. This may reflect the high prevalence of heart failure among Indigenous peoples. Multidisciplinary heart failure services can decrease the rate of hospital admissions and readmissions for this condition.

In 2012–13, 4,400 people were admitted to hospital for diabetes-related lower limb amputation in Australia. Once again, the rates in remote areas were higher. It is known that Indigenous people are about three times more likely to have diabetes, 10 times more likely to be admitted for diabetic foot complications and 30 times more likely to suffer diabetes-related lower limb amputation than non-Indigenous people.

Anticholinesterase medicines are used to alleviate symptoms of some types of dementia including Alzheimer’s disease. There was considerable variation in dispensing of these medicines across Australia, and dispensing rates were highest in major cities.

The findings in this chapter demonstrate the continued need for prevention of chronic diseases among Indigenous peoples and those living in remote areas. These efforts need to be sustained over decades given that many of these admissions are the result of years of poor health.

Data item	Range across local areas per 100,000	Times difference (excluding outliers)	Number per annum
6.1 Asthma medicines dispensing 3–19 years	1,298 to 53,379	3.2	1,270,400
6.2 Asthma medicines dispensing 20–44 years	2,244 to 44,092	3.4	1,659,993
6.3 Asthma and chronic obstructive pulmonary disease medicines dispensing 45 years and over	17,415 to 146,961	2.2	7,276,843
6.4 Asthma and related respiratory hospital admissions 3–19 years	61 to 651	3.3	15,111
6.5 Asthma hospital admissions 20–44 years	18 to 530	8.0	6,558
6.6 Asthma and chronic obstructive pulmonary disease hospital admissions 45 years and over	201 to 3,893	5.3	70,932
6.7 Heart failure hospital admissions 40 years and over	192 to 1,397	2.7	50,983
6.8 Diabetes-related lower limb amputation hospital admissions 18 years and over	8 to 91	2.5	4,402
6.9 Stroke average length of stay in hospital by peer group – 65 years and over	4.2–17.5 days	2.4	14,554 admissions
6.10 Anticholinesterase medicines dispensing 65 years and over	1,843 to 28,261	3.7	427,211

Key findings and recommendations

6. Interventions for chronic diseases

Recommendations

6a. The Commission hosts a roundtable of service providers and consumers from remote areas to identify successful strategies for implementing best practice primary and secondary prevention services for patients with chronic disease in remote Australia.

Asthma and chronic obstructive pulmonary disease medicines dispensing and hospital admissions

6b. The Australian Government Department of Health encourages primary health networks to develop local models of integrated care for asthma and chronic obstructive pulmonary disease (COPD) to ensure properly coordinated community prevention strategies are implemented.

6c. State and territory health departments and primary health networks jointly review the uptake of vaccinations against respiratory disease in high-risk populations and their influence on local variation.

Heart failure hospital admissions 40 years and over

6d. Primary health networks, state and territory health departments and clinicians collaborate to improve access for patients with heart failure to comprehensive heart failure programs consistent with evidence-based best practice.

Diabetes-related lower limb amputation hospital admissions 18 years and over

6e. Public and private hospitals and primary health networks adopt risk-stratified levels of support for managing diabetes care, including earlier diagnosis and intervention.

6f. Primary health networks and state and territory health departments collaborate to improve access to coordinated services that deliver evidence-based care for those with diabetes, including multidisciplinary foot clinics, and care by vascular, endocrine and orthopaedic specialists.

Stroke average length of stay in hospital 65 years and over

6g. Hospital and ambulance services ensure patients have access to care that aligns with the Acute Stroke Clinical Care Standard.

6h. State and territory health departments consider mechanisms to improve coding, analytics and collection of outcome data for stroke.

6i. Relevant clinical colleges ensure educational and training material, as well as continuing professional development requirements, are in keeping with the Acute Stroke Clinical Care Standard.

Investigating and addressing unwarranted variation

Addressing unwarranted healthcare variation can contribute to more equitable access to, and better value, health care. There are areas where the data could be improved and further investigation into the cause of variation is needed. However it is clear that many areas require change at clinical, health service and system levels.

Appropriate care

The challenge in identifying and addressing unwarranted variation is that for many healthcare interventions we do not know what rates of intervention deliver the best outcomes for patients and the broader community. Ease of access to care is one factor affecting variation in healthcare use. Individual decisions about treatments are another factor. One approach to address unwarranted variation is to focus on the process leading to individual decisions about treatment. Integral to this are the concepts of health literacy and shared decision making, together with definitions of appropriate care in clinical standards or evidence-based guidelines.

Investigating and addressing unwarranted variation

Health literacy

It is estimated that about 60 per cent of Australians have low health literacy, which affects their capacity to make decisions and act to manage their health and health care.[9] People with low health literacy are more likely to need to go to an emergency department, to be hospitalised, and to have poorer health outcomes.[10]

For a number of the data items in the atlas, issues such as patient preferences and patient decisions are proposed as potential reasons for variation. These issues are at the core of the concept of health literacy. Health literacy determines the way in which people access, understand and use information to make effective decisions about health and health care, and take appropriate action. It is also about the way information is presented, and the communications and interactions that occur between patients and providers. The wider environment – including health systems, processes and practices – often does not make it easy for people to understand the issues affecting their health and health care.[11]

Although low health literacy can be found across the socioeconomic spectrum, people from disadvantaged groups can be at higher risk of having low health literacy. Health literacy is a particular issue for these groups because having low health literacy can exacerbate underlying access and equity issues they may be experiencing. Because of the impact of disadvantage and vulnerability on health literacy, focusing on health literacy in specific geographic areas or settings may help to reduce the healthcare variation. The Commission has proposed a systematic approach to address health literacy in the National Statement of Health Literacy.[11]

Shared decision making

Shared decision making allows patients to examine the likely benefits and harms of available screening, investigation and management options, communicate their values and preferences, and select the best course of action for them. This is particularly important when the evidence is uncertain or multiple options are available with different probabilities of risk and benefit.

Patients who are fully informed about the implications of various options and how these align with their values will often make different choices.[12,13] Shared decision making is therefore widely seen as a strategy for promoting patient-centred care and reducing unwarranted variation.

If shared decision making is to occur, patients and clinicians need to have ready access to evidence about treatment options, understandable information about the probability of risk and benefit, and guidance on weighing the pros and cons of different options. The clinical culture must support patient engagement.[14] The Commission is starting a program to increase access to tools and resources that will assist with shared decision making.[15]

Clinical standards and evidence-based guidelines

Clinical standards and evidence-based guidelines can play an important role in delivering appropriate care and reducing unwarranted variation, as they identify and define the care people should expect to be offered or receive, regardless of where they are treated. The Commission has produced a series of Clinical Care Standards.[16] These contain quality statements which describe the care that patients should be offered by clinicians and health services for a specific condition or defined clinical pathway in line with current best evidence. The findings in the atlas will inform the development of future clinical care standards.

Where clinical guidelines and clinical care standards exist, strategies to promote their use are essential. All Clinical Care Standards the Commission has developed have accompanying indicators to enable monitoring of the extent to which routine care aligns with the standard.

Using data for improvement

The atlas is one of many mechanisms using clinically important data to drive healthcare improvements. There has been an enormous investment in health information technology in Australia in recent years through the National E-Health Transition Authority (NEHTA). This work aims to improve data flows between parts of the health system, connecting information to improve efficiency and health outcomes. This work is especially important for patients with complex and chronic diseases, who see multiple providers in the system across the primary care and hospital settings. The atlas reinforces that the way we use available health data in Australia is vital for healthcare improvement.

In addition, the atlas suggests that building more ways to capture clinically important data into routine data collection and information technology infrastructure will improve clinical practice and service delivery. In developing the atlas, the use of national mandatory datasets has created many challenges. The limitations described in each chapter about using data from the PBS, MBS and Admitted Patient Care National Minimum Data Set also highlight opportunities for improving how we measure healthcare delivery. Improving existing datasets can help identify where change needs to happen and provide a way of monitoring whether efforts towards change have been successful. Jurisdictions should also continue developing data linkage systems to provide better intelligence on the outcomes of healthcare interventions.

Improving our understanding of patient outcomes

Evidence shows that the systematic use of information from patient-reported outcome measures leads to better communication and decision making between clinicians and patients, and improves patient satisfaction with care.[17] Patient-reported outcome measures for surgical interventions, such as for knee pain, cataract removal, radical prostatectomy and lumbar spine surgery, will enable assessment of the effectiveness of these procedures from the patient's perspective. In addition, patient-reported outcome measures can be used to determine the extent to which the outcomes achieved in routine settings align with patient expectations. The atlas strengthens the case for developing and adopting patient-reported outcome measures as a means of monitoring and feedback on the outcomes achieved.

The atlas has highlighted the lack of outcome measures collected in Australia, from either routine data or other means such as patient-reported outcome measures. This restricts understanding of both the benefits and harms people experience when they have healthcare interventions. A better understanding of clinical outcomes would allow us to know what level of intervention benefits patients across Australia.

Clinical quality registries

Clinical quality registries enable monitoring of outcome data, where supported by professional groups, and feedback to health services on management and treatment outcomes. Australia has the capacity to support a number of high-priority national registries. They should conform to the Commission's Framework for Australian Clinical Quality Registries.[18] National registries for monitoring acute stroke care, cataract surgery, surgical knee interventions, hip fracture, prostatectomy and lumbar spine surgery warrant support, given the variation illustrated in this atlas. These should include data elements that accompany related Clinical Care Standards.

Investigating and addressing unwarranted variation

Next steps

Raising the profile of healthcare variation is the critical first step to addressing unwarranted variation. The *Australian Atlas of Healthcare Variation* is the first of a series of atlases the Commission will produce on the extent of variation across a range of procedures and interventions in Australia.

In addition to demonstrating the levels of variation that exist, the atlas also starts the process of interpreting and examining the findings. Clinical and critical analysis of the potential reasons for variation, and suggestions for areas of further exploration, will help to ensure more appropriate care is provided. In this atlas, we have suggested ways in which coordinated action can be taken at all levels of the healthcare system.

Healthcare variation is important because it reflects the care patients receive – or do not receive. The suggested actions and recommendations are designed to improve equity and efficiency, as well as the safety and quality of health care.

About the atlas

The Commission has led the development of the atlas together with the Australian, state and territory governments in consultation with consumers, clinicians and their professional organisations. An oversight and advisory structure, including a clinical and consumer advisory group and a state and territory advisory group, has ensured wide-ranging input into its development. The National Health Performance Authority extracted and analysed data and produced the maps and graphs. More than 100 clinicians, epidemiologists and pharmaceutical experts have examined and commented on the data.

The atlas examines a selection of interventions in a range of clinical areas. While a large number of interventions were nominated and considered for inclusion, many were not suitable, either because of issues of data quality, or because small numbers limited the capacity to analyse and present the data. The final selection of data items reflects areas where there was interest in the topic, where data were available and where variation raised questions about underlying patterns of illness, equity, treatment options and possible underuse or overuse of interventions.

The atlas provides information on 36 healthcare interventions, grouped into six clinical themes, covering medicines dispensed through the PBS; tests and procedures funded by the MBS; and hospital admissions for medical care or for surgical procedures.

The introduction to each chapter provides an overview of the items included in the chapter, international comparisons, information about national activities to improve care for these items and key recommendations. Specific data limitations are also outlined. Clinical commentary is presented alongside each data item, outlining the context, magnitude of variation, and possible reasons for the variation.

About the atlas

The atlas uses data sourced from three national health datasets:

1. Medicare Benefits Schedule (MBS)
2. Pharmaceutical Benefits Scheme (PBS)
3. Admitted Patient Care National Minimum Data Set (APC NMDS).

The years of data shown for each data item depend on the source and the most recently available data:

- MBS and PBS items are analysed by the year 2013–14.
- APC NMDS items are analysed by the year 2012–13, or the average of the three financial years 2010–11 to 2012–13 for data items with small numbers.

For MBS and PBS items, the rates are based on where the patient lives as determined by the person's Medicare enrolment postcode. For hospital admissions, the rates are determined by the person's residential postcode as recorded at the time of hospital admission.

The geographic local areas used are Australian Bureau of Statistics (ABS) standard geographical regions known as the Statistical Areas Level 3 (SA3) and Statistical Areas Level 4 (SA4). SA3s provide a standardised regional breakup to assist in analysing data at the regional level. SA3s generally have populations between 30,000 and 130,000. For data items with small numbers, data have been analysed at SA4. SA4s are combinations of whole SA3s and are the largest sub-state regions. To enable comparisons, local areas are also grouped by state and territory, and by remoteness and socioeconomic status. The remoteness categories used are from the ABS 2011 Australian Statistical Geography Standard. The socioeconomic quintiles are based on the ABS 2011 Index of Relative Socioeconomic Disadvantage at the SA1 level. The remote and very remote quintiles were combined into one category to create four remoteness categories.

The atlas presents age-standardised rates per 100,000 population. Populations in different geographic areas differ in size and structure. The total number of interventions will be affected by the population structure. For example, if a particular intervention is more common in older people, and a statistical area has a larger proportion of older people than usual, that area might appear to have excess interventions when in fact the rate is the same as other areas once the age structure is taken into account. Age-standardised rates remove the effect of differences in population age structure when comparing crude rates for different geographic areas. Age-standardised rates were calculated for all data using the ABS Estimated Resident Population report as at 30 June 2001 (based on the 2001 Census).

For the two data items that examine length of stay in hospital, the results present information from major and large public hospitals and are analysed by the hospital where the care was provided.

The data specifications for each item can be accessed on the Australian Institute of Health and Welfare's (AIHW's) Metadata Online Registry (METeOR) at **www.meteor.aihw.gov.au**.

Data limitations

The data items describe variation in interventions and service provision. It is not possible at this time to conclude what proportion of this variation is unwarranted or to comment on the relative performance of health services and clinicians in one area compared with another. The data are provided to encourage discussion of the reasons for any variation at local, regional, state and territory levels.

The hospital data from the APC NMDS exclude episodes of non-admitted care provided in outpatient clinics or emergency departments. As there is no standardised admissions policy across states and territories, analysis of variation for some procedures should take into account possible differences in admission practice and policies among providers and states and territories. For example, procedures such as knee arthroscopy can be recorded as either non-admitted or admitted care.

The MBS items in this report do not include some services such as those provided free to public patients in hospitals, or services attracting benefits under the Department of Veterans' Affairs National Treatment Account.

The PBS items cover all medicines dispensed under the PBS or the Repatriation Schedule of Pharmaceutical Benefits, including medicines that do not receive a Commonwealth subsidy. They do not capture a large proportion of public hospital drug usage, over-the-counter purchases, and private prescriptions. The direct supply of some medicines to remote Aboriginal Health Services means some dispensing is also not captured. However, this should be recognised as more than a data limitation, because low levels of dispensing could be occurring in remote areas.

Some data have been suppressed to protect confidentiality where they could potentially identify a patient – for example, when the number of services, or the population used to calculate rates, is very small.

A small number of SA3s have a very small or zero population, and are mainly very large national parks close to the outskirts of major cities. These SA3s have been excluded from the analysis. For items using MBS and PBS data, analysis at SA3 and SA4 excludes services from GPO postcodes 2001, 2124, 3001, 4001, 5001 and 6843. However, these data are included in state and territory and national-level analyses.

For further information on the data limitations, refer to the individual data items. Detailed information on the methods used to calculate the data are described in the Technical Supplement.

Maps and graphs

Data for 34 of the 36 data items in the atlas are displayed as both graphs and maps to show variation in rates by geographic location of patient residence.

On the map for each intervention, age-standardised rates in each of the geographic areas were ranked from lowest to highest and then split into 10 categories. These are displayed with colour gradients, where darker colours represent higher rates and lighter colours represent lower rates. Separate maps show the greater metropolitan areas that are not clearly visible in the larger map of Australia.

Three graphs are also provided for each item. They are:

- Number and rates per 100,000 people, age standardised, by local area, listing the areas with the lowest and highest rates
- Number and rates per 100,000 people, age standardised, with the average and the areas with the highest and lowest rates by state and territory
- Number and rates per 100,000 people, age standardised, by remoteness and socioeconomic status.

For each of the two hospital length-of-stay data items, three graphs show the average length of stay for patients in major and large public hospitals. The first graph shows hospitals with the shortest and longest stays; the second graph shows average length of stay and hospitals with the highest and lowest length of stay by peer group of hospital; and the third shows average length of stay and hospitals with the shortest and longest stays by state and territory.

Further information on interpreting the graphs is provided in the following figures.

About the atlas

Interpreting the figures

The atlas uses three figures to illustrate rates for different items across local areas in Australia.

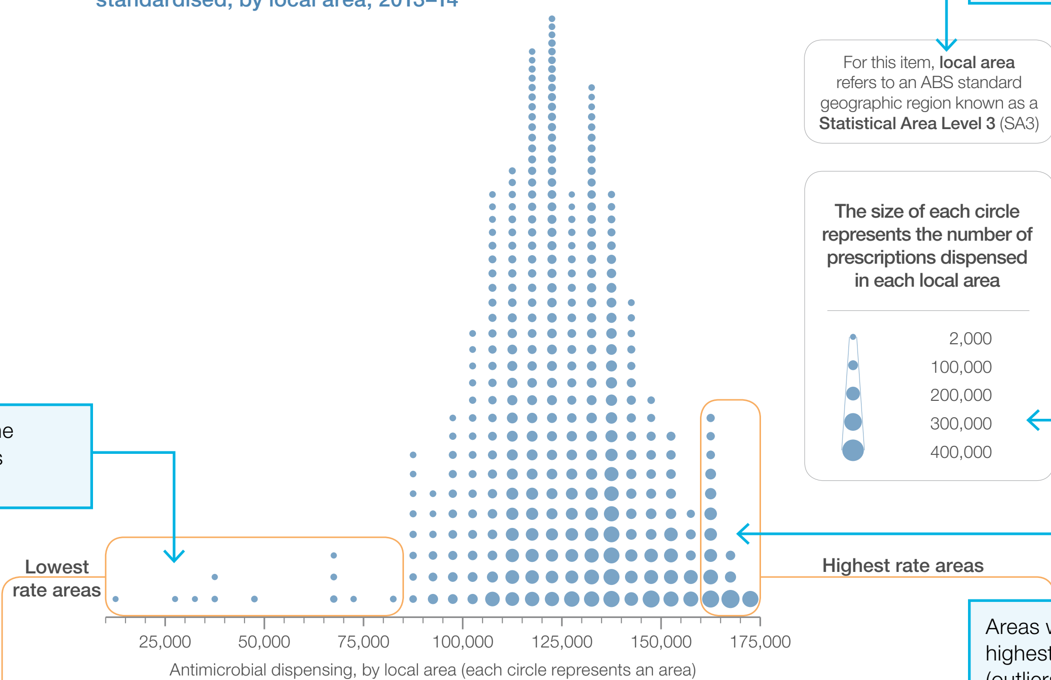
Title of the figure describes what has been measured:

- Type of data (MBS, PBS or APC)
- Age
- Local area (SA3, SA4 or state/territory)
- Financial year of data

Local area reported at SA3 or SA4 level

Legend describes the number of interventions, represented by a circle

Figure 2: Number of PBS prescriptions dispensed for antimicrobials per 100,000 people, age standardised, by local area, 2013–14



Area with the lowest rates (outliers)

Areas with the highest rates (outliers)

Local area	State	Rate	Prescriptions
Daly - Tiwi - West Arnhem	NT	14,895	2,271
East Arnhem	NT	26,772	3,702
Barkly	NT	31,106	1,896
Kimberley	WA	38,081	13,768
Katherine	NT	38,162	6,985
Alice Springs	NT	49,052	18,043
Pilbara	WA	65,839	36,645
Far North	Qld	67,807	20,117
Gascoyne	WA	68,924	6,771
Esperance	WA	70,832	12,042
Manjimup	WA	80,946	19,625

Local area	State	Rate	Prescriptions
Campbelltown	NSW	171,841	262,581
St Marys	NSW	168,152	90,560
Springwood - Kingston	Qld	167,787	133,531
Fairfield	NSW	165,119	312,902
Beenleigh	Qld	164,974	69,591
Ipswich Inner	Qld	164,172	169,158
Sunbury	Vic	163,852	62,472
Bribie - Beachmere	Qld	163,240	58,832
Bringelly - Green Valley	NSW	162,981	137,305
Browns Plains	Qld	162,856	123,680
Mount Druitt	NSW	162,133	171,617
Liverpool	NSW	161,121	178,766
Bankstown	NSW	160,702	283,735
Tullamarine - Broadmeadows	Vic	160,598	225,763

Local areas with the lowest and highest rates. The rate is age standardised (as per the technical supplement)

Rate per 100,000 population in each local area

Actual number of prescriptions, hospital admissions or services provided, depending on the data source, in each local area

Highest, lowest and average rate and number for each state and territory

The title of the figure describes what has been measured:

- Type of data (MBS, PBS or APC)
- Age
- Local area
- State and territory
- Timeframe

Figure 4: Number of PBS prescriptions dispensed for antimicrobials per 100,000 people, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	171,841	163,852	167,787	143,965	123,357	131,403	139,567	125,936
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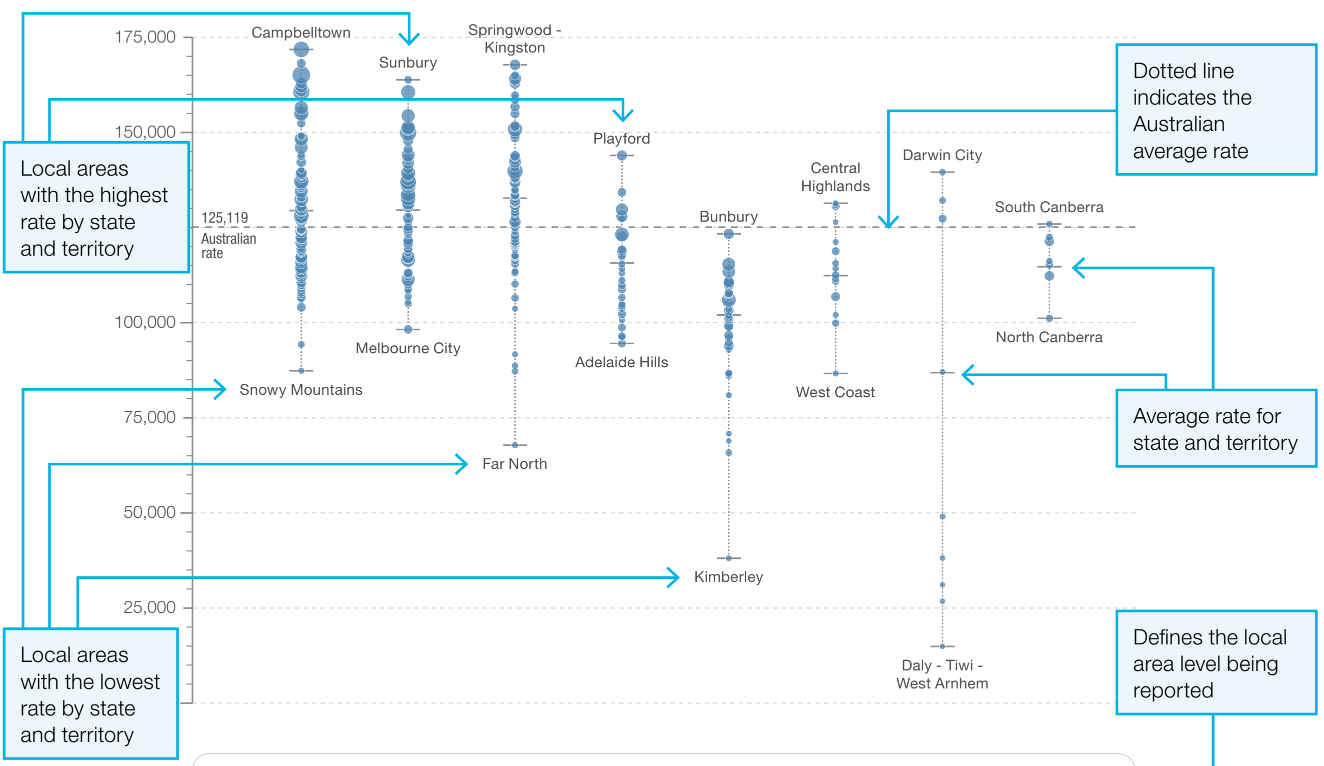


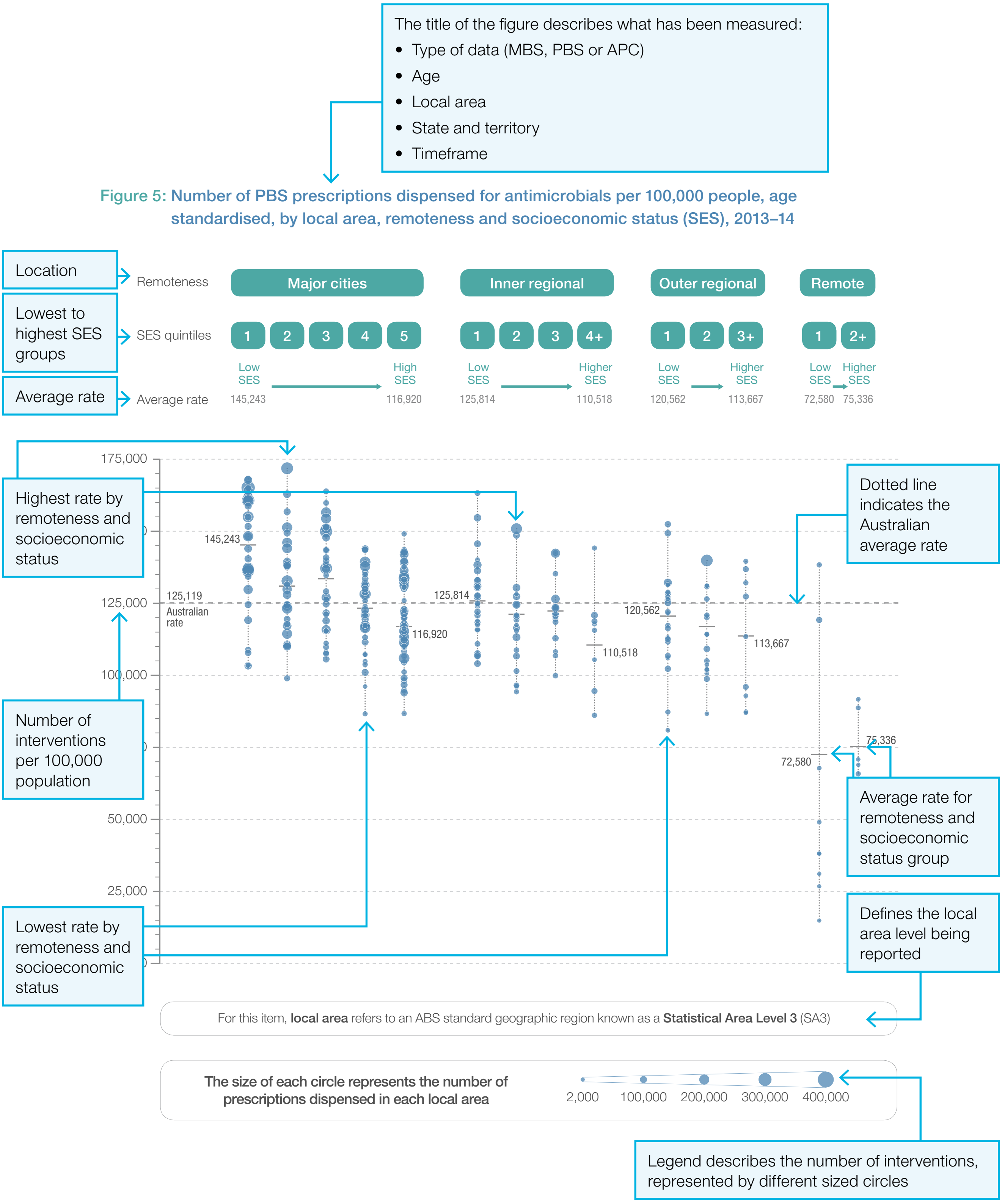
For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

2,000 100,000 200,000 300,000 400,000

Legend describes the number of interventions, represented by different sized circles

About the atlas



1 Dartmouth Institute for Health Policy and Clinical Practice, Health Dialog, New South Wales Department of Health. New South Wales health care atlas final report. Sydney: Health NSW, 2010.
2 National Health Performance Authority. Hospital Performance reports, 2015. (Accessed 18 September 2015 at www.myhospitals.gov.au)
3 National Health Performance Authority. MyHealthyCommunities, 2015. (Accessed 18 September 2015 at www.myhealthycommunities.gov.au)
4 Australian Institute of Health and Welfare. Hospital resources 2013–14: Australian hospital statistics. Health services. Ser. no. 63. Cat. no. HSE 160. Canberra: AIHW, 2015.
5 Organisation for Economic Co-operation and Development. Geographic variations in health care: what do we know and what can be done to improve health system performance? Paris: OECD Publishing, 2014.
6 The Dartmouth Institute for Health Policy and Clinical Practice. The Dartmouth Atlas of Health Care 2015. (Accessed 18 September 2015 at www.dartmouthatlas.org.)
7 NHS Right Care. NHS Atlas, 2015. (Accessed 18 September 2015 at www.rightcare.nhs.uk/index.php/nhs-atlas.)
8 New Zealand Health Quality and Safety Commission. Atlas of Healthcare Variation, 2015. (Accessed 18 September 2015 at www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/atlas-of-healthcare-variation.)
9 Australian Bureau of Statistics. Health Literacy, Australia 2006. Cat. no. 4233.0. Canberra: ABS, 2008.
10 Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Viera A, Crotty K et al. Health literacy interventions and outcomes: an updated systematic review. Evidence report/technology assessment no. 199. (Prepared by RTI International–University of North Carolina Evidence-based Practice Center under contract No. 290-2007-10056-I). AHRQ pub. no. 11-E006. Rockville, MD: Agency for Healthcare Research and Quality 2011.
11 Australian Commission on Safety and Quality in Health Care. Health literacy: taking action to improve safety and quality. Sydney: ACSQHC, 2014.
12 Birkmeyer JD, Reames BN, McCulloch P, Carr AJ, Campbell WB, Wennberg JE. Understanding of regional variation in the use of surgery. Lancet 2013;382(9898):1121–9.
13 McCulloch P, Nagendran M, Campbell WB, Price A, Jani A, Birkmeyer JD et al. Strategies to reduce variation in the use of surgery. Lancet 2013;382(9898):1130–9.
14 Elwyn G, Laitner S, Coulter A, Walker E, Watson P, Thomson R. Implementing shared decision making in the NHS. BMJ 2010;341.
15 Australian Commission on Safety and Quality in Health Care. Shared decision making. 2015. (Accessed 18 September 2015 at www.safetyandquality.gov.au/our-work/shared-decision-making.)
16 Australian Commission on Safety and Quality in Health Care. Overview of the clinical care standards. ACSQHC 2015. (Accessed 16 September 2015 at www.safetyandquality.gov.au/our-work/clinical-care-standards/overview-of-the-clinical-care-standards.)
17 Nelson EC, Eftimovska E, Lind C, Hager A, Wasson JH, Lindblad S. Patient reported outcome measures in practice. BMJ 2015;350.
18 Australian Commission on Safety and Quality in Health Care. Framework for Australian clinical quality registries. Sydney: ACSQHC, 2014.

Chapter 1
Antimicrobial dispensing

At a glance

Australia has very high overall rates of community antimicrobial use compared with some countries. In 2013–14, more than 30 million prescriptions for antimicrobials were dispensed. Many of these were unnecessary because antimicrobials are frequently used to treat infections for which they provide little or no benefit. The rate of total antimicrobial dispensing was over 11 times more in the area with the highest rate compared to the area with the lowest rate. High community use of antimicrobials increases the risk that bacteria will become resistant to these medicines and they will cease to be effective against serious life-threatening conditions. Even when the areas with highest and lowest rates were excluded, the rate was nearly twice as high in some parts of Australia than others. Western Australia appears to be much more successful than other parts of the country in keeping rates of antimicrobial dispensing relatively low – the highest rate for any area in Western Australia was lower than the Australian average rate.

Use of a specific class of antimicrobials called quinolones was low compared with other countries because their use is restricted in Australia. Nevertheless, more than 350,000 prescriptions were dispensed for these antimicrobials in 2013–14, and considerable variation was seen across Australia. The rates of quinolone dispensing were over 8 times more in the area with the highest rate compared to the area with the lowest rate. Even when the areas with the highest and lowest rates were excluded, rates of dispensing of quinolones were over 2.5 times more in some areas of Australia than in others.

There was variation in dispensing across the country for amoxycillin, the most commonly dispensed antimicrobial in Australia, and for amoxycillin-clavulanate, a modified version of amoxycillin. Combined, these two antimicrobials accounted for more than 10 million prescriptions dispensed under the Pharmaceutical Benefits Scheme (PBS) in Australia in 2013–14. The rates of amoxycillin dispensing were 20.5 times more in the area with the highest rate compared with the area with the lowest rate, and 2.7 times when the highest and lowest rates were excluded. The rates of amoxycillin-clavulanate dispensing were 16 times more in the area with the highest rate compared with the area with the lowest rate, and 2.2 times when the highest and lowest rates were excluded.

Antimicrobial dispensing

Recommendations

1a. The Australian Government Department of Health develops national benchmarks for best practice prescribing of antimicrobial agents. Findings from the atlas should be used to identify variations from these benchmarks and target interventions to reduce inappropriate use.

1b. The Pharmaceutical Benefits Advisory Committee examines the use of topical quinolones and access to amoxycillin-clavulanate on the PBS.

1c. Antimicrobial stewardship programs are implemented in general practice in line with recommendations in the National Antimicrobial Resistance Strategy to reduce the use of amoxycillin and amoxycillin-clavulanate.

1d. The relevant clinical colleges support incorporation of decision support software in prescribing software, and review the current default repeat prescriptions option.

1e. Primary health networks and local health networks track and compare antimicrobial prescribing rates where they do not do so already.

1f. National boards and the Australian Health Practitioner Regulation Agency consider what can be done to ensure relevant registered health practitioners have up-to-date knowledge of prescribing guidelines for antimicrobials.

Background

Antimicrobials are a 'miracle' of modern medicine. Although the term antimicrobial includes medicines such as antivirals and antifungals[1], for this chapter it refers to medicines with primarily antibacterial activity.

Countless lives have been saved since the arrival of the first antimicrobial, penicillin, in the early 1940s. However, the miracle is being squandered by treating infections for which antimicrobials provide little or no benefit. This includes nearly all upper respiratory tract infections and acute bronchitis.[2,3,4,5] Most of these infections are caused by viruses, against which antimicrobials are ineffective. In addition, many bacterial upper respiratory tract infections generally resolve spontaneously and without complication.[6] Unnecessary use of antimicrobials exposes patients to adverse effects and increases antimicrobial resistance in both individuals and the general population.

Antimicrobial resistance is the ability of micro-organisms, such as bacteria, to evolve to stop an antimicrobial from working effectively. As a result, standard antimicrobials become ineffective, and infections may persist and spread to others. Although antimicrobial resistance is a natural feature of bacterial evolution, inappropriate use of antimicrobials has increased the development of antimicrobial resistance not only in humans, but in animals and agriculture. Examining variations in the use of antimicrobials in the community will increase our understanding of how they are used and enhance our ability to improve their use.

Chapter overview

This chapter includes the following data items:

- antimicrobial dispensing
- quinolone dispensing
- amoxycillin and amoxycillin-clavulanate dispensing.

Antimicrobials include quinolones, which have been restricted for many years, and amoxycillin and amoxycillin-clavulanate. The latter two are among the most commonly prescribed antimicrobials and are often used interchangeably, according to prescriber preference.

The data item on antimicrobial dispensing includes systemic and topical antibacterials and antifungals, which have been included because the resistance issue is similar to that of antibacterials.

International comparisons

Compared with many other developed countries, historically Australia has had high rates of community use of antimicrobials based on the international standard of comparison: defined daily dose (DDD) per 1,000 inhabitants per day (DDD/1,000/day). In 2013, Australia's DDD/1,000/day for systemic antibacterials was 22.8.[7] When compared with 27 member countries from the European Centre for Disease Prevention and Control, Australia ranks 11th in consumption.

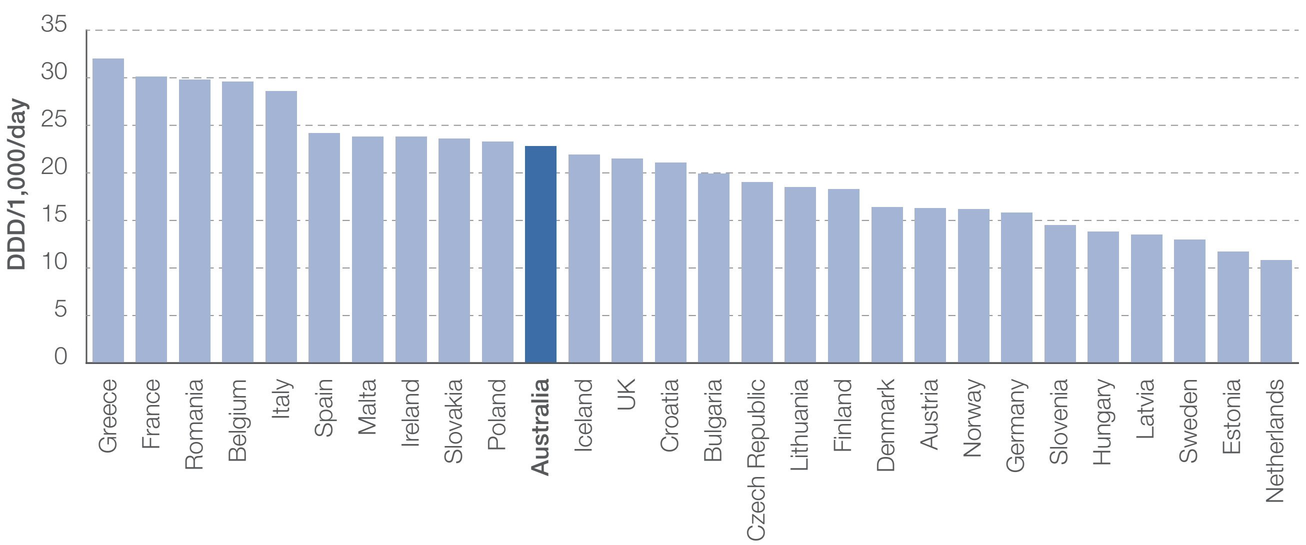
Australia's rate is slightly higher than England's rate of 21 DDD/1,000/day,[8] but is more than twice that of the Netherlands at 10 DDD/1,000/day (Figure 1).[7] The Netherlands has the lowest level of community use in Europe. Assuming that the pattern and prevalence of infections in Europe do not differ greatly from that of Australia, the Netherlands might be considered an international benchmark due to its low use of antimicrobials and low levels of resistance.

The total estimated number of systemic antimicrobial prescriptions dispensed is another measure of use. In 2013–14, 1,199 prescriptions were dispensed per 1,000 people in Australia. This number was higher than in the United States, where 842 prescriptions were dispensed per 1,000 people in 2011[9], and almost double that of Canada, where 642 prescriptions were dispensed per 1,000 people in 2012–13.[10] These figures confirm that Australia has high antimicrobial use compared with many other countries of similar socioeconomic status.

Australian initiatives

Australia's National Antimicrobial Resistance Strategy has been developed to combat antimicrobial resistance in people, animals, food and agriculture.[11] As part of this strategy, the Commission is coordinating the development of a national antimicrobial resistance surveillance system through the Antimicrobial Use and Resistance in Australia (AURA) Project.[12]

Figure 1: Comparing DDD/1,000/day for systemic antibacterial use in Australia and Europe



Note: Adapted from 'Consumption of antimicrobials for Systemic use (ATC group J01) in the community (primary care sector) in Europe', reporting year 2013.[8]

Antimicrobial dispensing

The Commission is also addressing inappropriate antimicrobial use and antimicrobial resistance through the standard on preventing and controlling healthcare-associated infections in the National Safety and Quality Health Service Standards[13] and the Antimicrobial Stewardship Clinical Care Standard.[14] The Clinical Care Standard aims to ensure the appropriate use and review of antimicrobials to optimise a patient's health outcomes, lessen the risk of adverse effects and reduce the emergence of antibiotic resistance.

About the data

The data for this chapter is sourced from the 2013–14 PBS and reported as prescriptions dispensed per 100,000 people. It is not possible to compare this measure with DDD/1,000/day. The measures are calculated differently and there are no defined daily dose rates for topical antimicrobials. For instance, Australia's DDD/1,000/day rate was 22.8 in the calendar year 2013, while the total number of prescriptions dispensed for systemic antimicrobials (administered orally or by injection) was 29.2 million.

While the PBS aims to provide Australian residents with affordable and reliable access to a range of medicines, the ready availability of antimicrobials has fuelled unnecessary use. The PBS aims to curb unnecessary antimicrobial use through restriction mechanisms ('Restricted Benefit' or 'Authority Required'). However, the PBS facilitates affordable access to the commonly prescribed antimicrobials so that they are still available in case of benefit.

A number of limitations are implicit in the atlas data, including:

- the average dispensing rate, which does not necessarily represent best practice
- variations at a local level, which may reflect chance variations and can be influenced by clustering of high-risk individuals or many episodes of infection for some individuals
- the data have not been linked to investigate how rates of dispensing relate to health outcomes
- repeat prescriptions, which may be dispensed for individuals within the year and are counted more than once
- dispensing from some remote area Aboriginal Health Services, which are not captured in the PBS, resulting in artificially low rates of dispensing in many remote communities. Aboriginal Health Services distributed about 280,000 antimicrobial packs in 2013[15]
- not knowing the reasons for prescribing as this is not captured in the PBS
- PBS data exclude a large proportion of public hospital medicine dispensing.

1 Australian Commission on Safety and Quality in Health Care. Antimicrobial prescribing practice in Australian hospitals: results of the 2014 National Antimicrobial Prescribing Survey. Sydney: ACSQHC, 2015.
2 Kenealy T, Arroll B. Antibiotics for the common cold and acute purulent rhinitis. Cochrane Database of Systemic Reviews 2013. Issue no. 6: Art. no. CD000247.
3 Ahovuo-Saloranta A, Rautakorpi UM, Borisenko OV, Liira H, Williams Jr JW, Mäkelä M. Antibiotics for acute maxillary sinusitis in adults. Cochrane Database of Systemic Reviews 2014. Issue no. 2. Art. no. CD000243.
4 Venekamp RP, Sanders S, Glasziou PP, Del Mar CB, Rovers MM. Antibiotics for acute otitis media in children. The Cochrane Database of Systematic Reviews 2013. Issue no. 1. Art. no: CD000219.
5 Smith SM, Fahey T, Smucny J, Becker LA. Antibiotics for acute bronchitis. Cochrane Database of Systemic Reviews 2014. Issue 3. Art. no: CD000245.
6 Spinks A, Glasziou PP, Del Mar CB. Antibiotics for sore throat. Cochrane Database of Systemic Reviews 2013. Issue no. 11. Art no. CD000023.
7 European Centre for Disease Prevention and Control. Antimicrobial consumption rates by country: Consumption of antimicrobials of antibacterials for systemic use (ATC group J01) in the community (primary care sector) in Europe, reporting year 2013 2013. (Accessed 1 September 2015 at: http://ecdc.europa.eu/en/healthtopics/antimicrobial_resistance/esac-net-database/Pages/Antimicrobial-consumption-rates-by-country.aspx.)
8 Right Care. The NHS Atlas of Variation in Healthcare: Reducing unwarranted variation to increase value and improve quality. London: NHS, 2015.
9 Hicks LA, Bartoces MG, Roberts RM, Suda KJ, Hunkler RJ, Taylor TH et al. US outpatient antibiotic prescribing variation according to geography, patient population, and provider specialty in 2011. Clinical Infectious Diseases 2015.
10 Government of Canada. Human antimicrobial drug use report 2012–13. Ontario: Public Health Agency of Canada, 2014.
11 Department of Health, Department of Agriculture. National Antimicrobial Resistance Strategy 2015–2019. Canberra, 2015.
12 Australian Commission on Safety and Quality in Health Care. Antimicrobial Use and Resistance in Australia Project. 2015. (Accessed September 2015 at www.safetyandquality.gov.au/national-priorities/amr-and-au-surveillance-project/).
13 Australian Commission on Safety and Quality in Health Care. National safety and quality health service standards. Sydney: ACSQHC, 2012.
14 Australian Commission on Safety and Quality in Health Care, Clinical care standards. 2015. (Accessed 1 September 2015 at: www.safetyandquality.gov.au/our-work/clinical-care-standards/).
15 Pharmaceutical Benefits Scheme. Antibiotics: PBS/RPBS utilisation: drug utilisation sub-committee. Canberra: PBS, 2015.

1.1 Antimicrobial dispensing

Context

This data item examines antimicrobial dispensing for people of all ages. These data are sourced from the PBS and relate to the number of prescriptions dispensed per 100,000 people.

Antimicrobials include antibiotics, antivirals and antifungals and are used to treat microbial infections. Their use is driven by factors such as prescribing practices, patient factors, the incidence of infections and the prevalence of antimicrobial resistance.

Inappropriate prescribing of antimicrobials is common. It leads to unnecessary spending on prescriptions, a higher risk of adverse effects and increased population-level antimicrobial resistance.

Healthcare systems around the world have tried incentive payments and feedback systems to reduce unnecessary prescribing. These programs have had limited success.[1] In Australia, NPS MedicineWise has been working for more than a decade to reduce inappropriate prescribing.[2] Further reductions could be made, especially in unnecessary use of antimicrobials for upper respiratory tract infections.

Antimicrobial dispensing

Magnitude of variation

In 2013–14, there were 30,355,539 PBS prescriptions dispensed for antimicrobials, representing 125,119 prescriptions per 100,000 people (the Australian rate).

The number of PBS prescriptions dispensed for antimicrobials across 325* local areas (SA3s) ranged from 14,895 to 171,841 per 100,000 people. The number of prescriptions was **11.5 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 86,877 per 100,000 people in the Northern Territory, to 132,730 in Queensland.

After excluding the highest and lowest results, the antimicrobial prescription rate across the 300 remaining local areas was **1.9 times higher** in one local area compared to another.

Dispensing rates were lowest in remote communities. Generally, rates were highest in areas of lowest socioeconomic status, and decreased with increasing socioeconomic status, consistent with poorer health and higher infection rates with decreasing socioeconomic status.

There is insufficient evidence to identify which factors are driving geographic patterns of antimicrobial dispensing in Australia. For many of the common bacteria involved in community-acquired infections, rates of resistance do not vary widely.[3]

Interpretation

Potential reasons for the variation include differences in:

- prescribing practices and patient expectations
- the distribution of populations with high risk of infection and high rates of antimicrobial use, such as residents of nursing homes and Aboriginal and Torres Strait Islander peoples
- the prevalence of risk factors for infection, such as household crowding and tobacco smoking
- private prescriptions, which are not included in this data.

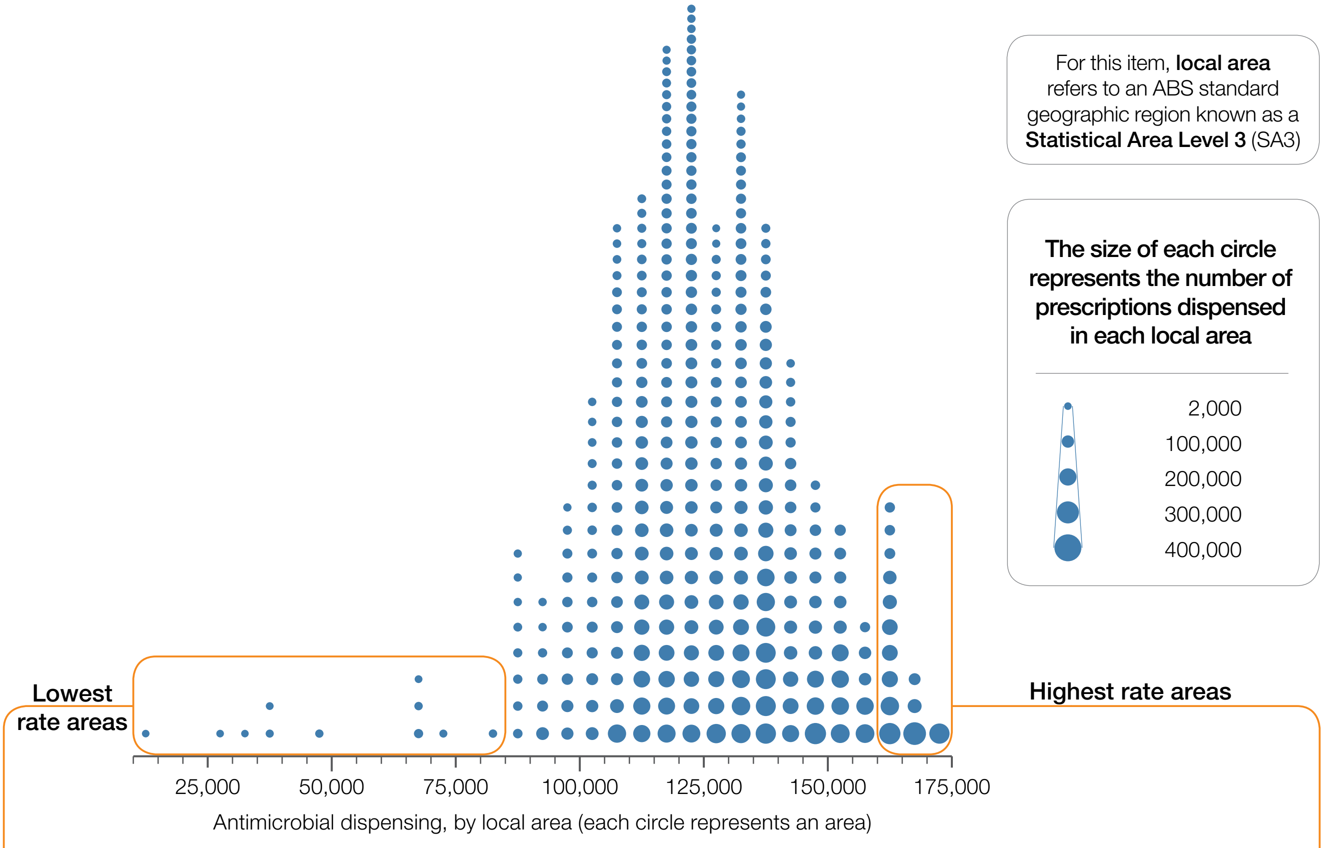
It is also important to consider that the dispensing of antimicrobials in remote areas by some Aboriginal Health Services is not captured in the PBS database.

To explore this variation, further analysis could focus on:

- factors that contribute to local variations in antimicrobial dispensing. This investigation would help to explain why some areas have lower antimicrobial dispensing rates than others.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 2: Number of PBS prescriptions dispensed for antimicrobials per 100,000 people, age standardised, by local area, 2013–14



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Tullamarine - Broadmeadows	Vic	160,598	225,763

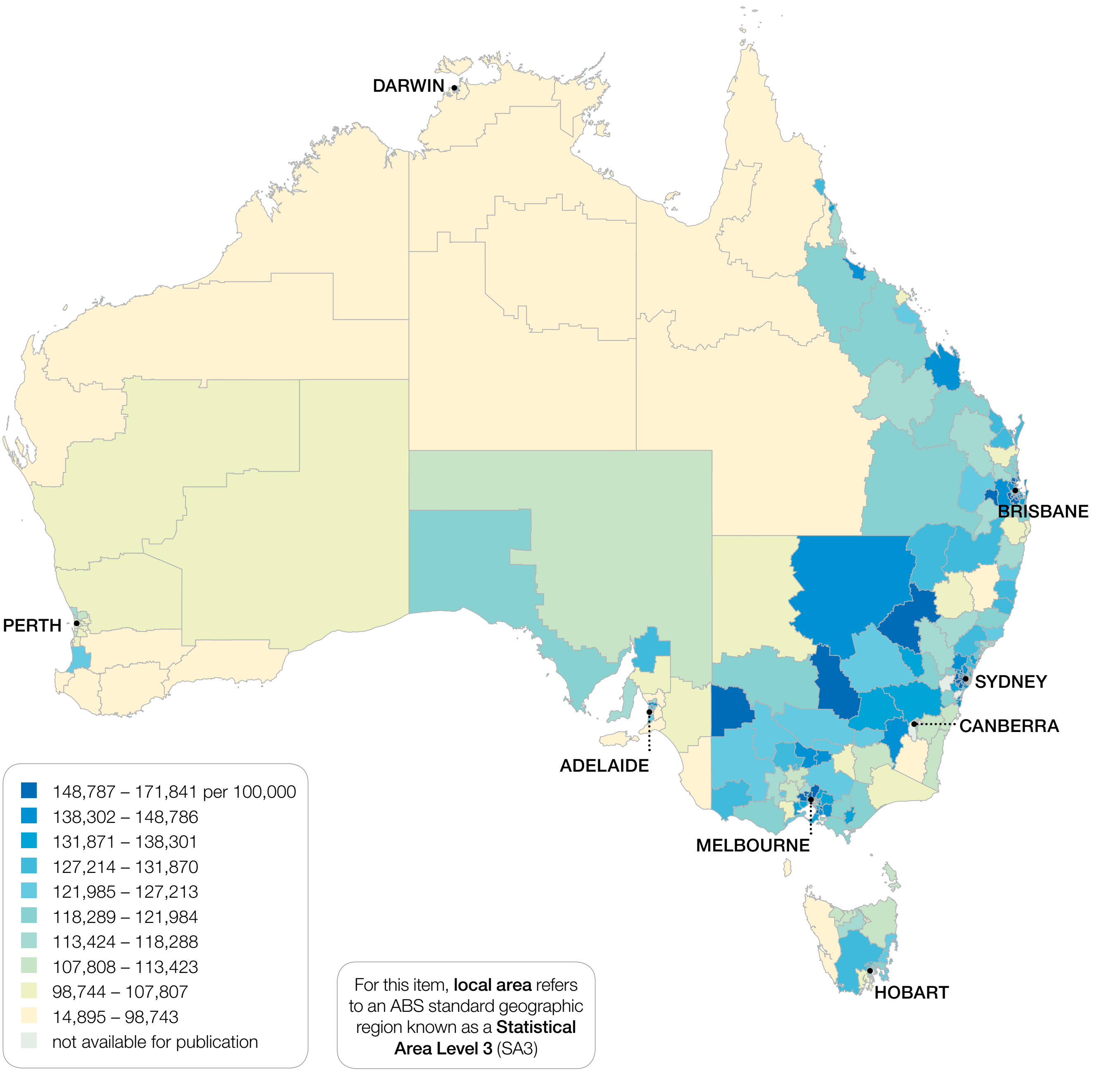
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 51,660 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 06/03/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

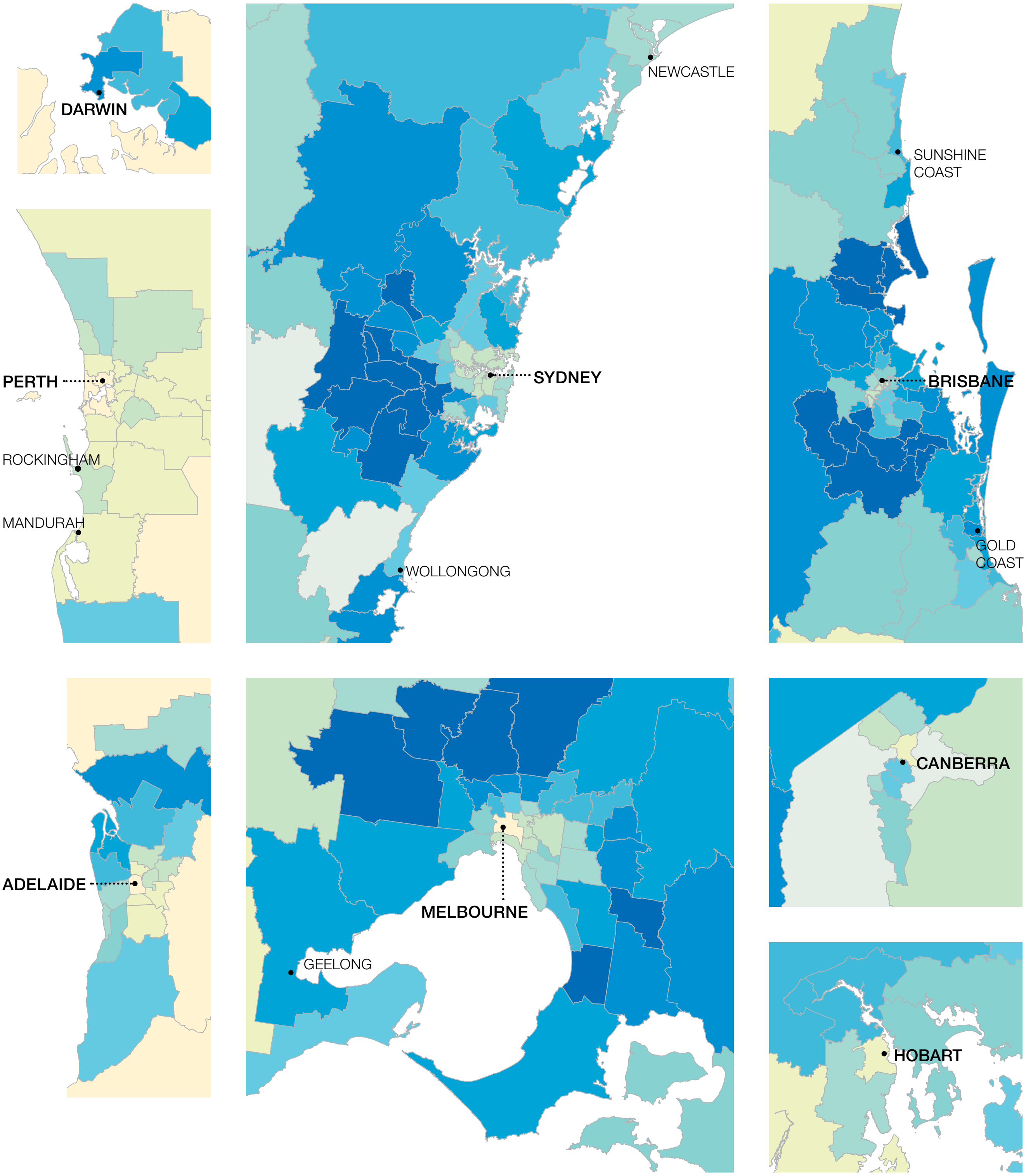
Antimicrobial dispensing

Figure 3: Number of PBS prescriptions dispensed for antimicrobials per 100,000 people, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 06/03/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for antimicrobials across 325 local areas (SA3s) ranged from 14,895 to 171,841 per 100,000 people. The number of prescriptions was **11.5 times higher** in the area with the highest rate compared to the area with the lowest rate.



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Antimicrobial dispensing

Figure 4: Number of PBS prescriptions dispensed for antimicrobials per 100,000 people, age standardised, by local area, state and territory, 2013–14

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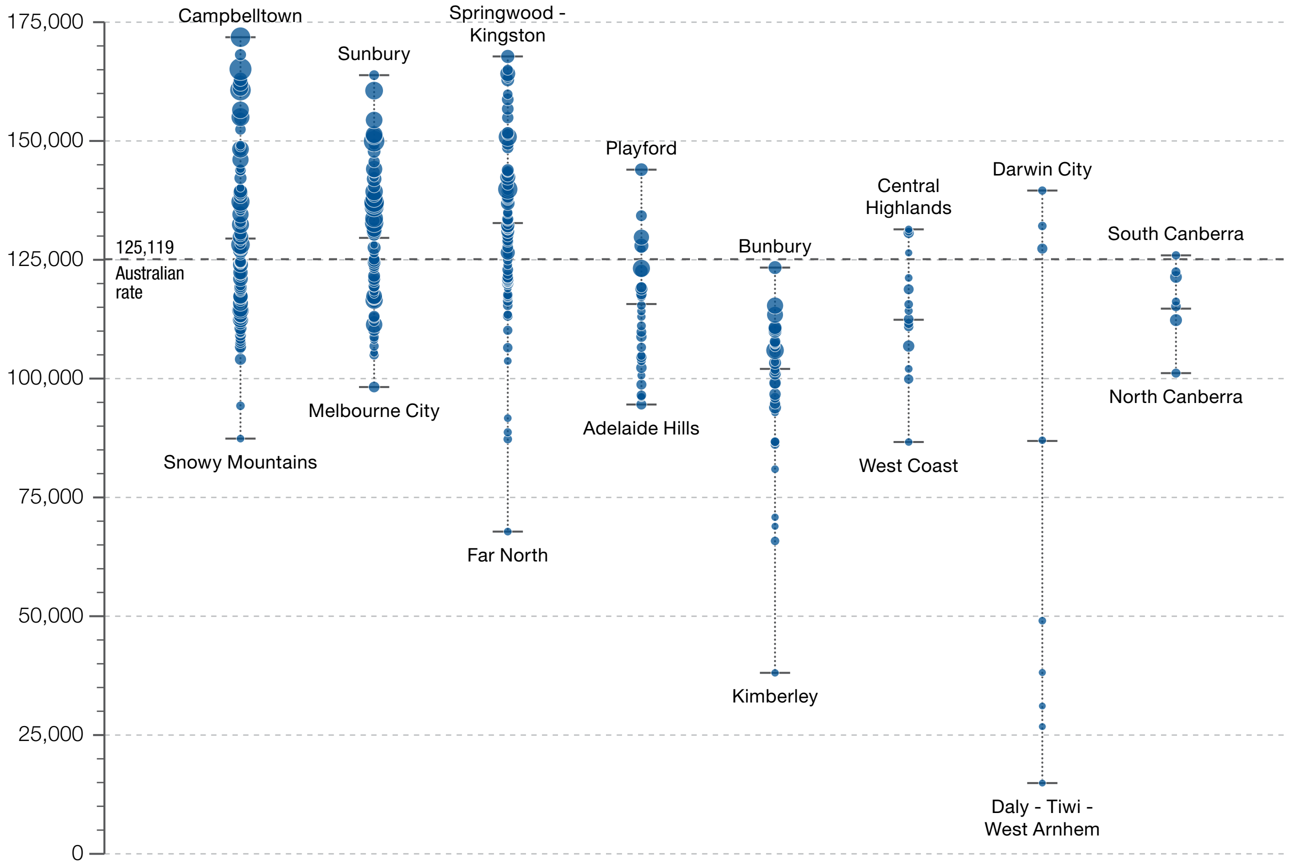
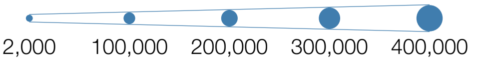
Highest rate	171,841	163,852	167,787	143,965	123,357	131,403	139,567	125,936
State/territory	129,473	129,607	132,730	115,685	102,038	112,376	86,877	114,714
Lowest rate	87,375	98,230	67,807	94,552	38,081	86,658	14,895	101,153
No. prescriptions	10,005,249	7,680,669	6,292,104	2,048,032	2,576,952	615,378	189,166	430,511



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

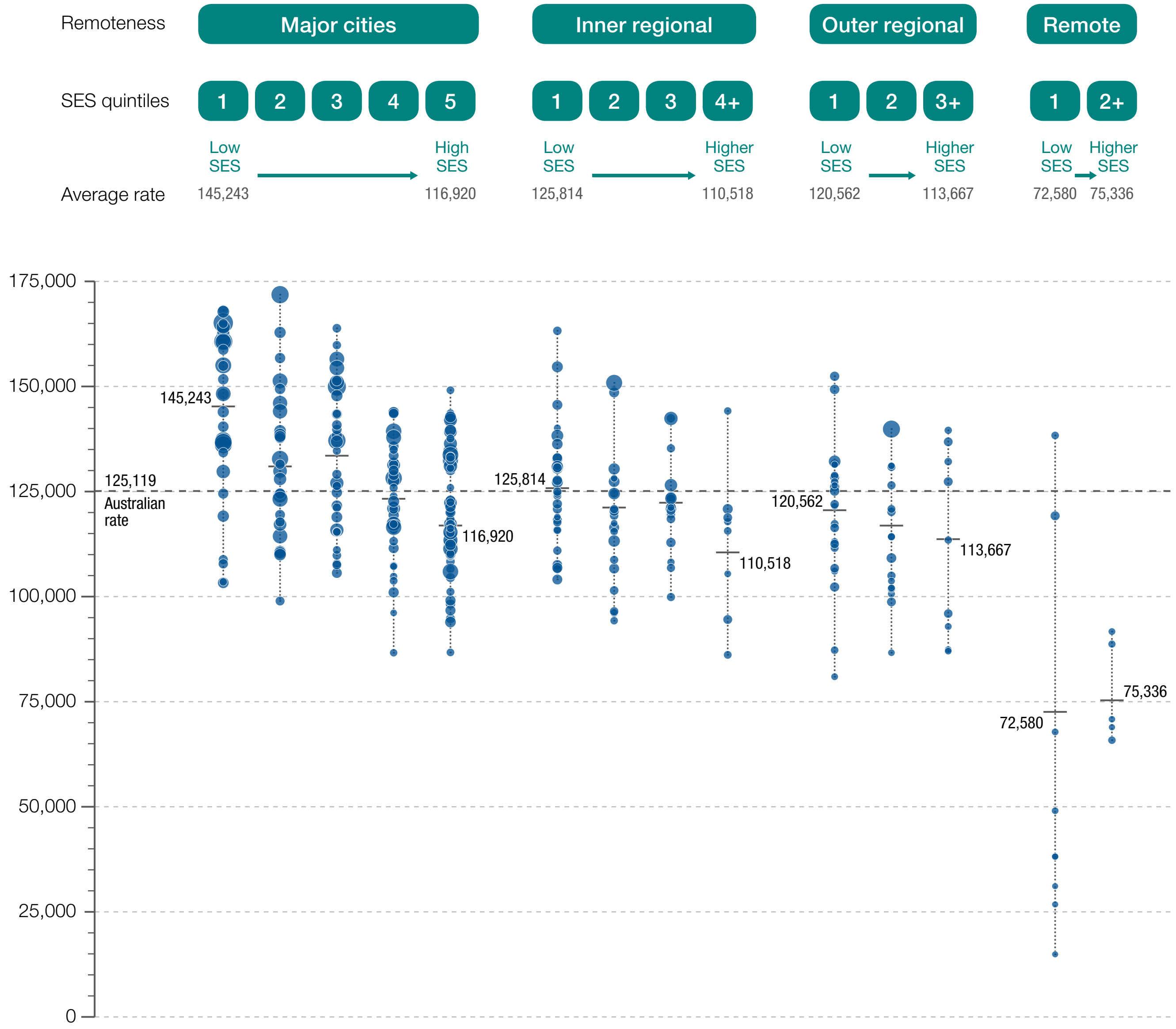
The size of each circle represents the number of prescriptions dispensed in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 06/03/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 5: Number of PBS prescriptions dispensed for antimicrobials per 100,000 people, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

2,000 100,000 200,000 300,000 400,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 06/03/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antimicrobial dispensing

Resources

- Therapeutic Guidelines Limited. *Therapeutic guidelines: Antibiotic*. Version 15. 2014. Available at: www.tg.org.au/.
- Australian Medicines Handbook Pty Ltd. *Australian Medicines Handbook 2015* (online). 2015. Available at: http://amhonline.amh.net.au/.
- Australian Commission on Safety and Quality in Health Care. *Antimicrobial stewardship clinical care standard*. 2014. Available at: www.safetyandquality.gov.au/our-work/clinical-care-standards/antimicrobial-stewardship-clinical-care-standard/.
- Australian Government. *National antimicrobial resistance strategy 2015–2019*. 2015. Available at: www.health.gov.au/internet/main/publishing.nsf/Content/ohp-amr.htm.
- Australian Commission on Safety and Quality in Health Care. *National antimicrobial utilisation surveillance program*. 2014. Available at: www.safetyandquality.gov.au/national-priorities/amr-and-au-surveillance-project/.
- Australian Commission on Safety and Quality in Health Care. *National safety and quality health service standards*. 2012. Available at: www.safetyandquality.gov.au/wp-content/uploads/2011/09/NSQHS-Standards-Sept-2012.pdf.
- Drug Utilisation Subcommittee (DUSC) of the Pharmaceutical Benefits Advisory Committee (PBAC). *Antibiotics: PBS/RPBS utilisation*. October 2014 and February 2015. Available at: www.pbs.gov.au/info/industry/listing/participants/public-release-docs/antibiotics-oct-14-feb-15.
- Pharmaceutical Benefits Scheme. *Antibiotics Roundtable Outcomes Statement*. 2015. Available at: www.pbs.gov.au/reviews/authority-required-files/antibiotics-roundtable-outcome-statement.pdf.
- Pharmaceutical Benefits Scheme. *Australian Statistics on Medicines*. 2015. Available at: www.pbs.gov.au/info/browse/statistics.

1 Meeker D, Knight TK, Friedberg MW, Linder JA, Goldstein NJ, Fox CR, et al. Nudging guideline-concordant antibiotic prescribing: a randomized clinical trial. JAMA Intern Med. 2014;174(3):425-31.
2 National Prescribing Service, MedicineWise. Antibiotics. 2014. (Accessed 1 September 2015 at: www.nps.org.au/medicines/infections-and-infestations/antibiotics).
3 Australian Group on Antimicrobial Resistance. AGAR Surveys. (Accessed 1 September 2015 at: www.agargroup.org/surveys).

1.2 Quinolone dispensing

Context

This data item examines quinolone dispensing for people of all ages. These data are sourced from the PBS and relate to the number of prescriptions dispensed per 100,000 people.

Quinolones are a class of antimicrobials that have been available in Australia for more than 25 years and can be administered orally, by injection and topically. Twenty years ago, Australia became the first country to restrict access to quinolones in both hospitals and the community.

Clinicians must obtain authority to prescribe quinolones from the PBS and can prescribe only for specific PBS-listed infections.[1] These restrictions have minimised resistance to these important antimicrobials, and preserved their value in treating infections caused by bacteria resistant to other antimicrobial classes.[2]

Restricted use of quinolones in food-producing animals has also minimised the risk of transmitting resistance through the food chain. Compared to almost all other developed countries, overall use of quinolones is very low in Australia.[2]

Quinolone dispensing

Magnitude of variation

In 2013–14, there were 354,403 PBS prescriptions dispensed for quinolones, representing 1,383 prescriptions per 100,000 people (the Australian rate).

The number of PBS prescriptions dispensed for quinolones across 325* local areas (SA3s) ranged from 281 to 2,339 per 100,000 people. The number of prescriptions was **8.3 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 1,025 per 100,000 people in the Australian Capital Territory, to 1,731 in Queensland.

After excluding the highest and lowest results, the quinolone prescription rate across the 307 remaining local areas was **2.6 times higher** in one local area compared to another.

Variations in dispensing of quinolones did not strongly correlate with socioeconomic status. Dispensing rates were lower in remote areas, especially those of lower socioeconomic status. Dispensing rates were lowest in remote communities.

Interpretation

The number of prescriptions dispensed for quinolones is relatively small, so a few individuals who receive multiple repeat prescriptions could influence dispensing rates at the local level, especially in areas with small populations.

Other potential reasons for the variation include differences in:

- the distribution of Aboriginal and Torres Strait Islander peoples with a high risk of infections for which quinolones are indicated. Topical quinolones are widely used to treat chronic suppurative otitis media (middle ear infection)
- prescribing preferences, which are known to be a factor in variations across Europe[3]
- local laboratory reporting practices. Some laboratories routinely report bacterial sensitivity to quinolones, particularly norfloxacin for urinary tract infection. Others restrict reporting of quinolones, providing the result only when resistance to multiple other classes of antimicrobials has been detected. Changing from the former to the latter practice in the laboratory servicing a mid-sized metropolitan hospital resulted in a significant decrease in norfloxacin use[4]
- private prescriptions, which are not included in this data.

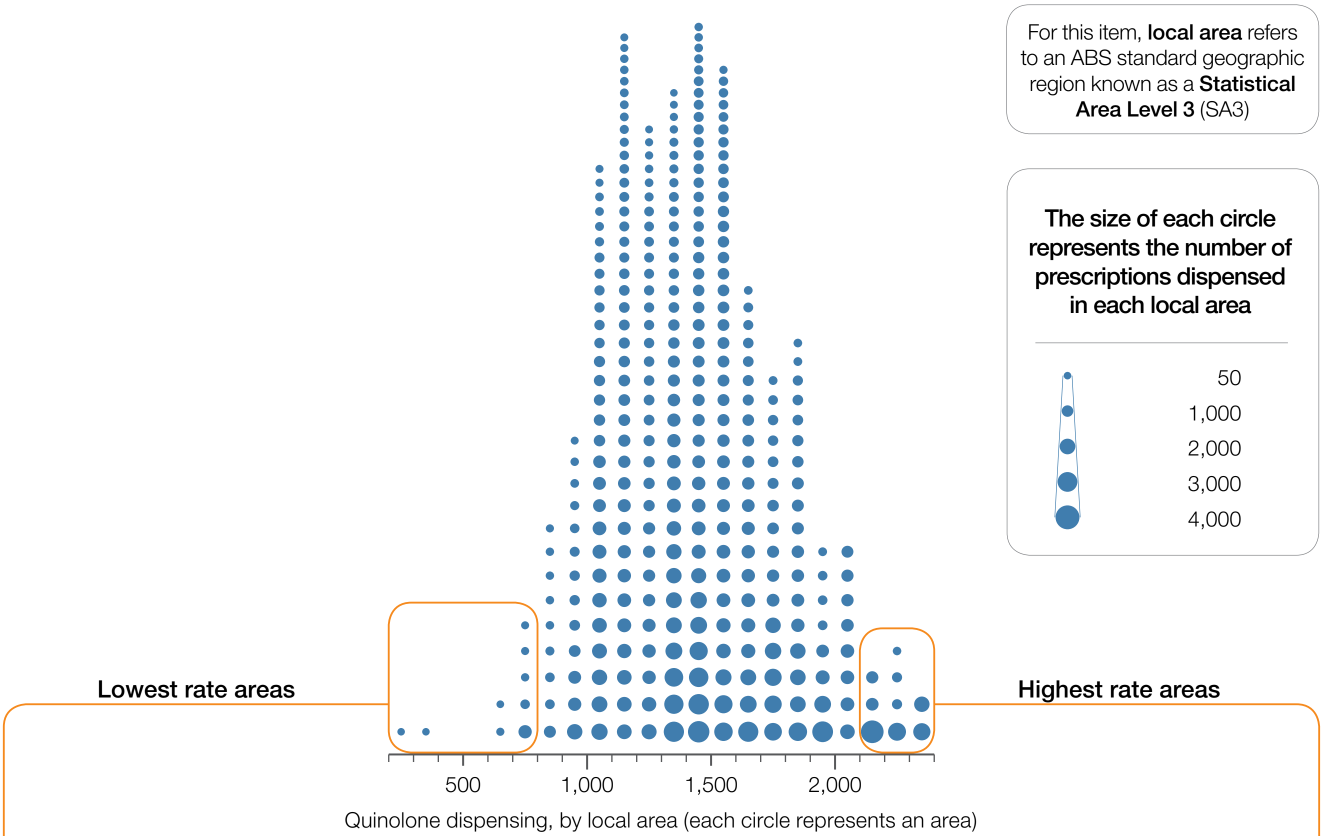
It is also important to consider that the dispensing of antimicrobials in remote areas by some Aboriginal Health Services is not captured in the PBS database.

To explore this variation, further analysis could focus on:

- variations between states and territories. Aside from potential geographical variations in the incidence of some infections, use of quinolones should not significantly vary across Australia
- variations, if any, in the private prescription market.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 6: Number of PBS prescriptions dispensed for quinolones per 100,000 people, age standardised, by local area, 2013–14



Local area	State	Rate	Prescriptions
East Arnhem	NT	281	44
Daly - Tiwi - West Arnhem	NT	363	44
Alice Springs	NT	671	199
Katherine	NT	682	86
Kimberley	WA	705	238
Snowy Mountains	NSW	747	184
West Coast	Tas	753	163
Auburn	NSW	785	539
Brimbank	Vic	787	1,440

Local area	State	Rate	Prescriptions
Ipswich Inner	Qld	2,339	2,383
Dubbo	NSW	2,314	1,950
Mackay	Qld	2,273	2,554
Port Douglas - Daintree	Qld	2,263	281
Bowen Basin - North	Qld	2,224	670
Bourke - Cobar - Coonamble	NSW	2,220	678
Toowoomba	Qld	2,198	3,705
Noosa	Qld	2,183	1,180
Mid West	WA	2,157	1,284

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

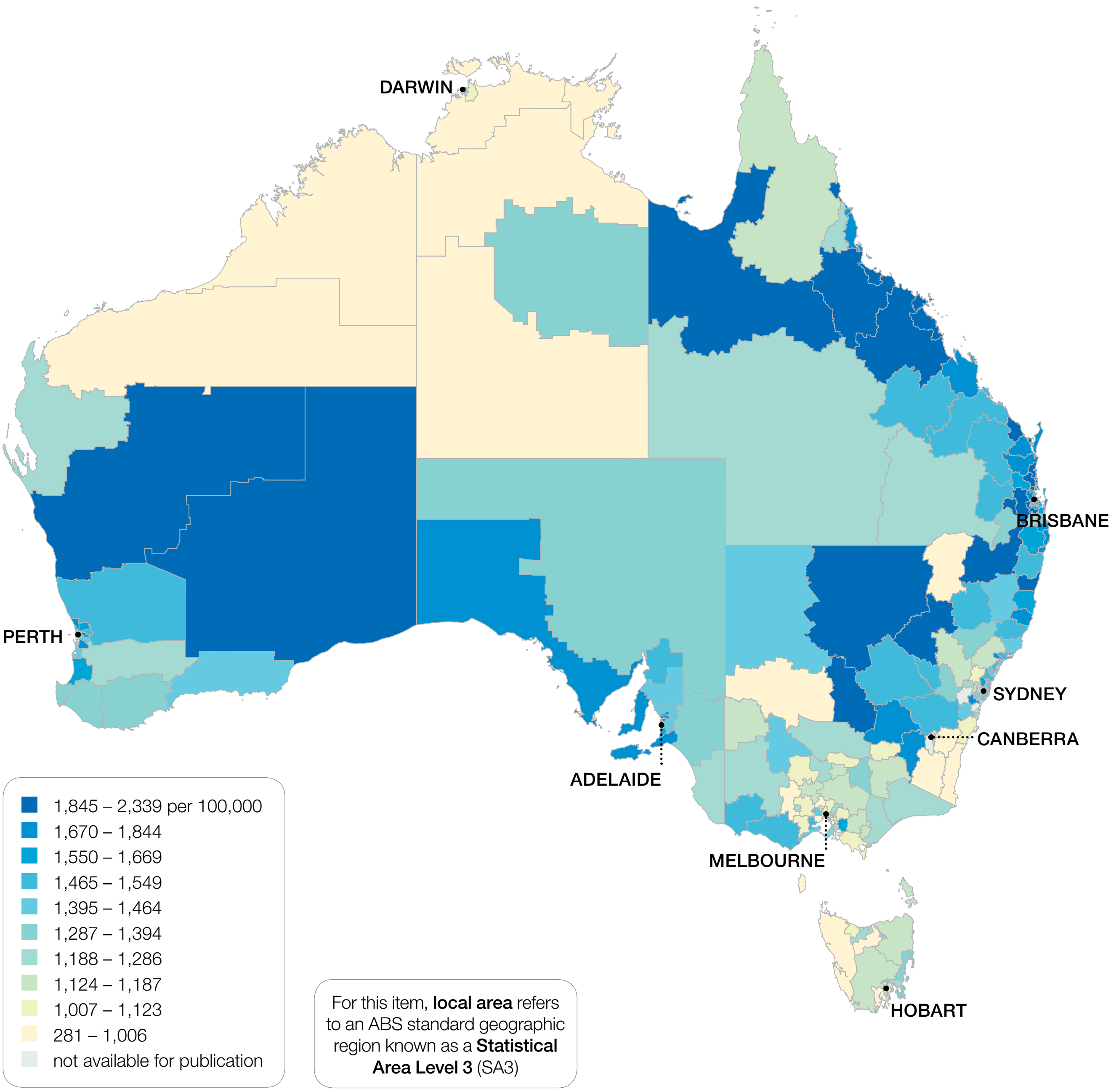
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions.
SA3 analysis excludes approximately 890 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Quinolone dispensing

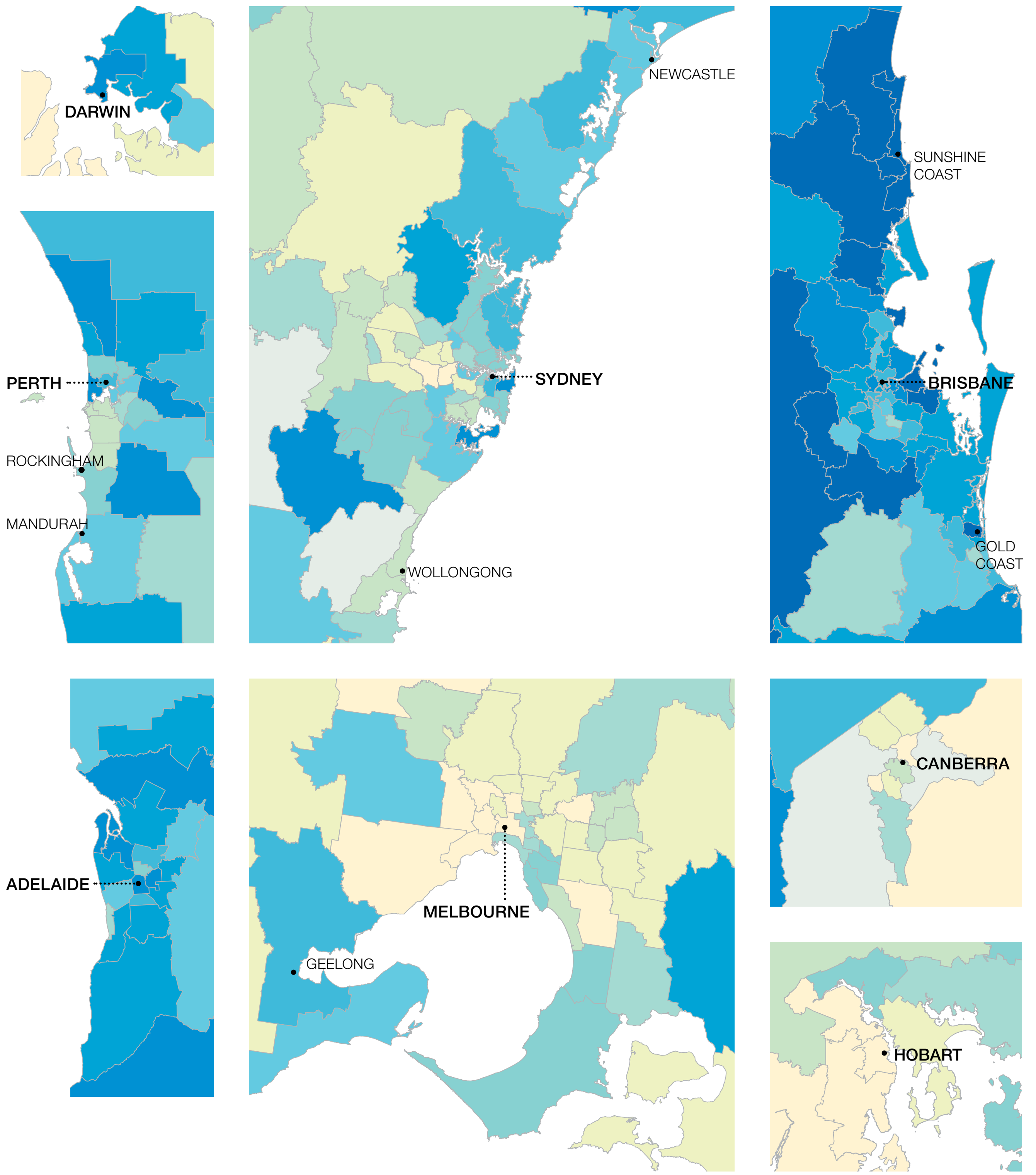
Figure 7: **Number of PBS prescriptions dispensed for quinolones per 100,000 people, age standardised, by local area, 2013–14**



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for quinolones across 325 local areas (SA3s) ranged from 281 to 2,339 per 100,000 people. The number of prescriptions was **8.3 times higher** in the area with the highest rate compared to the area with the lowest rate.

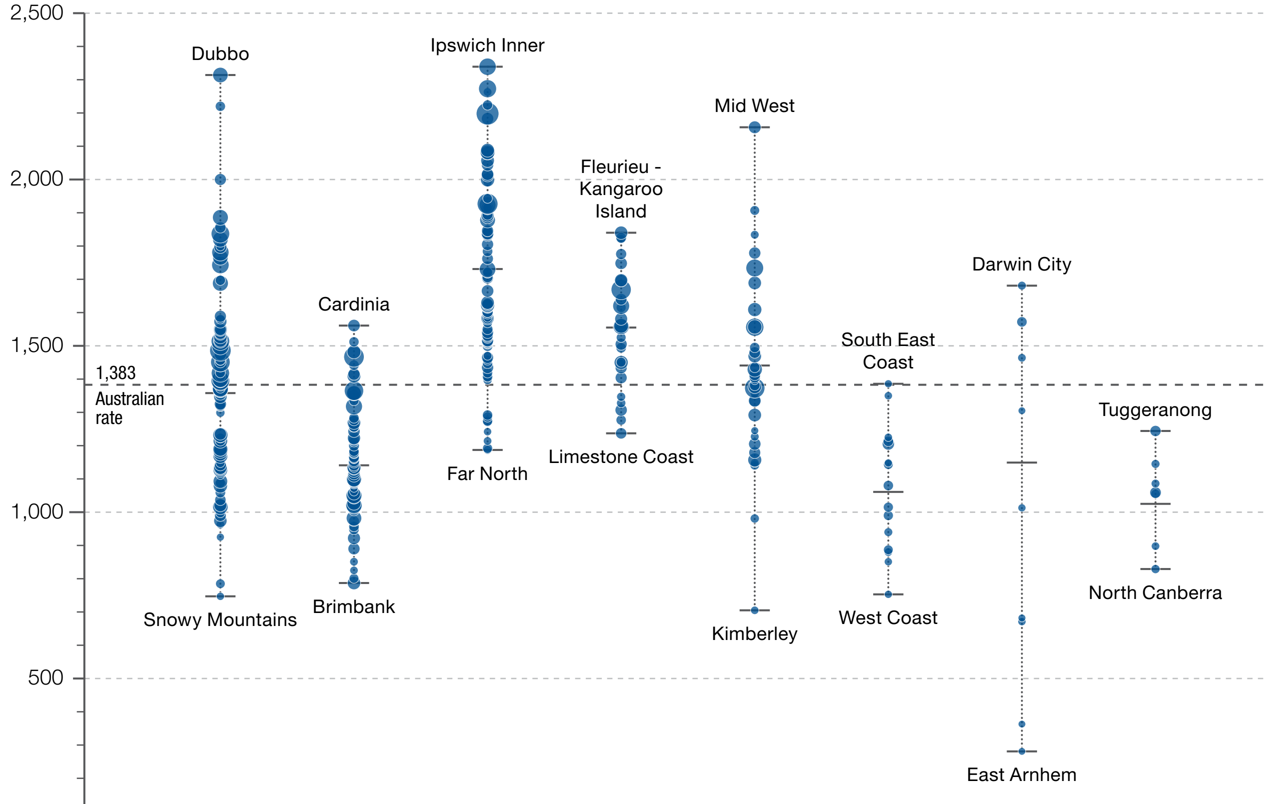


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

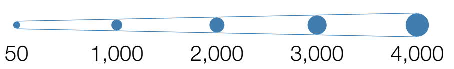
Quinolone dispensing

Figure 8: Number of PBS prescriptions dispensed for quinolones per 100,000 people, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	2,314	1,561	2,339	1,840	2,157	1,386	1,681	1,244
State/territory	1,358	1,141	1,731	1,555	1,441	1,061	1,149	1,025
Lowest rate	747	787	1,187	1,237	705	753	281	829
No. prescriptions	114,100	72,167	84,722	31,535	36,538	6,631	1,914	3,714



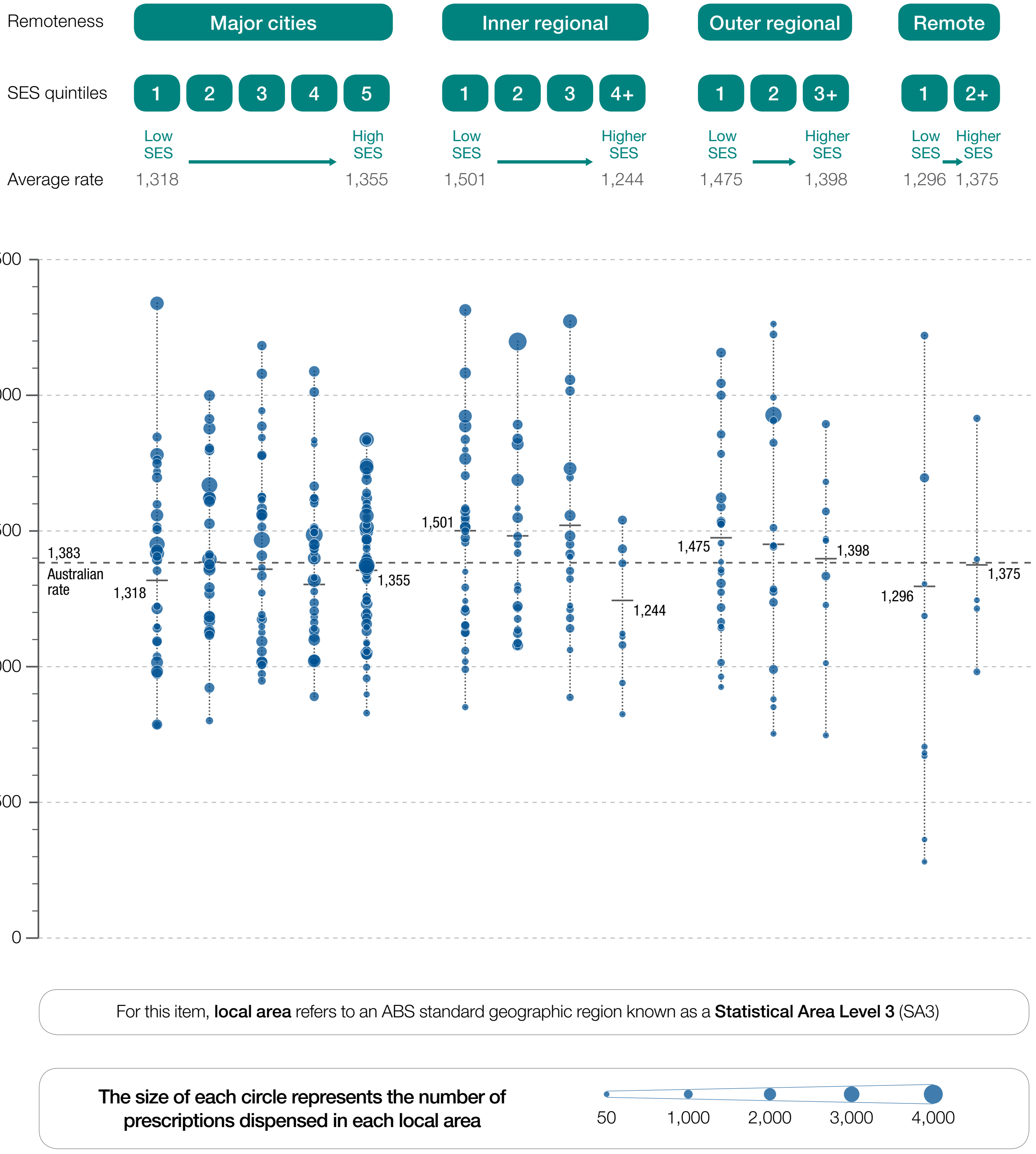
For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 9: Number of PBS prescriptions dispensed for quinolones per 100,000 people, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Quinolone dispensing

Resources

- Therapeutic Guidelines Limited. *Therapeutic Guidelines: Antibiotic*. Version 15. 2014. Available at: www.tg.org.au/.
- Australian Medicines Handbook Pty Ltd. *Australian Medicines Handbook 2015* (online). 2015. Available at: http://amhonline.amh.net.au/.
- Pharmaceutical Benefits Scheme. *Antibiotics Roundtable Outcomes Statement*. 2015. Available at: www.pbs.gov.au/reviews/authority-required-files/antibiotics-roundtable-outcome-statement.pdf.

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1 Australian Group on Antimicrobial Resistance. AGAR Surveys. (Accessed 1 September 2015 at: www.agargroup.org/surveys).
2 Cheng AC, Turnidge J, Collignon P, Looke D, Barton M, Gottlieb T. Control of fluoroquinolone resistance through successful regulation, Australia. Emerging infectious diseases 2012;18(9):1453–60.
3 Deschepper R, Grigoryan L, Lundborg CS, Hofstede G, Cohen J, Kelen GV et al. Are cultural dimensions relevant for explaining cross-national differences in antimicrobial use in Europe? BMC Health Service Research 2008;8:123.
4 Australian Commission on Safety and Quality in Health Care. National Antimicrobial Utilisation Surveillance Program. 2014. (Accessed 1 September 2015 at: www.safetyandquality.gov.au/national-priorities/amr-and-au-surveillance-project/national-antimicrobial-utilisation-surveillance-program/).

1.3 Amoxycillin and amoxycillin-clavulanate dispensing

Context

This data item examines amoxycillin and amoxycillin-clavulanate dispensing for people of all ages. These data are sourced from the PBS and relate to the number of prescriptions dispensed per 100,000 people.

Amoxycillin is the most commonly dispensed antimicrobial in Australia, and in 2013 accounted for 21 per cent of systemic antimicrobial dispensing.[1] Amoxycillin is preferred for treating infections where β-lactamase producing bacteria are less common, such as most upper and lower bacterial respiratory tract infections.[2] These infections account for 57 per cent of all presentations in primary care where an antimicrobial agent is prescribed.[3]

The addition of clavulanic acid, a β-lactamase inhibitor, to amoxycillin enhances its spectrum of activity to include bacterial species commonly harbouring acquired β-lactamases, such as *Escherichia coli*, *Klebsiella* species and *Staphylococcus aureus*. The combination amoxycillin-clavulanate is the third most commonly dispensed antimicrobial in Australia.[1]

Amoxycillin-clavulanate is preferred over amoxycillin for urinary tract infections. Neither is recommended for skin or skin structure infections, the two other common presentations in primary care. Amoxycillin-clavulanate causes more adverse reactions than amoxycillin alone.

Amoxycillin and amoxycillin-clavulanate dispensing

Magnitude of variation

In 2013–14, there were 5,697,634 PBS prescriptions dispensed for amoxycillin, representing 24,062 prescriptions per 100,000 people (the Australian rate).

The number of PBS prescriptions dispensed for amoxycillin across 325* local areas (SA3s) ranged from 2,186 to 44,884 per 100,000 people. The number of prescriptions was **20.5 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 15,047 per 100,000 people in the Northern Territory, to 28,347 in Victoria.

After excluding the highest and lowest results, the amoxycillin prescription rate across the 301 remaining local areas was **2.7 times higher** in one local area compared to another.

In 2013–14, there were 4,621,154 PBS prescriptions dispensed for amoxycillin-clavulanate, representing 19,081 prescriptions per 100,000 people (the Australian rate).

The number of PBS prescriptions dispensed for amoxycillin-clavulanate across 325* local areas (SA3s) ranged from 1,998 to 32,058 per 100,000 people. The number of prescriptions was **16.0 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 13,740 per 100,000 people in Tasmania, to 21,979 in Queensland.

After excluding the highest and lowest results, the amoxycillin-clavulanate prescription rate across the 300 remaining local areas was **2.2 times higher** in one local area compared to another.

At the geographic level of SA3, the ratio of amoxycillin dispensed to the total of amoxycillin-clavulanate varied from 40 per cent to 60 per cent. The optimum ratio is unknown, despite evidence that for many of the common bacteria involved in community-acquired infections, rates of resistance do not vary widely.[4]

As with total antimicrobial dispensing, there was a link between higher dispensing rates of amoxycillin and amoxycillin-clavulanate and lower socioeconomic status, and lower dispensing rates with increasing remoteness. The very low dispensing rate in remote communities is most likely because medicines dispensed by remote-area Aboriginal Health Services are not captured in the PBS database.

Interpretation

Potential reasons for the variation include differences in:

- prescribing practices and patient expectations
- the distribution of populations with a high risk of infection and high rates of antimicrobial use, such as residents of nursing homes and Aboriginal and Torres Strait Islander peoples
- the prevalence of risk factors for infection, such as household crowding and tobacco smoking
- private prescriptions, which are not included in this data.

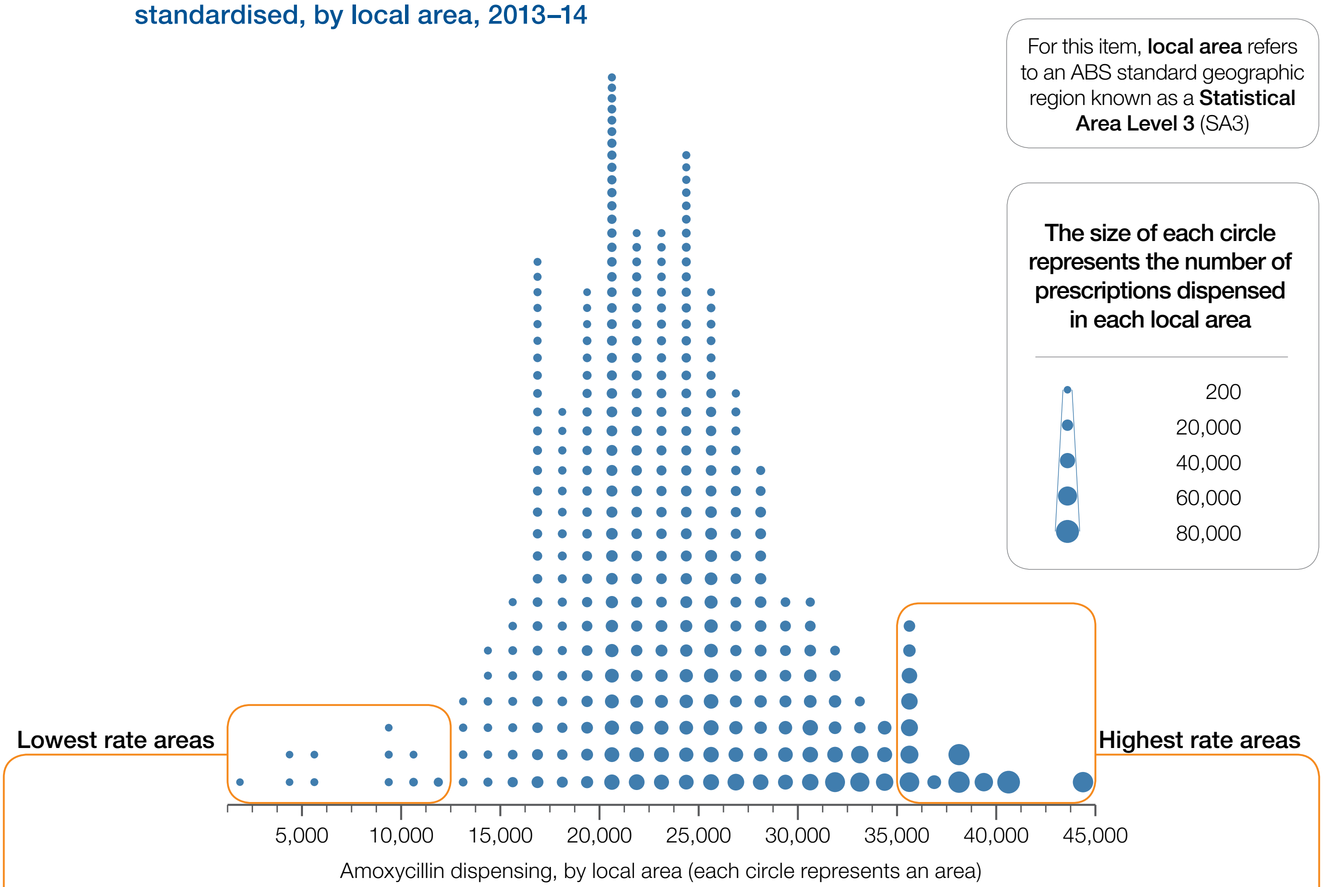
To explore this variation, further analysis could focus on:

- variation in prescribing practices.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Amoxycillin dispensing

Figure 10: Number of PBS prescriptions dispensed for amoxycillin per 100,000 people, age standardised, by local area, 2013–14



Local area	State	Rate	Prescriptions
Daly - Tiwi - West Arnhem	NT	2,186	365
East Arnhem	NT	4,238	687
Barkly	NT	4,608	310
Katherine	NT	5,644	1,171
Kimberley	WA	5,985	2,357
Alice Springs	NT	8,763	3,459
Far North	Qld	9,103	2,959
Gascoyne	WA	9,644	959
Esperance	WA	10,433	1,767
Pilbara	WA	10,484	6,291
Cottesloe - Claremont	WA	12,410	8,785

Local area	State	Rate	Prescriptions
Tullamarine - Broadmeadows	Vic	44,884	66,540
Whittlesea - Wallan	Vic	40,211	78,494
Melton - Bacchus Marsh	Vic	39,164	56,426
Brimbank	Vic	38,177	70,631
Fairfield	NSW	38,115	71,750
Bringelly - Green Valley	NSW	36,773	32,594
Liverpool	NSW	35,822	41,665
Keilor	Vic	35,810	20,907
Bankstown	NSW	35,649	62,965
Merrylands - Guildford	NSW	35,641	54,203
Canterbury	NSW	35,629	49,272
Casey - North	Vic	35,497	46,364
Moreland - North	Vic	35,490	25,834

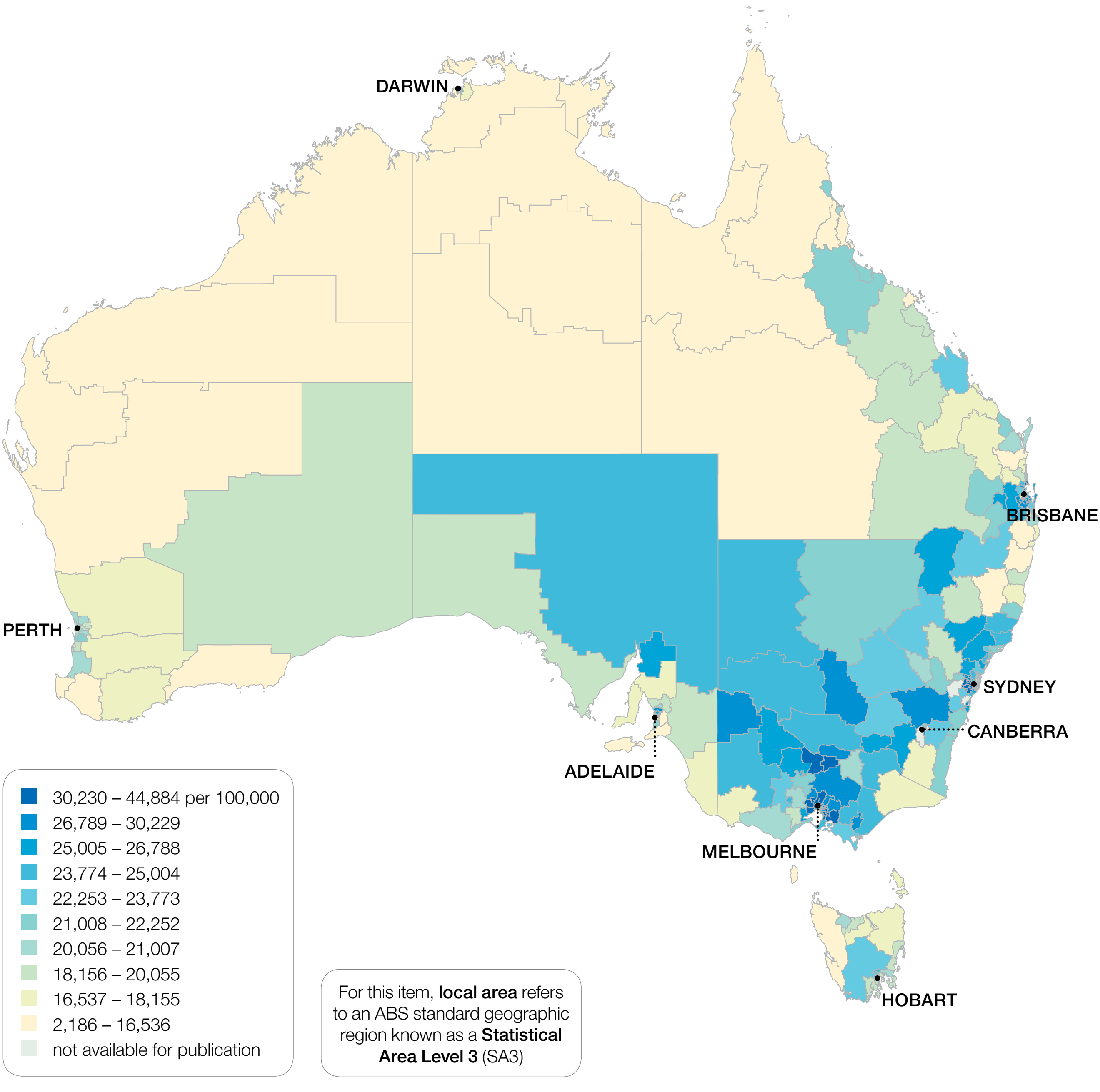
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 6,340 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

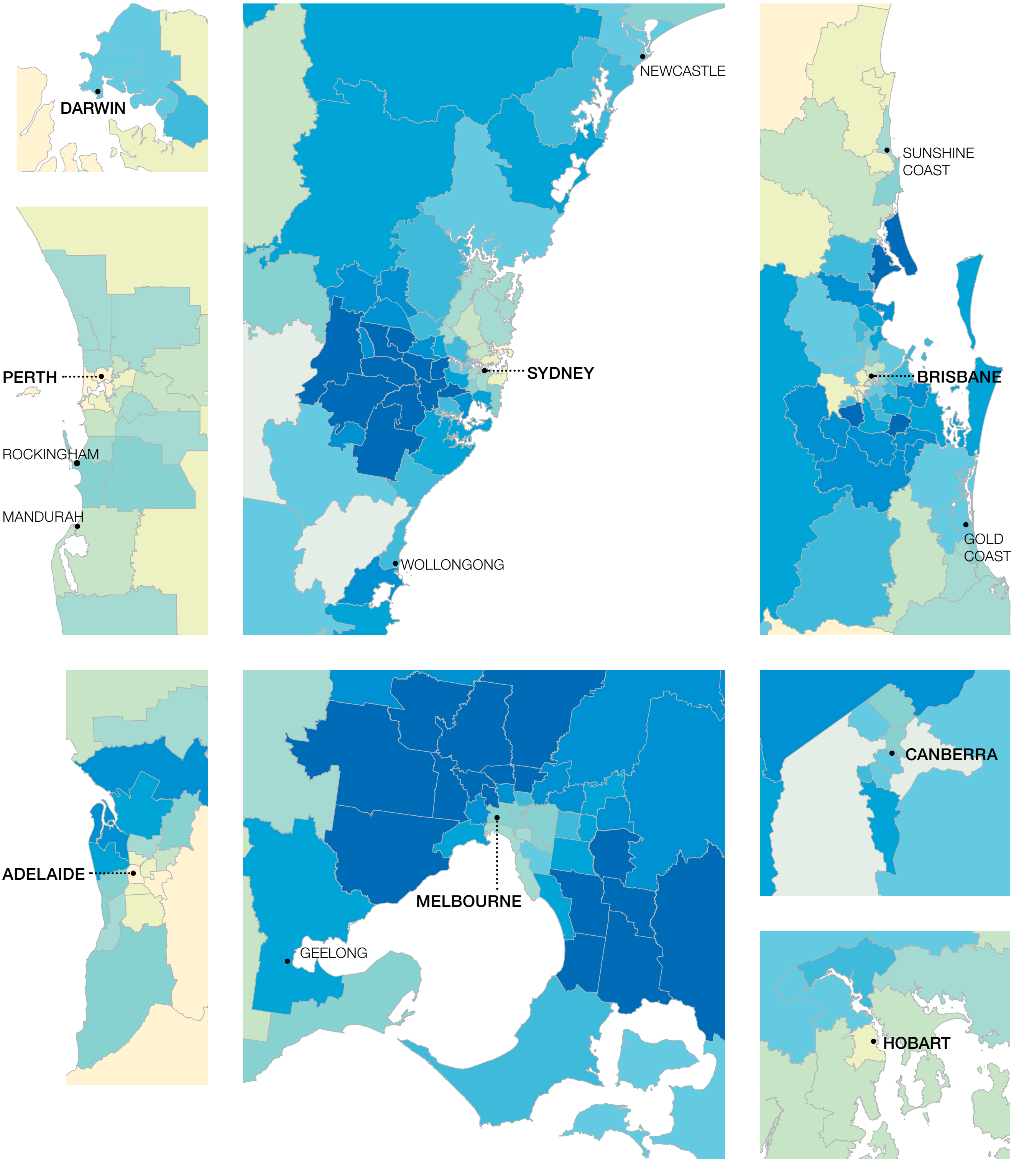
Amoxycillin dispensing

Figure 11: Number of PBS prescriptions dispensed for amoxycillin per 100,000 people, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for amoxycillin across 325 local areas (SA3s) ranged from 2,186 to 44,884 per 100,000 people. The number of prescriptions was **20.5 times higher** in the area with the highest rate compared to the area with the lowest rate.

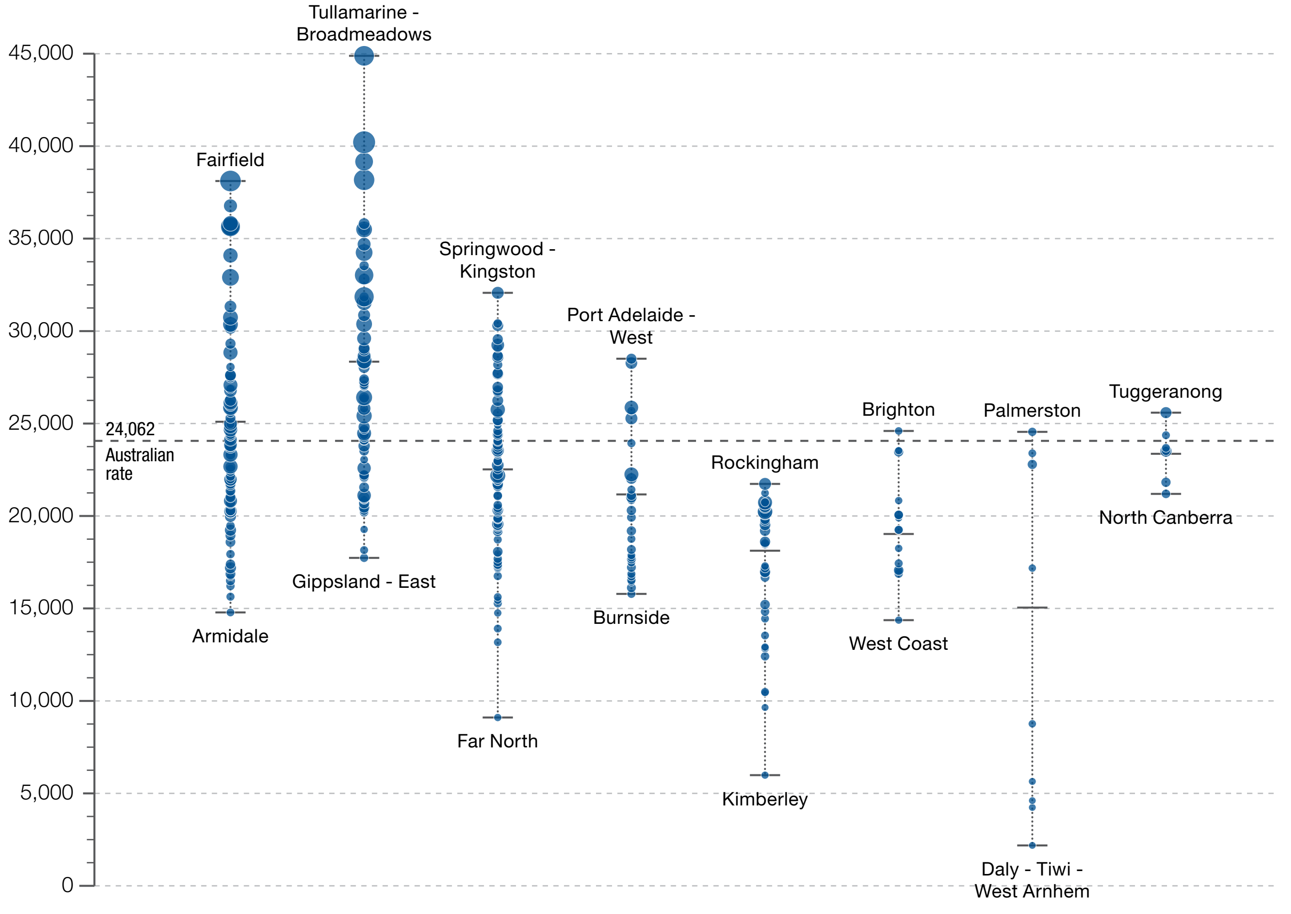


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Amoxycillin dispensing

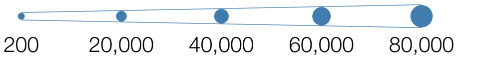
Figure 12: Number of PBS prescriptions dispensed for amoxycillin per 100,000 people, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	38,115	44,884	32,069	28,507	21,736	24,599	24,551	25,589
State/territory	25,099	28,347	22,521	21,165	18,124	19,028	15,047	23,363
Lowest rate	14,785	17,735	9,103	15,787	5,985	14,369	2,186	21,197
No. prescriptions	1,873,019	1,623,538	1,054,732	351,217	455,519	98,054	36,008	88,020



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

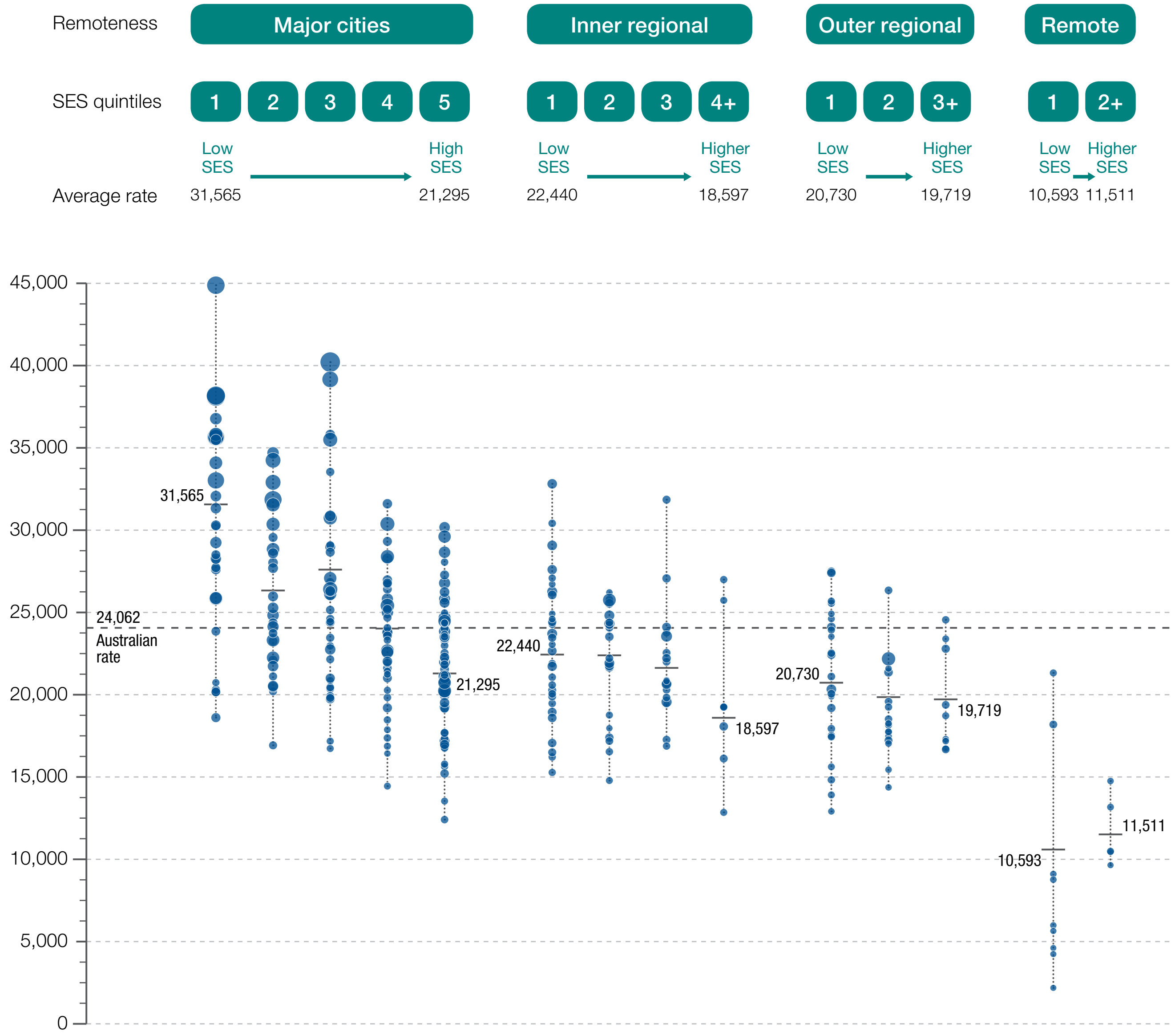
The size of each circle represents the number of prescriptions dispensed in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 13: Number of PBS prescriptions dispensed for amoxycillin per 100,000 people, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

200 20,000 40,000 60,000 80,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Amoxycillin dispensing

Resources

- Therapeutic Guidelines Limited. *Therapeutic Guidelines: Antibiotic*. Version 15. 2014. Available at: www.tg.org.au/.

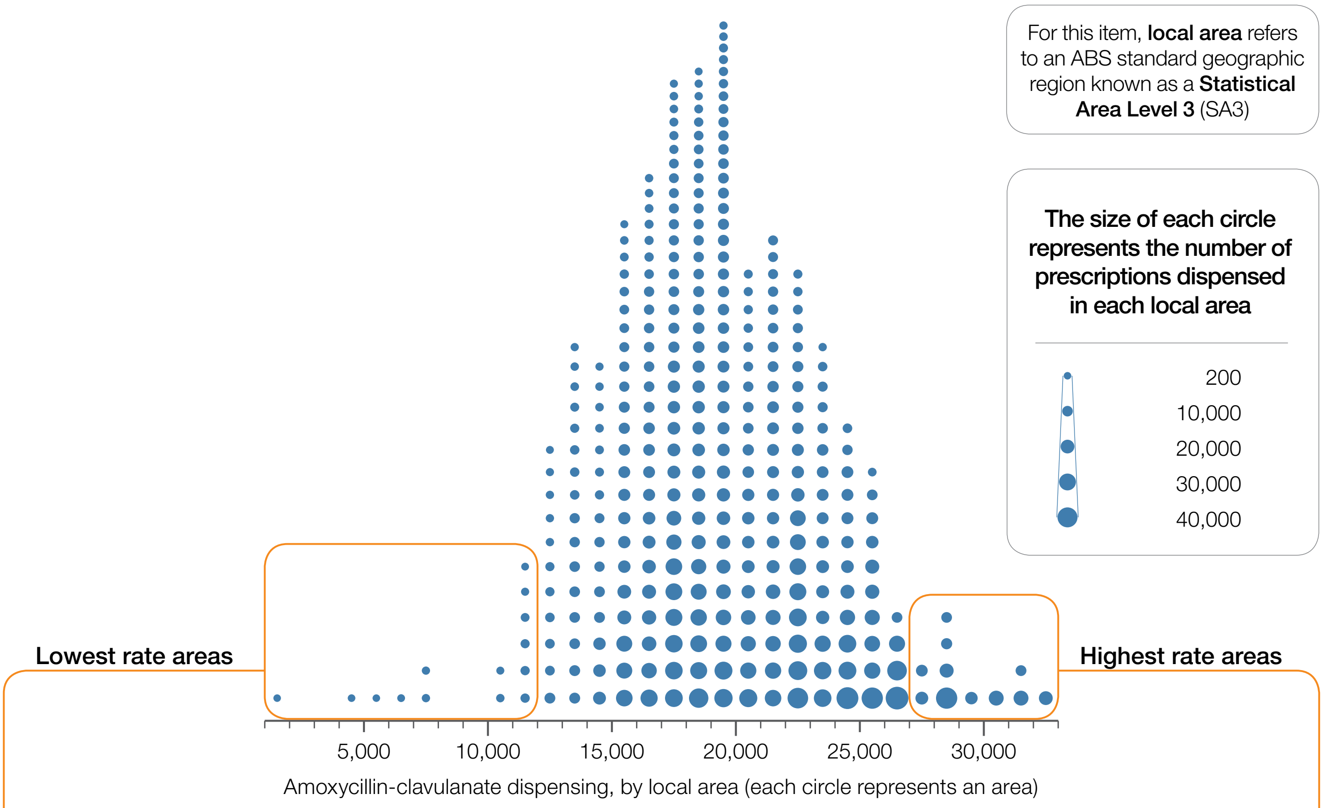
- Australian Medicines Handbook Pty Ltd. *Australian Medicines Handbook 2015* (online). 2015. Available at: http://amhonline.amh.net.au/.

- Pharmaceutical Benefits Scheme. *Antibiotics Roundtable Outcomes Statement*. 2015. Available at: www.pbs.gov.au/reviews/authority-required-files/antibiotics-roundtable-outcome-statement.pdf.

1 Drug Utilisation Subcommittee (DUSC) of the Pharmaceutical Benefits Advisory Committee (PBAC). Antibiotics: PBS/RPBS utilisation: October 2014 and February 2015. Canberra: PBS, 2015.
2 Antibiotic Expert Groups. Therapeutic guidelines: antibiotic. Version 15. Melbourne: Therapeutic Guidelines Limited, 2014.
3 Britt H, Miller G, Charles J, Henderson J, Bayram C, Pan Y et al. General practice activity in Australia 2010–11. Bettering the Evaluation And Care of Health. Sydney: Sydney University Press, 2011.
4 Australian Group on Antimicrobial Resistance surveys. AGAR Surveys. (Accessed 1 September 2015 at: www.agargroup.org/surveys).

Amoxycillin-clavulanate dispensing

Figure 14: Number of PBS prescriptions dispensed for amoxycillin-clavulanate per 100,000 people, age standardised, by local area, 2013–14



Local area	State	Rate	Prescriptions
Daly - Tiwi - West Arnhem	NT	1,998	332
East Arnhem	NT	4,146	598
Barkly	NT	5,856	347
Katherine	NT	6,298	1,185
Kimberley	WA	7,032	2,571
Alice Springs	NT	7,530	2,789
Far North	Qld	10,508	3,153
Esperance	WA	10,756	1,850
Burnie - Ulverstone	Tas	11,088	5,983
Armidale	NSW	11,376	4,437
Gippsland - East	Vic	11,434	5,448
Gascoyne	WA	11,470	1,143
West Coast	Tas	11,574	2,230
Devonport	Tas	11,912	5,911

Local area	State	Rate	Prescriptions
Caboolture	Qld	32,058	20,330
Bribie - Beachmere	Qld	31,245	10,749
Browns Plains	Qld	31,182	23,676
Springwood - Kingston	Qld	30,095	23,835
St Marys	NSW	29,488	16,037
Dubbo	NSW	28,769	20,930
Campbelltown	NSW	28,767	44,103
Jimboomba	Qld	28,361	10,367
Beenleigh	Qld	28,342	11,810
Narangba - Burpengary	Qld	27,753	17,093
Griffith - Murrumbidgee (West)	NSW	27,442	13,717

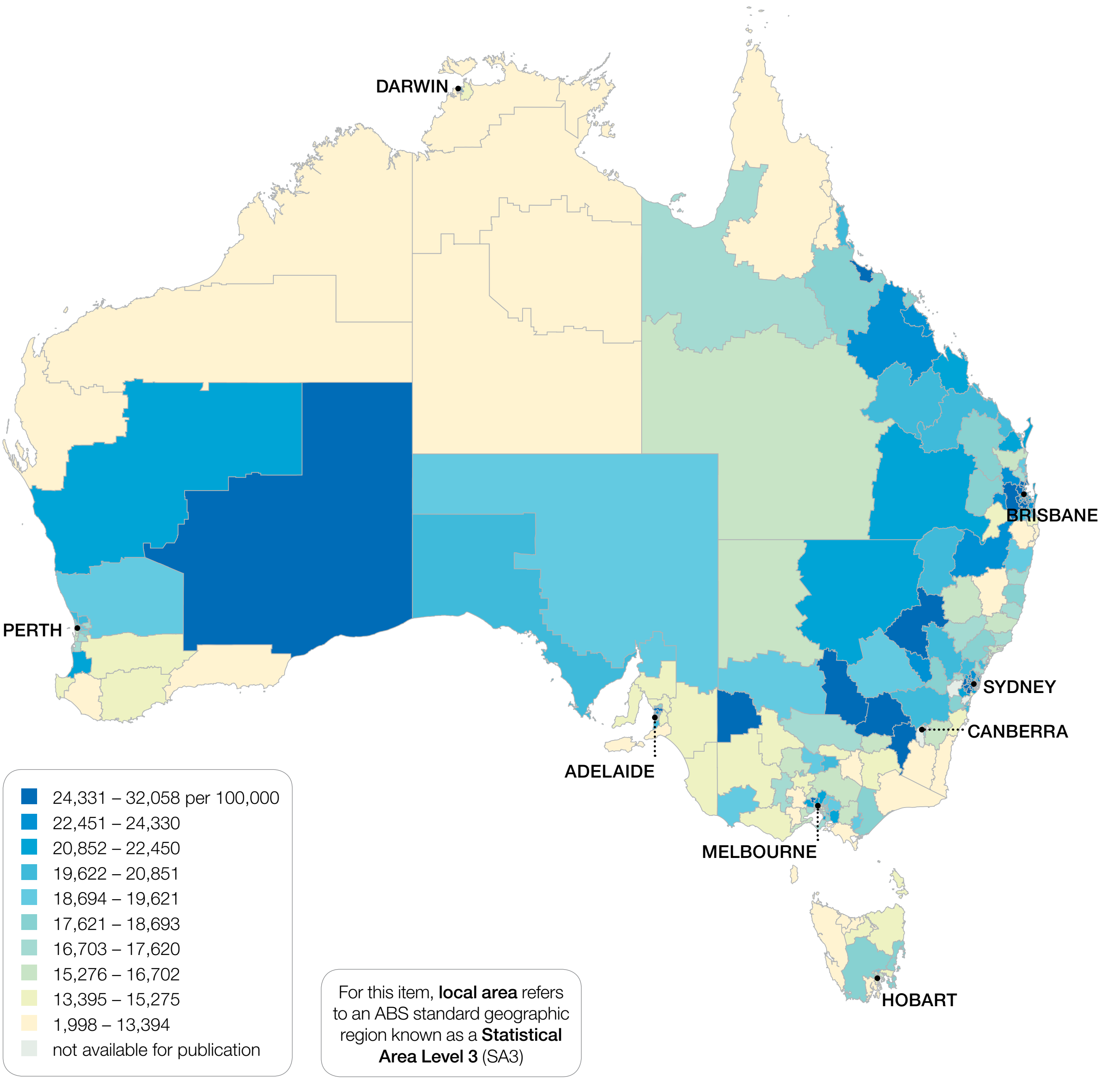
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 7,880 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

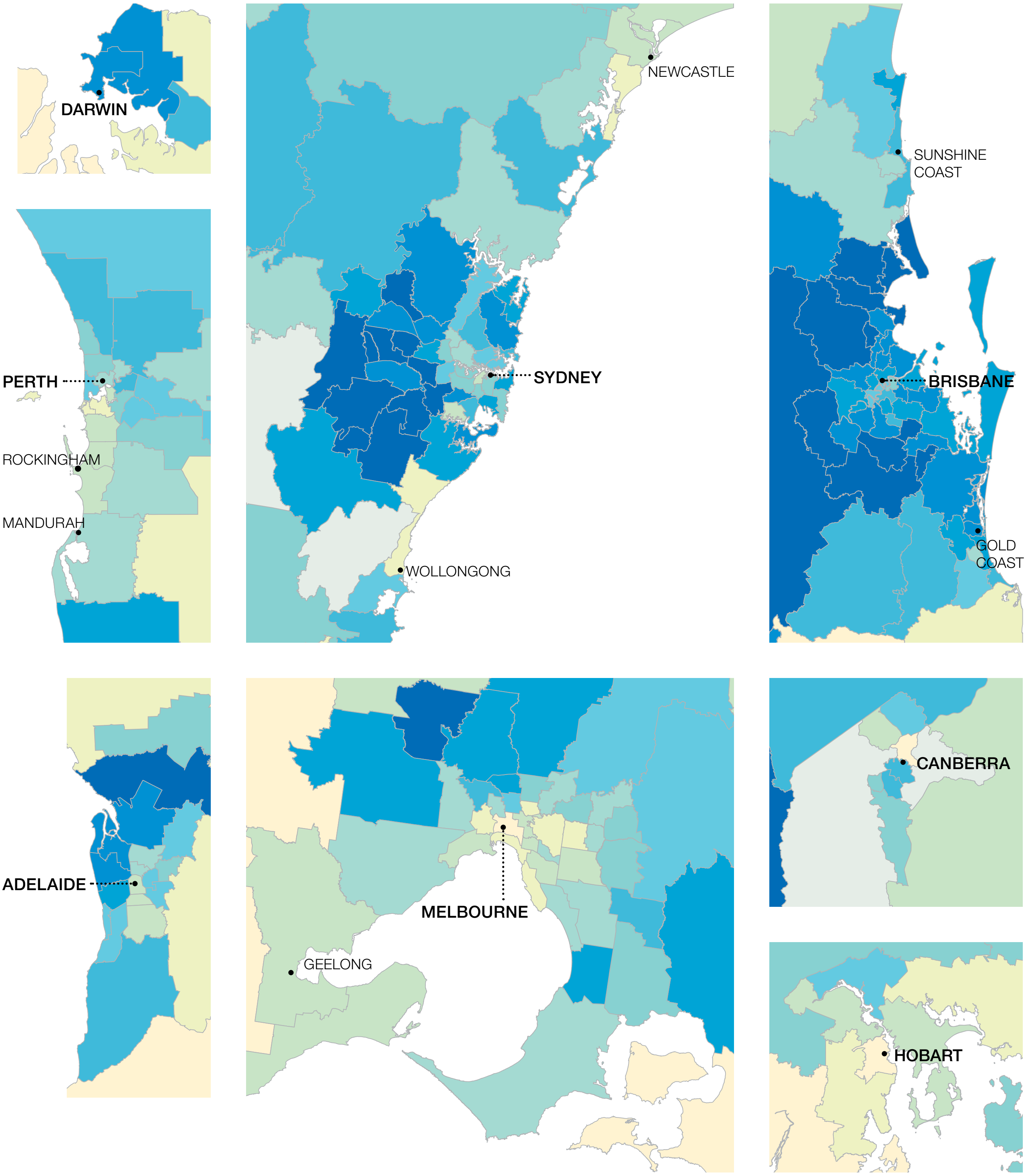
Amoxycillin-clavulanate dispensing

Figure 15: Number of PBS prescriptions dispensed for amoxycillin-clavulanate per 100,000 people, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for amoxycillin-clavulanate across 325 local areas (SA3s) ranged from 1,998 to 32,058 per 100,000 people. The number of prescriptions was **16.0 times higher** in the area with the highest rate compared to the area with the lowest rate.

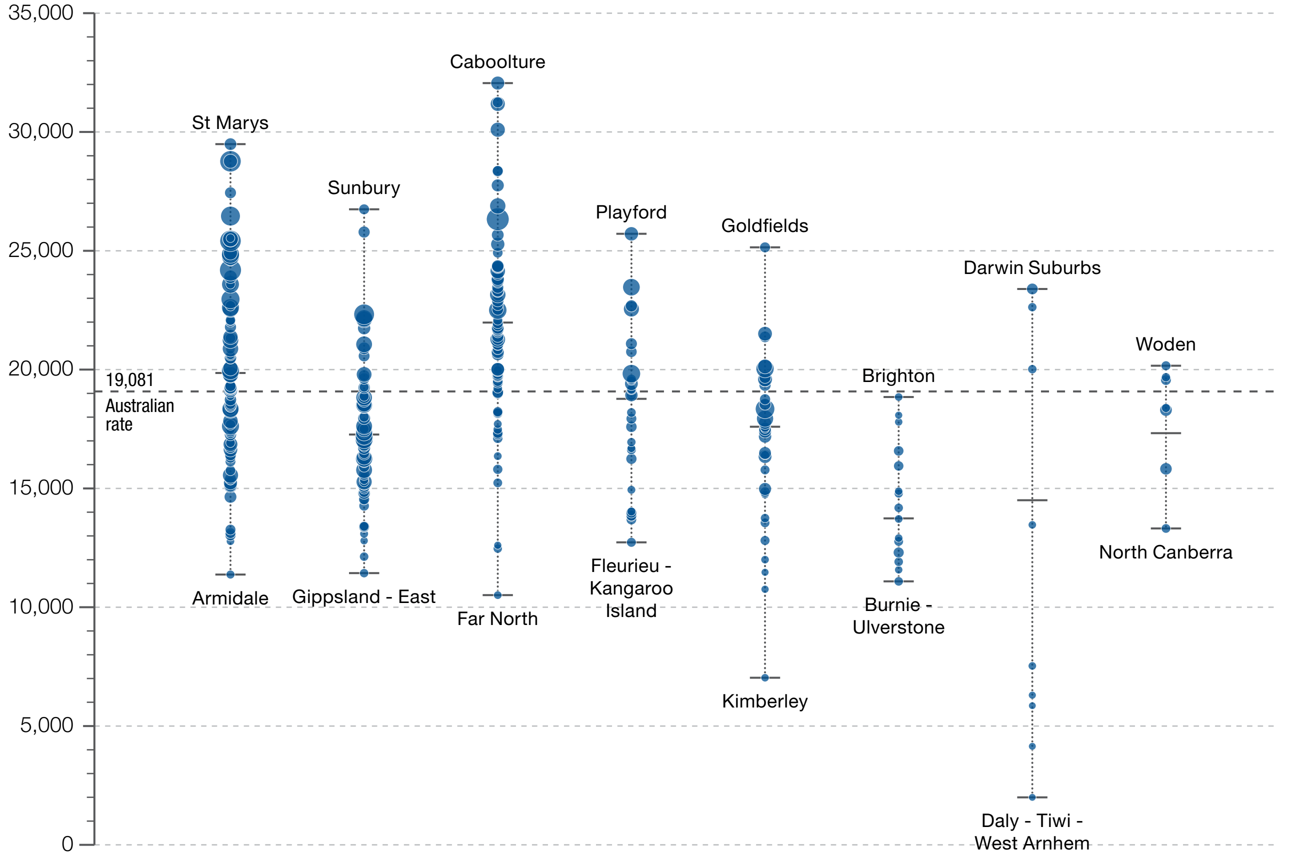


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Amoxycillin-clavulanate dispensing

Figure 16: Number of PBS prescriptions dispensed for amoxycillin-clavulanate per 100,000 people, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	29,488	26,746	32,058	25,714	25,145	18,846	23,394	20,162
State/territory	19,857	17,267	21,979	18,770	17,595	13,740	14,504	17,326
Lowest rate	11,376	11,434	10,508	12,732	7,032	11,088	1,998	13,315
No. prescriptions	1,526,874	1,027,679	1,041,369	333,058	446,467	75,320	31,736	65,560



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

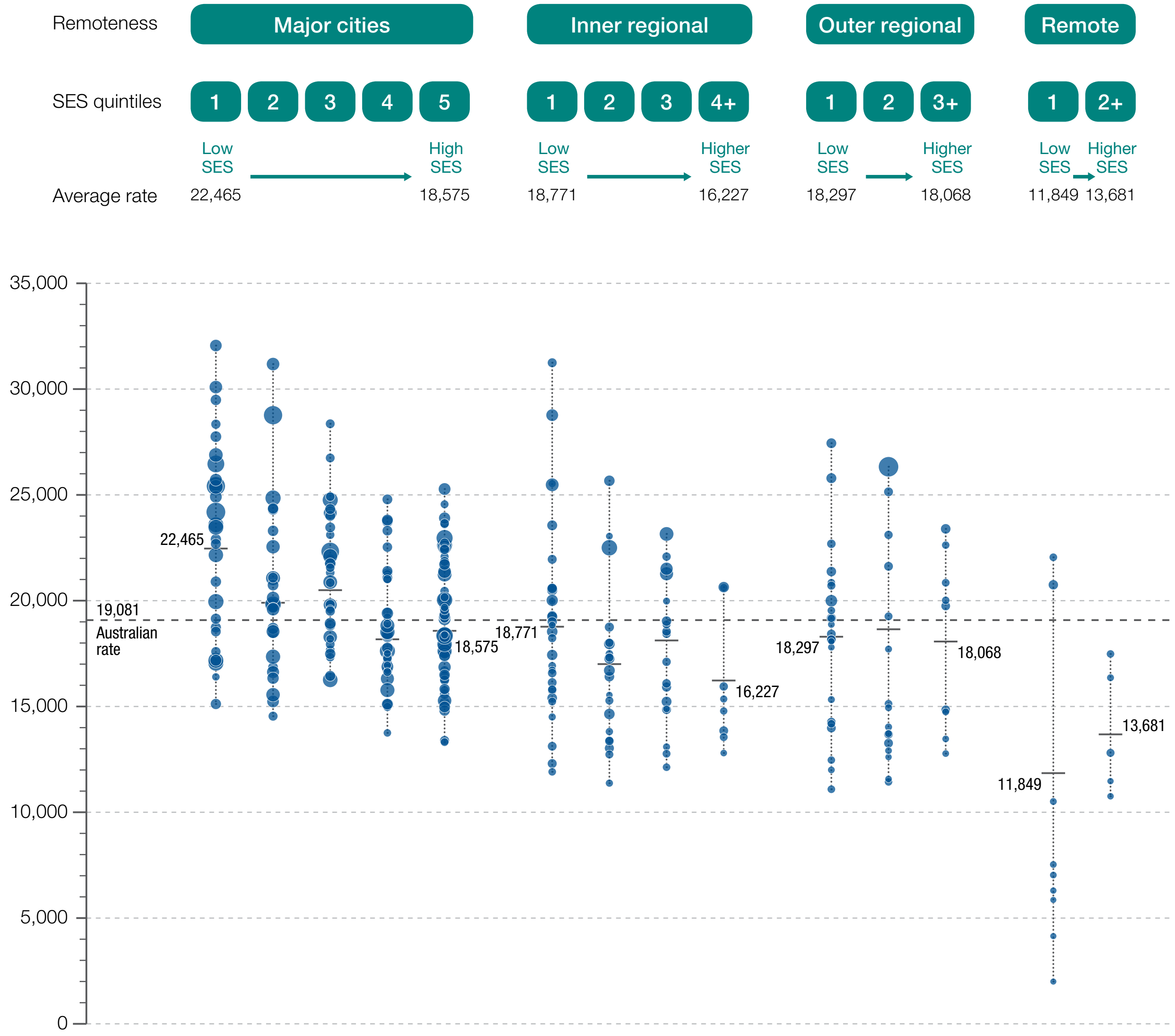
The size of each circle represents the number of prescriptions dispensed in each local area

200 | 10,000 | 20,000 | 30,000 | 40,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 17: Number of PBS prescriptions dispensed for amoxycillin-clavulanate per 100,000 people, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

200 10,000 20,000 30,000 40,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

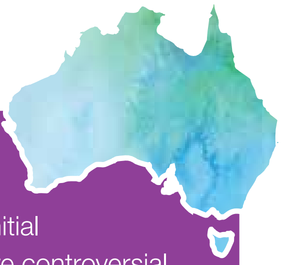
Amoxycillin-clavulanate dispensing

Resources

- Therapeutic Guidelines Limited. *Therapeutic Guidelines: Antibiotic*. Version 15. 2014. Available at: www.tg.org.au/.
- Australian Medicines Handbook Pty Ltd. *Australian Medicines Handbook 2015* (online). 2015. Available at: http://amhonline.amh.net.au/.
- Pharmaceutical Benefits Scheme. *Antibiotics Roundtable Outcomes Statement*. 2015. Available at: www.pbs.gov.au/reviews/authority-required-files/antibiotics-roundtable-outcome-statement.pdf.

1 Drug Utilisation Subcommittee (DUSC) of the Pharmaceutical Benefits Advisory Committee (PBAC). Antibiotics: PBS/RPBS utilisation: October 2014 and February 2015. Canberra: PBS, 2015.
2 Antibiotic Expert Groups. Therapeutic guidelines: antibiotic. Version 15. Melbourne: Therapeutic Guidelines Limited, 2014.
3 Britt H, Miller G, Charles J, Henderson J, Bayram C, Pan Y et al. General practice activity in Australia 2010–11. Bettering the Evaluation And Care of Health. Sydney: Sydney University Press, 2011.
4 Australian Group on Antimicrobial Resistance surveys. AGAR Surveys. (Accessed 1 September 2015 at: www.agargroup.org/surveys).

Chapter 2
Diagnostic interventions



At a glance

Almost 600,000 Medicare Benefits Schedule (MBS) funded fibre optic colonoscopies were performed in Australia in 2013–14, and the number of services is likely to rise as the National Bowel Cancer Screening Program increases its coverage. Very large variations were seen in colonoscopy rates across the country – the highest rate was 30 times that of the lowest. Even when highest and lowest rates were removed, the rate was more than four times higher in one local area compared with another. Rates were higher in high socioeconomic populations in metropolitan areas and decreased with distance from major cities. Participation in the National Bowel Cancer Screening Program follows similar trends, with higher participation in metropolitan areas.

Approaches to screening and initial treatment for prostate cancer are controversial. More than 25,000 MBS-funded prostate biopsies were performed in Australia in 2013–14, with considerable variation across the country.

Low back pain is a frequent reason for presentation to general practitioners, who may refer patients for diagnostic imaging. However, inappropriate use of diagnostic imaging exposes patients to unnecessary radiation. More than 314,000 MBS-funded computed tomography (CT) scans of the lumbar spine were performed in 2013–14, with marked variation around Australia, suggesting overuse of this investigation.

Diagnostic interventions

Recommendations

Fibre optic colonoscopy

2a. The MBS Review Taskforce reviews relevant MBS item(s) to align reimbursement with adherence to the existing National Health and Medical Research Council (NHMRC) clinical practice guidelines for surveillance colonoscopy.

2b. Primary health networks work with general practitioners to ensure colonoscopy referral practices align with applicable NHMRC guidelines and the Royal Australian College of General Practitioners' guidelines for preventive activities in general practice (the red book). In addition, general practitioners recommend faecal occult blood test screening to age-appropriate patients.

2c. The Australian Government Department of Health continues to use educational materials related to the National Bowel Cancer Screening Program to promote key health messages, in particular among lower socioeconomic and rural and remote populations, about faecal occult blood testing and the substantial benefits of early diagnosis on patient outcomes.

2d. The Commission hosts a roundtable of clinical, consumer, and Australian, state and territory government representatives to support specialty-led strategies to improve adherence to the relevant NHMRC guidelines for surveillance colonoscopy in bowel cancer screening.

Prostate Biopsy 40 years and over

2e. Clinicians follow the clinical practice guidelines for prostate-specific antigen testing and early management of test-detected prostate cancer from the Prostate Cancer Foundation of Australia and Cancer Council Australia, and the Royal Australian College of General Practitioners' Guidelines for preventive activities in general practice (the red book).

2f. Clinicians use the prostate cancer screening decision aid produced by the Royal Australian College of General Practitioners for patients who request screening.

2g. NPS MedicineWise, as part of its Choosing Wisely campaign, monitors effective implementation of the Royal College of Pathologists of Australasia recommendations on prostate-sensitive antigen testing.

Computed tomography of the lumbar spine

2h. The Commission reviews the need for updating the NHMRC guidelines on lumbar imaging in acute non-specific low back pain as part of the ongoing national guideline prioritisation processes.

2i. Relevant clinical colleges review the availability and quality of education and training materials, and continuing professional development courses, to improve clinicians' knowledge and skills in referring patients or using CT imaging of the lumbar spine.

2j. NPS MedicineWise, as part of its Choosing Wisely campaign, monitors effective implementation of the Royal Australian and New Zealand College of Radiologists recommendation that imaging should not be performed in patients with non-specific acute low back pain.

Background

The development of modern medicine has led to advances in diagnostic interventions that were not available to previous generations. An emerging challenge is to ensure the appropriate use of these diagnostic interventions to benefit, rather than harm, patients. Diagnostic tests are used to assist clinicians and patients with diagnoses and treatment options.

This chapter considers three diagnostic tests – fibre optic colonoscopies, prostate biopsies and computed tomography of the lumbar spine. All are widely used and have known benefits for detecting disease. However, if they are used when there is a low chance of detecting significant treatable disease, they can cause harm.

Colonoscopies are used to screen for colorectal cancer and other large bowel diseases. Colorectal cancer is the second most common cause of cancer death in Australia[1], and the number of colonoscopies performed in Australia has increased.[2] Possible reasons for this include:

- the introduction of the National Bowel Cancer Screening Program
- the ageing population
- the increasing prevalence of colorectal cancer
- the availability of open-access endoscopy units
- the increasing use of private endoscopy services compared with public endoscopy services.[3]

Prostate biopsies are used to detect prostate cancer. Prostate cancer is the third-largest cause of cancer death among Australian men. Almost all patients presenting with localised prostate cancer live beyond five years, with 10-year survival rates at 93 per cent and 15-year survival rates at 77 per cent.[4] If early detection tests indicate prostate cancer may be present, a prostate biopsy is performed to determine whether this is the case. The number of prostate biopsies performed has increased as a result of the greater use of the prostate-specific antigen (PSA) test to detect preclinical cancer.[2]

The screening of apparently healthy men using the PSA test is a complex issue and the subject of ongoing debate in Australia and internationally. While screening may offer a longer life to those with aggressive cancers, it may harm men with cancers that would have caused no symptoms or harm by exposing them to treatments that cause significant adverse effects without any compensating benefit.[4]

Computed tomography of the lumbar spine is used to detect spinal abnormalities associated with low back pain. In Australia, low back pain is the leading cause of years lived with disability.[5] Radiation doses from CT scans are about 100 times higher than plain X-rays resulting in potential harm if overused.[6] Most lower back pain has no accompanying abnormalities on imaging.

Chapter overview

This chapter includes the following data items:

- fibre optic colonoscopy
- prostate biopsies 40 years and over
- computed tomography of the lumbar spine.

International comparisons

In recent decades, colorectal cancer survival rates have improved in developed countries as a result of advances in cancer prevention, screening and management practices. In England, the *NHS Atlas of Variation in Healthcare* reported a two-fold variation in rates of colonoscopy procedures and flexible sigmoidoscopy procedures across geographical areas.[7]

Diagnostic interventions

Internationally, prostate cancer rates vary widely due to differences in lifestyle, detection practices, particularly in the use of PSA testing in men with and without symptoms, and treatment options. The highest prostate cancer rates are found in high-income areas of the world, such as Australia, western and northern Europe and North America. However, the highest mortality rates are found in South America, the Caribbean and sub-Saharan Africa. Studies of healthcare variation in the United States report a seven-fold variation in prostate biopsy rates.[8]

The use of CT scans for low back pain is increasing worldwide.[9] The appropriateness of spinal imaging has been investigated in Canada. The findings suggested that financial interests, defensive medicine and consumer demand were leading to overuse of spinal imaging. A study from Canada's National Pain Centre has highlighted that CT scans were often unnecessary, particularly for patients with degenerative spinal disease.[10]

A study in the United States found that a significant proportion of variation in rates of spinal surgery is due to differences in the rates of advanced spinal imaging (CT and magnetic resonance imaging).[11] Improved consensus on the interpretation of spinal imaging studies is likely to reduce unwarranted variations.

Australian initiatives

National guidelines provide directions on the appropriate use of fibre optic colonoscopies[12] and prostate biopsies.[13]

In relation to CT imaging of the lumbar spine, the Royal Australian and New Zealand College of Radiologists has education modules about appropriate referrals for medical imaging. This includes the use of CT imaging for acute low back pain.[14]

About the data

The data in this chapter is from the MBS dataset, which does not include publicly funded hospital services.

1 Australian Institute of Health and Welfare. Cancer. 2015. (Accessed 7 October 2015 at: www.aihw.gov.au/cancer/).
2 The Center for the Evaluative Clinical Sciences, Dartmouth Medical School. The Dartmouth Atlas of Health Care. Chicago, Illinois: American Hospital Publishing, 1996.
3 DLA Piper Australia. Review of MBS colonoscopy items. Canberra: Department of Health and Ageing, 2011.
4 Cancer Council Australia. Prostate Cancer. 2014. (Accessed 7 October 2015 at: www.cancer.org.au/about-cancer/types-of-cancer/prostate-cancer.html#note_1).
5 Vos T, Barber RM, Bell B, Bertozzi-Villa A, Biryukov S, Bolliger I, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the global burden of disease study 2013. The Lancet. 2015;386(9995):743.
6 Goergen S, Maher C, Leech M, Kuang R. Acute low back pain. Education modules for appropriate imaging referrals. Sydney: Royal Australian and New Zealand College of Radiologists, 2015.
7 Right Care. The NHS Atlas of Variation in Healthcare: Reducing unwarranted variation to increase value and improve quality. London: NHS, 2015.
8 The Center for the Evaluative Clinical Sciences, Dartmouth Medical School. The Dartmouth Atlas of Health Care. Chicago, Illinois: American Hospital Publishing, 1996.
9 Dagenais S, Galloway EK, Roffey DM. A systematic review of diagnostic imaging use for low back pain in the United States. The spine journal. 2014;14(6):1036–48.
10 Busse J, Alexander PE, Abdul-Razzak A, Riva JJ, Alabousi M, John Dufton D, et al. Appropriateness of spinal imaging use in Canada. Ottawa: Canadian Institutes of Health Research, 2013.
11 Lurie JD, Birkmeyer NJ, Weinstein JN. Rates of advanced spinal imaging and spine surgery. Spine. 2003;28(6):616–20.
12 Australian Cancer Network Colorectal Cancer Guidelines Revision Committee. Guidelines for the prevention, early detection and management of colorectal cancer. Sydney: Cancer Council Australia and Australian Cancer Network, 2005.
13 Prostate Cancer Foundation of Australia PSA Testing Guidelines Expert Advisory Panel. Draft clinical practice guidelines for PSA testing and early management of test-detected prostate cancer. Sydney: Prostate Cancer Foundation of Australia and Cancer Council Australia, 2014.
14 The Royal Australian and New Zealand College of Radiologists. Education modules for appropriate imaging referrals (Accessed 3 September 2015 at: www.ranzcr.edu.au/quality-a-safety/program/key-projects/education-modules-for-appropriate-imaging-referrals).

2.1 Fibre optic colonoscopy

Context

This data item examines the number of colonoscopies performed. The data are for MBS-funded fibre optic colonoscopy services. They exclude publicly funded hospital services. Colonoscopies for public patients in public hospitals account for about 20 per cent of colonoscopies nationally.[1]

A colonoscopy is a medical procedure that examines the large bowel (colon). It is used for screening and surveillance for colorectal cancer and other large bowel diseases.

During a colonoscopy, a thin, flexible tube called a fibre optic colonoscope is carefully fed into the bowel. This allows the clinician to see whether any abnormalities are present and, if so, sample (biopsy) or remove them.

Colonoscopies are performed when patients exhibit some or all of the following signs or symptoms:

- bleeding from the bowel
- blood in the stool
- unexplained abdominal pain
- changes in bowel habits.

Colonoscopies promote earlier detection of bowel cancer. Evidence shows that people who return a positive faecal occult blood test have a higher rate of abnormalities in colonoscopies, thus making it a cost-effective intervention to prevent bowel cancer.[2] A colonoscopy can also be used to prevent bowel cancer by screening for polyps (which can be a precursor to bowel cancer) in those with an increased risk. This includes not only those who return a positive faecal occult blood test, but those with a history of polyps and a family history of bowel cancer.

General practitioners play a pivotal role in referring people for colonoscopies. General practitioner recommendations have also been shown to positively influence participation in bowel cancer screening using faecal occult blood tests.[3]

Fibre optic colonoscopy

Magnitude of variation

In 2013–14, there were 589,748 MBS-funded services for fibre optic colonoscopy, representing 2,355 services per 100,000 people (the Australian rate).

The number of MBS-funded services for fibre optic colonoscopy across 324* local areas (SA3s) ranged from 146 to 4,374 per 100,000 people. The number of services was **30.0 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of services varied across states and territories, from 902 per 100,000 people in the Northern Territory, to 2,688 in Queensland.

After excluding the highest and lowest results, the fibre optic colonoscopy rate across the 310 remaining local areas was **4.1 times higher** in one local area compared to another.

Rates were markedly higher in local areas in and around capital cities and were lower in remote areas. In major cities, rates were lowest in areas of low socioeconomic status and increased in areas of higher socioeconomic status. This socioeconomic patterning was not observed in regional or remote areas.

Interpretation

Potential reasons for the variation include differences in:

- clinical decision-making and clinicians' adherence to the NHMRC guidelines
- levels of screening among patients with no symptoms. The national guidelines endorse colonoscopies only for those who return a positive faecal occult blood test or are at a moderate or high risk of colorectal pathology.[2] Screening with colonoscopy may explain high rates among those who are at an average or low risk
- levels of private health insurance. This may explain the higher colonoscopy rates in higher socioeconomic areas, where more people have private health cover
- local availability of colonoscopy services in rural and remote locations, where the need to travel long distances may be a barrier
- levels of voluntary faecal occult blood test screening. The lowest rates of participation in the 2013–14 National Bowel Cancer Screening Program were among people from lower socioeconomic groups and those from remote areas[4]
- administrative arrangements in public hospitals, whereby some patients may be referred to private outpatient schemes (increasing the rate of MBS colonoscopies in some areas).

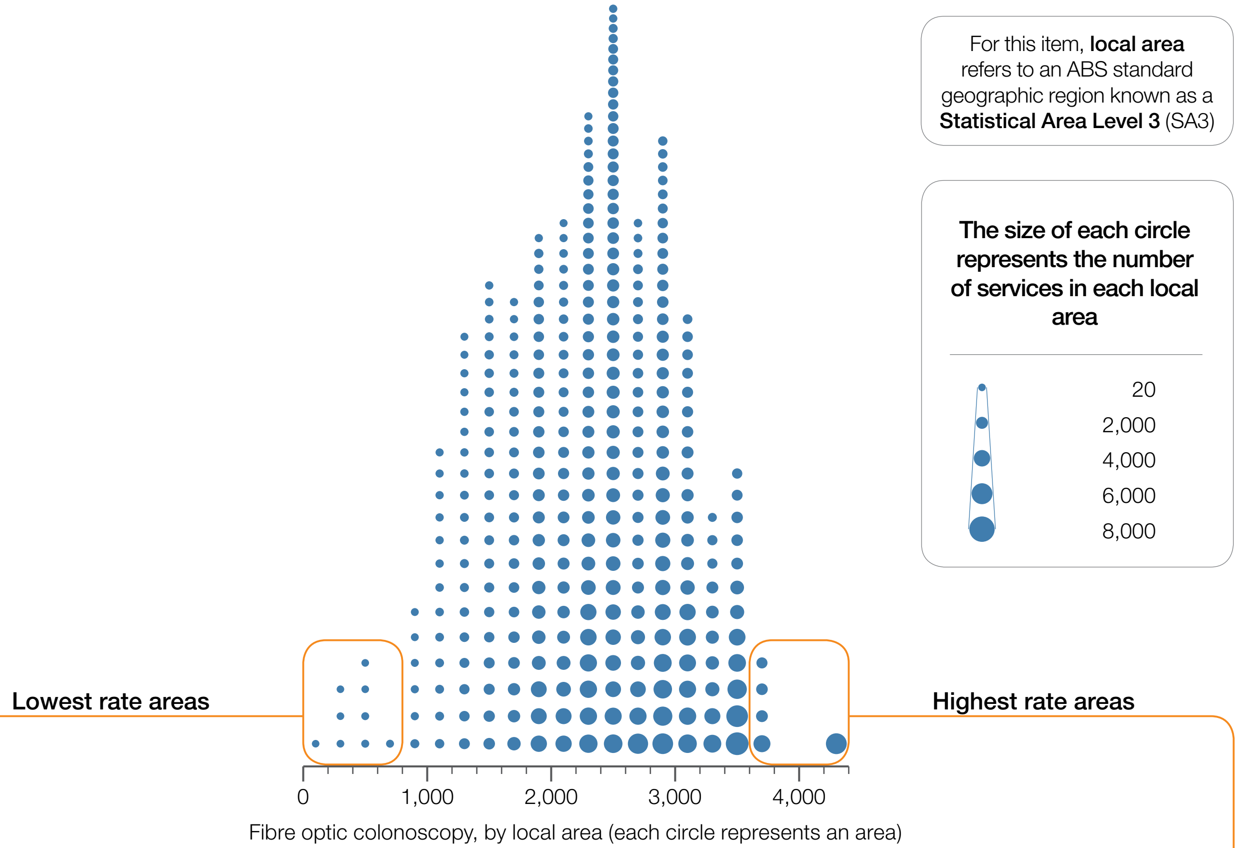
To explore this variation, further analysis could focus on:

- gathering data on rates of colonoscopy for publically funded patients to develop a comprehensive picture of variation.

*There are 333 SA3s. For this item, data were suppressed for 9 SA3s. This is because of confidentiality requirements given the small numbers of services in these areas.

Figure 18: Number of MBS-funded services for fibre optic colonoscopy per 100,000 people, age standardised, by local area, 2013–14

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3).



Local area	State	Rate	Services
Daly - Tiwi - West Arnhem	NT	146	24
Kimberley	WA	213	68
Alice Springs	NT	289	102
East Arnhem	NT	330	40
Pilbara	WA	414	224
Katherine	NT	420	72
Goldfields	WA	510	193
Gascoyne	WA	542	57
Outback - North and East	SA	661	206

Local area	State	Rate	Services
Eastern Suburbs - North	NSW	4,374	5,969
Kenmore - Brookfield - Moggill	Qld	3,746	1,936
Brisbane Inner - West	Qld	3,685	1,845
Stonnington - East	Vic	3,624	1,594
Bayside	Vic	3,607	4,239

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of services and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

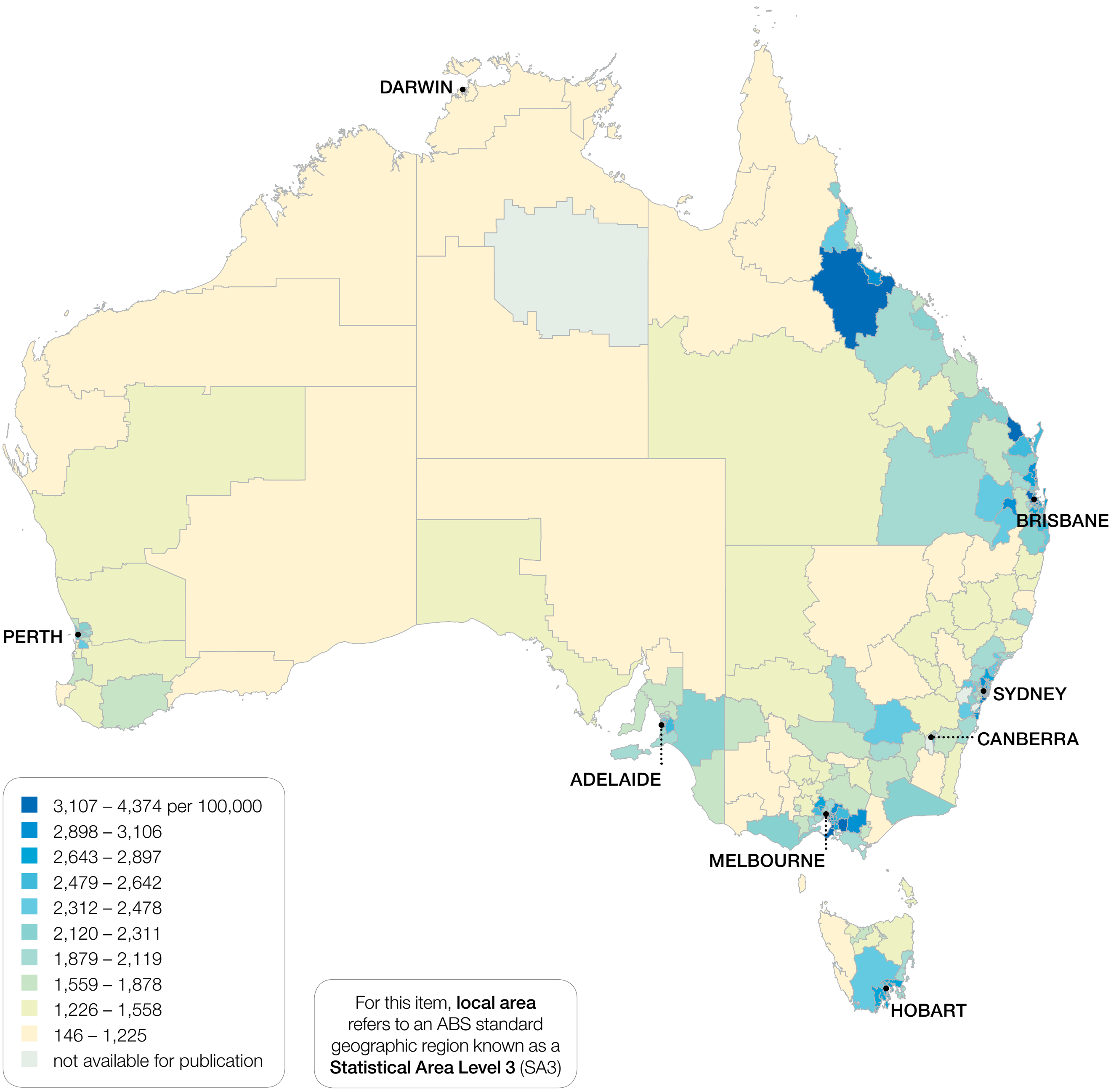
MBS statistics exclude services provided free of charge to public patients in hospitals, to Department of Veterans' Affairs beneficiaries, some patients under compensation arrangements and through other publicly funded programs.
SA3 analysis excludes approximately 430 services from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

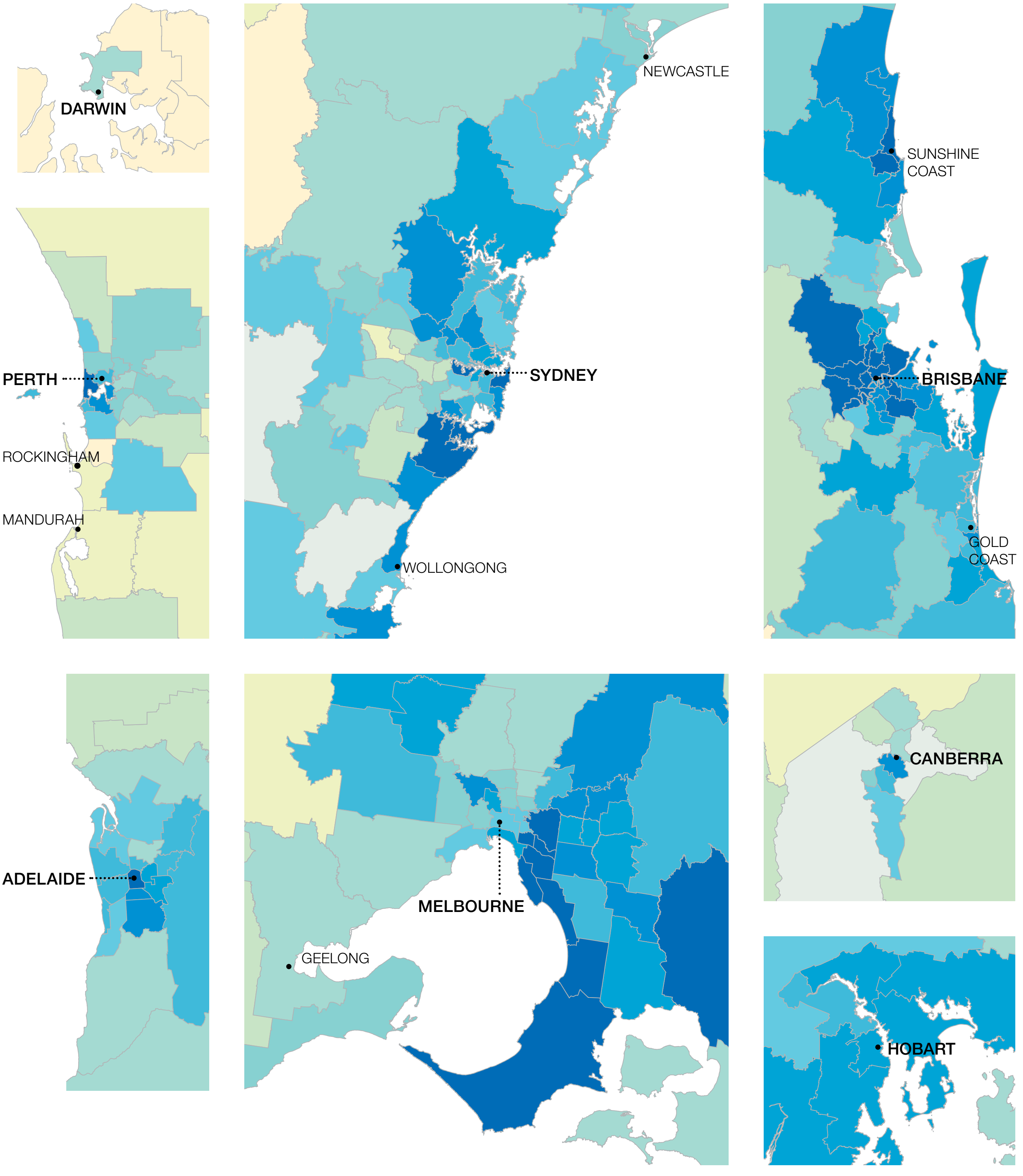
Fibre optic colonoscopy

Figure 19: Number of MBS-funded services for fibre optic colonoscopy per 100,000 people, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of MBS-funded services for fibre optic colonoscopy across 324 local areas (SA3s) ranged from 146 to 4,374 per 100,000 people. The number of services was **30.0 times higher** in the area with the highest rate compared to the area with the lowest rate.

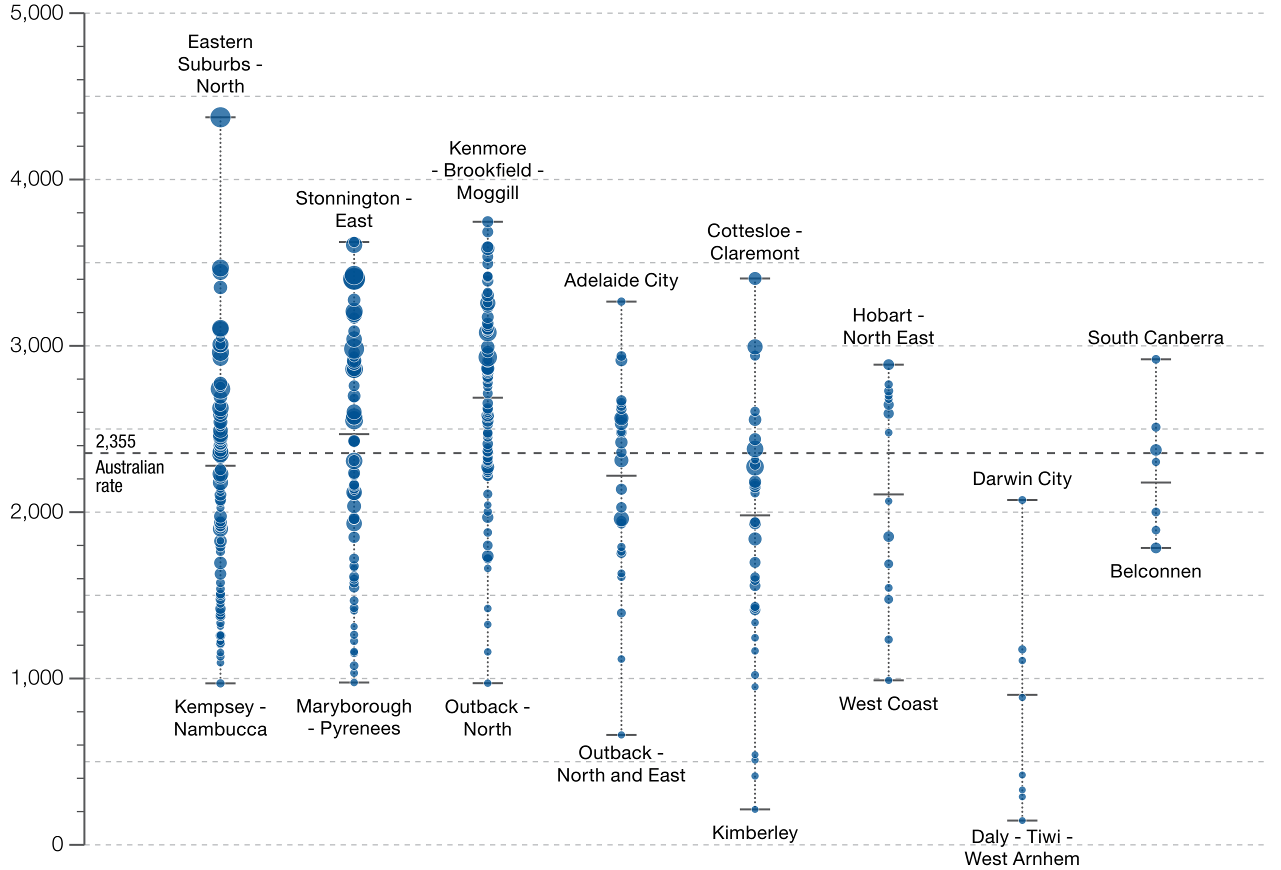


Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

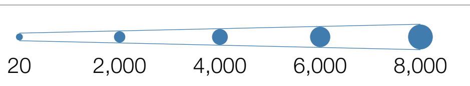
Fibre optic colonoscopy

Figure 20: Number of MBS-funded services for fibre optic colonoscopy per 100,000 people, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	4,374	3,624	3,746	3,266	3,405	2,887	2,073	2,919
State/territory	2,279	2,469	2,688	2,219	1,981	2,107	902	2,178
Lowest rate	971	976	972	661	213	989	146	1,785
No. services	185,985	153,168	132,657	43,432	51,366	13,042	1,845	8,232



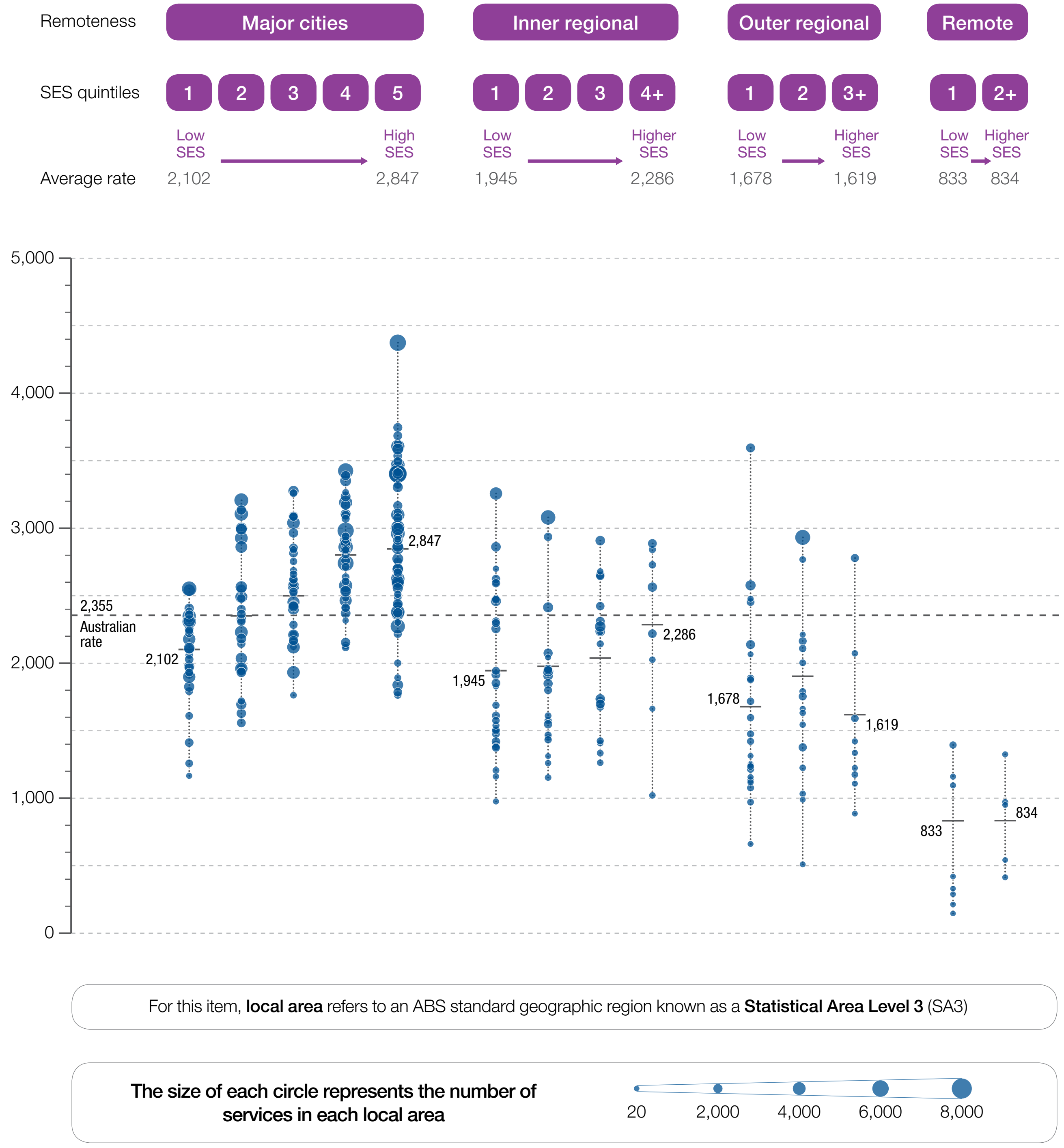
For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of services and people in the geographic area.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 21: Number of MBS-funded services for fibre optic colonoscopy per 100,000 people, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of services and people in Australia.
Average rates are based on the total number of services and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Fibre optic colonoscopy

Resources

- Australian Cancer Network Colorectal Cancer Guidelines Revision Committee. The Cancer Council Australia and Australian Cancer Network. *Guidelines for the prevention, early detection and management of colorectal cancer*. 2005. Available at: www.nhmrc.gov.au/guidelines-publications/cp106.

- Royal Australian College of General Practitioners. *Guidelines for preventive activities in general practice 8th edition*. 2012. Available at: www.racgp.org.au/your-practice/guidelines/redbook/.

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1 DLA Piper Australia. Review of MBS colonoscopy items. Canberra: Department of Health and Ageing, 2011.
2 Australian Cancer Network Colorectal Cancer Guidelines Revision Committee. Guidelines for the prevention, early detection and management of colorectal cancer. Sydney: Cancer Council Australia and Australian Cancer Network, 2005.
3 Royal Australian College of General Practitioners. Guidelines for preventive activities in general practice, 8th edition. East Melbourne: RACGP, 2012.
4 Australian Institute of Health and Welfare. National Bowel Cancer Screening Program: monitoring report 2013–14. Cancer Series No. 94. Cat. no. CAN 92. Canberra: AIHW, 2015.

2.2 Prostate biopsies 40 years and over

Context

This data item examines prostate biopsies performed on men aged 40 years and over. The data are for services funded by the MBS for prostate biopsies. They exclude publicly funded hospital services. Each repeat prostate biopsy for one person is counted as one service.

The prostate is an organ that forms part of the male reproductive system. Located immediately below the bladder and just in front of the bowel, its main function is to produce fluid that protects and enriches sperm.

A prostate biopsy is a procedure to remove samples of suspicious tissue from the prostate. It involves taking multiple small amounts of prostate tissue using a biopsy needle. The tissue is then examined under a microscope for cell abnormalities that indicate the presence of prostate cancer.

Prostate biopsies are commonly carried out if the results of early detection tests suggest a person may have prostate cancer. The three primary early detection tests are digital rectal examinations, prostate-specific antigen (PSA) blood tests and trans-rectal ultrasounds.

Early detection of prostate cancer by screening asymptomatic men with the PSA test is a complex issue. It is difficult to differentiate between potentially fatal cancers and benign tumours that would have caused no symptoms or harm. In cases where prostate cancer is not life threatening, early detection (known as over-diagnosis) may cause harm by exposing affected men to unnecessary treatments that carry substantial risk of adverse effects, such as urinary incontinence and impotence.[1]

A prostate biopsy may be performed in several different ways:

- the trans-rectal method, which is done through the rectum and is the most common
- the perineal method, which is done through the skin between the scrotum and the rectum.

Prostate biopsies 40 years and over

Magnitude of variation

In 2013–14, there were 25,869 MBS-funded services for prostate biopsies, representing 460 services per 100,000 men aged 40 years and over (the Australian rate).

The number of MBS-funded services for prostate biopsies across 87* local areas (SA4s) ranged from 150 to 1,357 per 100,000 men aged 40 years and over. The number of services was **9.0 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of services varied across states and territories, from 289 per 100,000 men aged 40 years and over in the Northern Territory, to 692 in South Australia.

After excluding the highest and lowest results, the prostate biopsies rate across the 71 remaining local areas was **2.7 times higher** in one local area compared to another.

Interpretation

Potential reasons for the variation include differences in:

- clinical decision-making and clinicians' adherence to clinical guidelines
- the number of procedures undertaken on public patients. These data contain only information on prostate biopsies funded through the MBS and exclude men who have procedures as public patients in public hospitals
- rates of PSA testing. High PSA levels are a key indicator for performing prostate biopsies. Studies have shown that rates of PSA testing are lower in rural and regional areas of Australia, which is consistent with the rates shown here for prostate biopsy[2,3]
- beliefs about the value of PSA testing, leading to different uses of the test
- levels of private health insurance and access to specialist urologists and private hospitals
- geographical access to urologists as the need to travel long distances is likely to be a barrier in rural and regional areas.

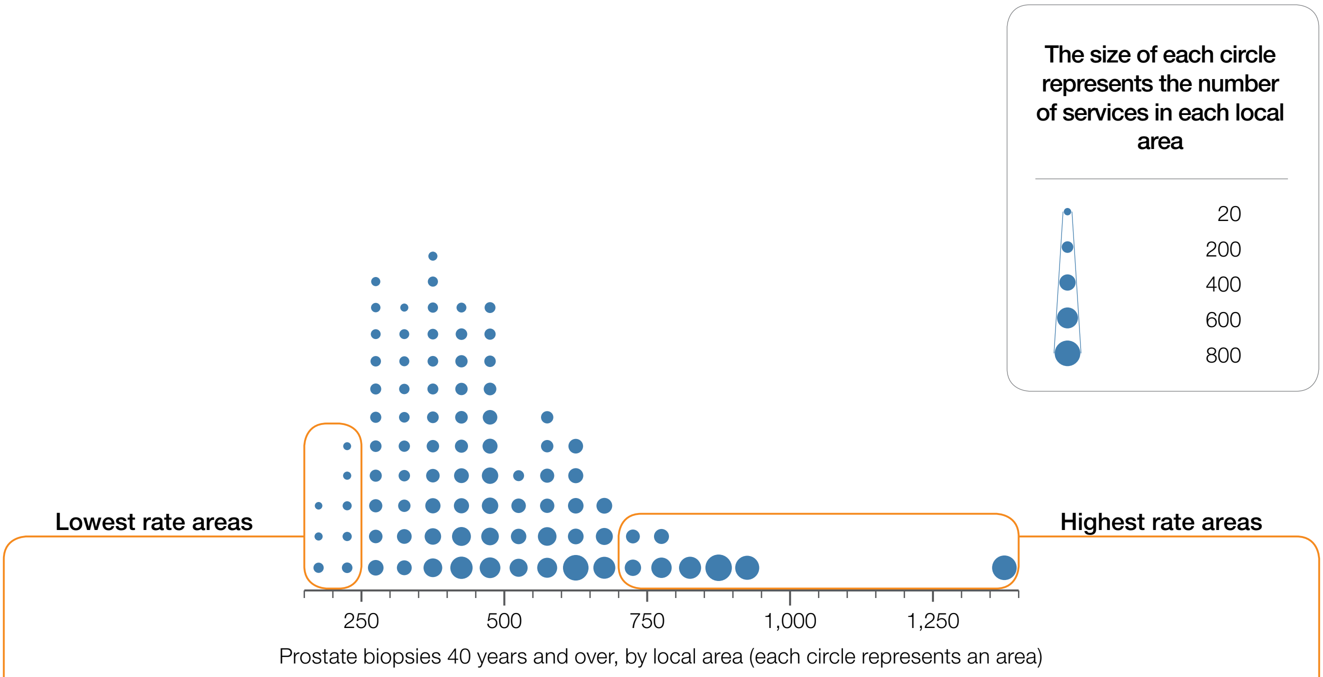
To explore this variation, further analysis could focus on:

- gathering data on prostate biopsy rates for public patients to develop a comprehensive picture of variation
- mapping PSA testing rates against prostate biopsy rates
- reviewing the data against the density of urologists by region.

*There are 88 SA4s. For this item, data were suppressed for 1 SA4. This is because of confidentiality requirements given the small numbers of services in this area.

Figure 22: Number of MBS-funded services for prostate biopsies per 100,000 men aged 40 years and over, age standardised, by local area, 2013–14

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 4** (SA4)



Local area	State	Rate	Services
West and North West	Tas	150	53
Northern Territory - Outback	NT	153	28
Latrobe - Gippsland	Vic	168	143
Launceston and North East	Tas	227	99
Queensland - Outback	Qld	227	44
South Australia - Outback	SA	228	54
Logan - Beaudesert	Qld	232	156
Shepparton	Vic	240	93

Local area	State	Rate	Services
Sydney - Sutherland	NSW	1,357	756
Mid North Coast	NSW	919	733
Adelaide - North	SA	882	836
Mornington Peninsula	Vic	815	649
Coffs Harbour - Grafton	NSW	790	346
Adelaide - Central and Hills	SA	781	577
Riverina	NSW	711	298
Adelaide - West	SA	708	404

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of services and men in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 4 (SA4).

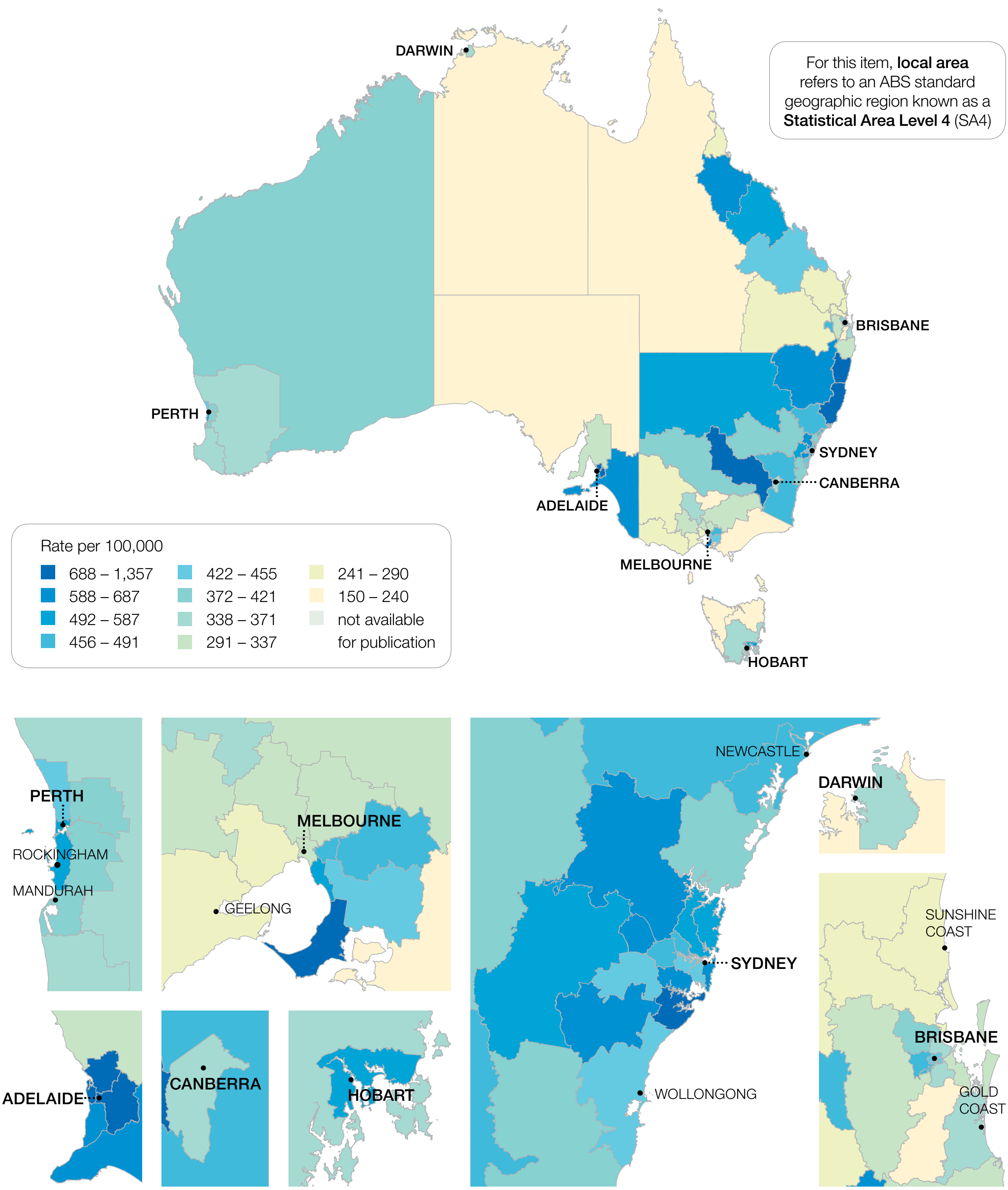
MBS statistics exclude services provided free of charge to public patients in hospitals, to Department of Veterans' Affairs beneficiaries, some patients under compensation arrangements and through other publicly funded programs. SA4 analysis excludes approximately 15 services from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Prostate biopsies 40 years and over

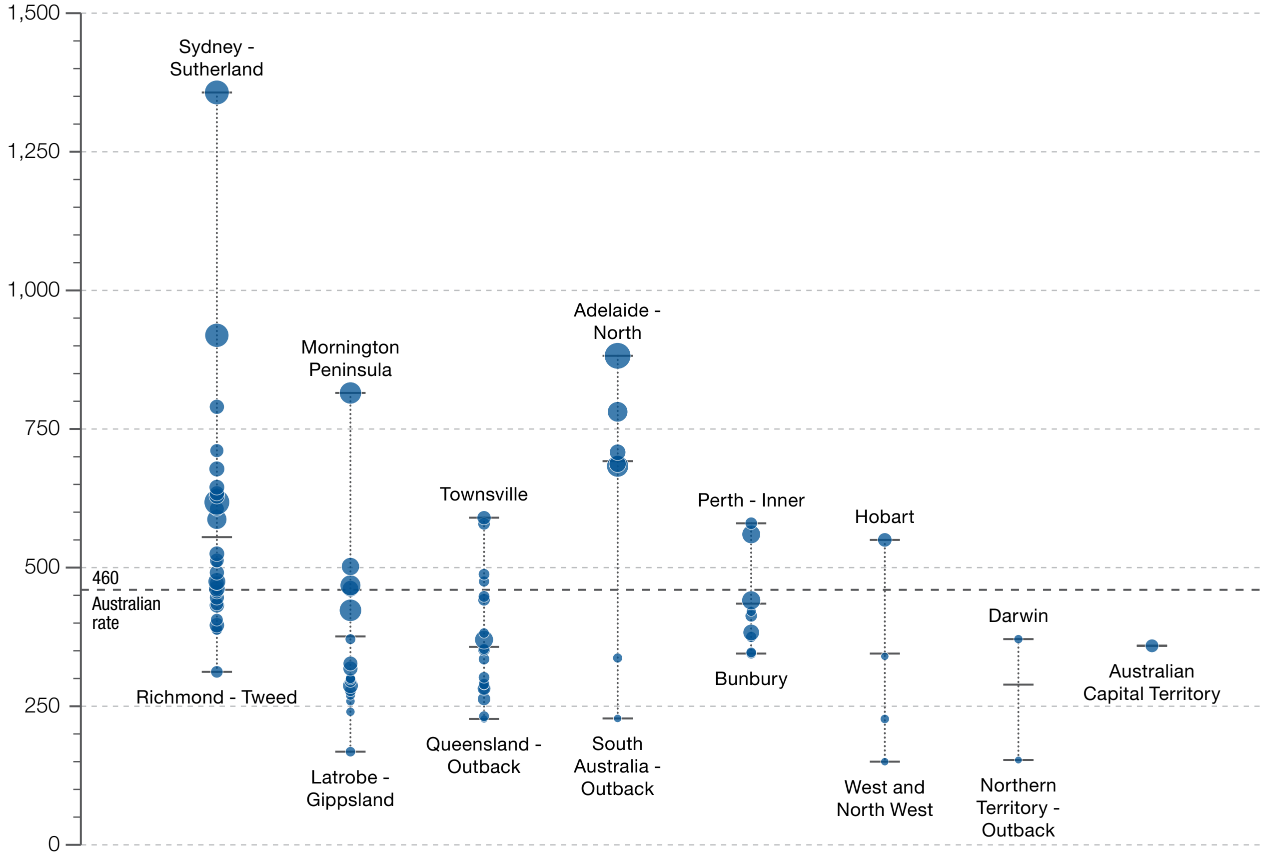
Figure 23: Number of MBS-funded services for prostate biopsies per 100,000 men aged 40 years and over, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

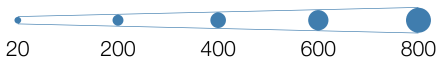
Figure 24: Number of MBS-funded services for prostate biopsies per 100,000 men aged 40 years and over, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	1,357	815	590	882	580	550	371	–
State/territory	555	376	357	692	435	345	289	359
Lowest rate	312	168	227	228	345	150	153	–
No. services	10,248	5,153	3,976	3,075	2,490	518	121	283



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 4** (SA4)

The size of each circle represents the number of services in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of services and men in the geographic area.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Prostate biopsies 40 years and over

Resources

- Prostate Cancer Foundation of Australia and Cancer Council Australia. *Clinical practice guidelines for PSA testing and early management of test-detected prostate cancer*. 2014. Forthcoming in 2015: www.prostate.org.au.
- National Institute for Health and Care Excellence. *Prostate cancer: diagnosis and management clinical guideline*. 2014. Available at: www.nice.org.uk/guidance/cg175.
- Australian Institute of Health and Welfare. *Prostate cancer in Australia*. Cancer Series No. 79. 2013. Available at: www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129545133.
- Evans SM, Millar JL, Wood JM, Davis ID, Bolton D, Giles GG, at al. *The Prostate Cancer Registry: monitoring patterns and quality of care for men diagnosed with prostate cancer*. BJU Int, 2013;111;159–66.
- Victorian Prostate Cancer Clinical Registry. *Five Year Report*. 2015. Available at: http://pcr.registry.org.au/Files/Annual%20Reports/Vic%20PCR%20Five%20Year%20Report.pdf.
- Choosing Wisely, Royal College of Pathologists of Australasia. *Tests, treatments and procedures clinicians and consumers should question*. 2015. Available at: www.choosingwisely.org.au/recommendations/rcpa.

1 Cancer Council Australia. Prostate cancer screening. 2015. (Accessed 24 September 2015, at http://wiki.cancer.org.au/policy/Prostate_cancer/Screening#Prostate-specific_antigen_test).
2 Coory MD, Baade PD. Urban-rural differences in prostate cancer mortality, radical prostatectomy and prostate-specific antigen testing in Australia. Med J Aust 2005;182(3):112–115.
3 Baade PD, Youlden DR, Coory MD, Gardiner RA, Chambers SK. Urban-rural differences in prostate cancer outcomes in Australia: what has changed. Med J Aust, 2011;194(6);293–296.

2.3 Computed tomography of the lumbar spine

Context

This data item examines computed tomography of the lumbar spine. The data are for services funded by the MBS. They exclude publicly funded hospital services. Each repeat lumbar spine CT imaging service for one person is counted as one service.

Computed tomography, more commonly known as a CT or CAT scan, is a diagnostic test that uses radiation to produce images of structures within the body.

The lumbar spine is the lowest portion of the spine and comprises vertebral bones, blood vessels, nerves, ligaments and cartilage. Back pain is common in the lumbar spine area. In Australia, low back pain is the number one cause of years lived with disability.[1] It is also the third most common problem seen by Australian general practitioners.[2]

Internationally, the use of CT scanning to diagnose low back pain is increasing.[3] CT of the lumbar spine should be performed only to confirm or exclude the presence of an underlying injury or disease of the spine that would change the subsequent medical treatment or investigation of the patient.[4] Inappropriate use of imaging can expose patients to unnecessary harm from radiation. Radiation doses from CT scans are about 100 times greater than from plain X-rays.[4]

The Royal Australian and New Zealand College of Radiologists has recommended that lumbar spine imaging for adults with non-specific acute lower back pain should only be undertaken when the patient has indicators of a serious cause for low back pain including risk factors for fracture and previous or current cancer.[5]

Computed tomography of the lumbar spine

Magnitude of variation

In 2013–14, there were 314,033 MBS-funded services for CT imaging of the lumbar spine, representing 1,282 services per 100,000 people (the Australian rate).

The number of MBS-funded services for CT imaging of the lumbar spine across 320* local areas (SA3s) ranged from 209 to 2,464 per 100,000 people. The number of services was **11.8 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of services varied across states and territories, from 720 per 100,000 people in the Northern Territory, to 1,407 in New South Wales.

After excluding the highest and lowest results, the CT imaging of the lumbar spine rate across the 292 remaining local areas was **2.7 times higher** in one local area compared to another.

Rates of CT of the lumbar spine were highest in major cities and decreased with increasing remoteness. Rates of claims were highest in areas of low socioeconomic status and decreased with increasing socioeconomic status.

Interpretation

Potential reasons for the variation include differences in:

- clinical decision making and clinicians' adherence to clinical guidelines
- the incidence and prevalence of back injury and back pain
- the prevalence of risk factors such as obesity[6]
- levels of private health insurance and access to private hospitals, noting that services provided to public patients in public hospitals are excluded from the data. The proportion of scans carried out in private hospitals may vary according to state and territory, as well as by remoteness and socioeconomic status. In particular, people living in metropolitan areas, and those of higher socioeconomic status, have greater access to private hospital services
- clinician referral patterns
- availability and access to CT scanners
- patient preferences and understanding of the risks and benefits of CT imaging
- indications for CT of the lumbar spine on the MBS schedule.

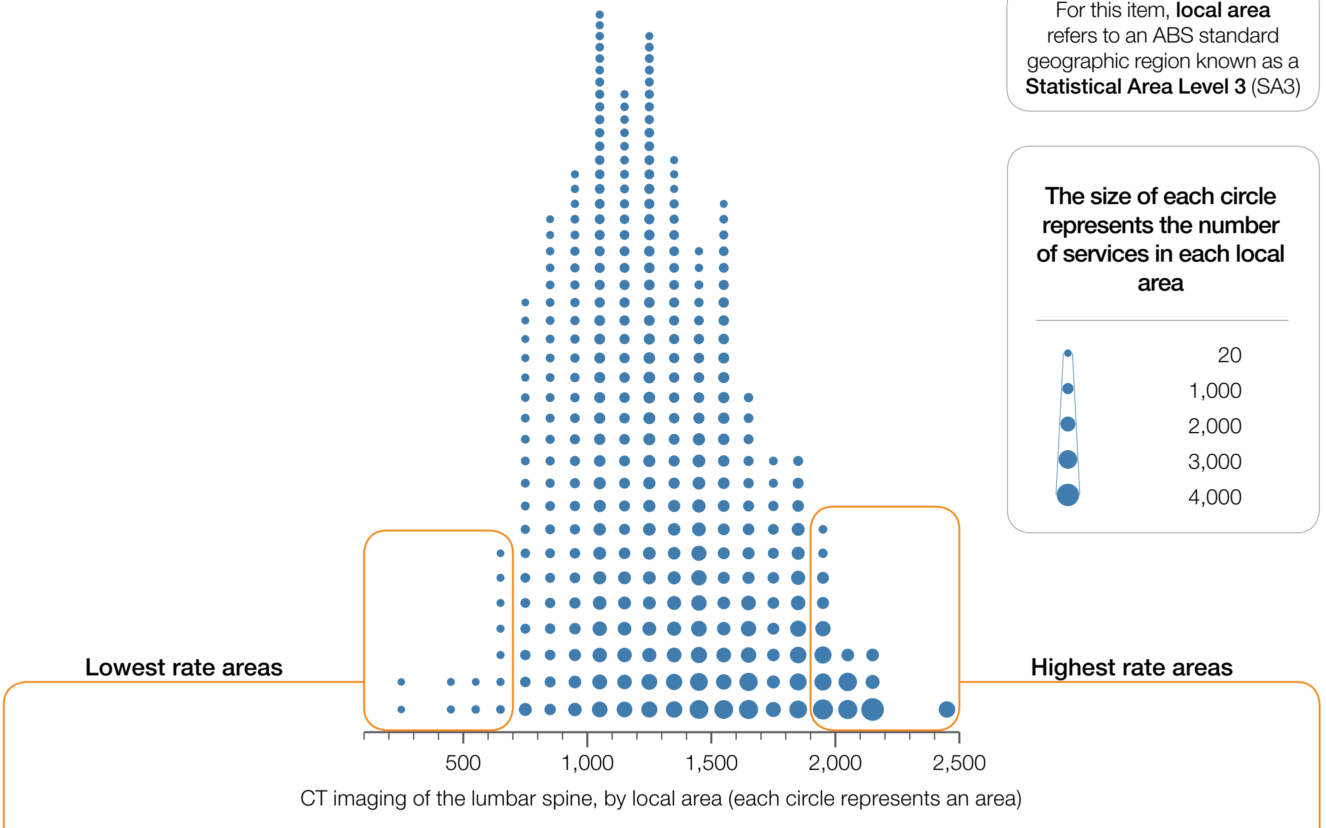
To explore this variation, further analysis could focus on:

- gathering data on rates of CT of the lumbar spine for public patients to develop a comprehensive picture of variation
- linking data to explore outcomes of imaging, such as patient reported outcome measures or the proportion of patients who progress to surgery.

*There are 333 SA3s. For this item, data were suppressed for 13 SA3s. This is because of confidentiality requirements given the small numbers of services in these areas.

Figure 25: Number of MBS-funded services for CT imaging of the lumbar spine per 100,000 people, age standardised, by local area, 2013–14

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)



Local area	State	Rate	Services
Daly - Tiwi - West Arnhem	NT	209	28
East Arnhem	NT	218	20
Far North	Qld	472	128
Alice Springs	NT	484	172
North Canberra	ACT	582	283
Katherine	NT	597	100
Kimberley	WA	607	191
Outback - North	Qld	639	202
Pilbara	WA	651	344
Meander Valley - West Tamar	Tas	677	195
Outback - South	Qld	684	147
Litchfield	NT	688	141
Gascoyne	WA	695	74

Local area	State	Rate	Services
Mount Druitt	NSW	2,464	2,425
Bringelly - Green Valley	NSW	2,155	1,758
Ipswich Hinterland	Qld	2,127	1,414
Fairfield	NSW	2,118	4,079
Campbelltown	NSW	2,069	3,135
Merrylands - Guildford	NSW	2,066	2,954
Blacktown - North	NSW	2,025	1,404
Tumut - Tumbarumba	NSW	1,989	340
Springfield - Redbank	Qld	1,982	1,221
Bankstown	NSW	1,982	3,403
Blacktown	NSW	1,975	2,599
Rouse Hill - McGraths Hill	NSW	1,969	528
Liverpool	NSW	1,954	2,106
Southport	Qld	1,935	1,185
Canterbury	NSW	1,901	2,601

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of services and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

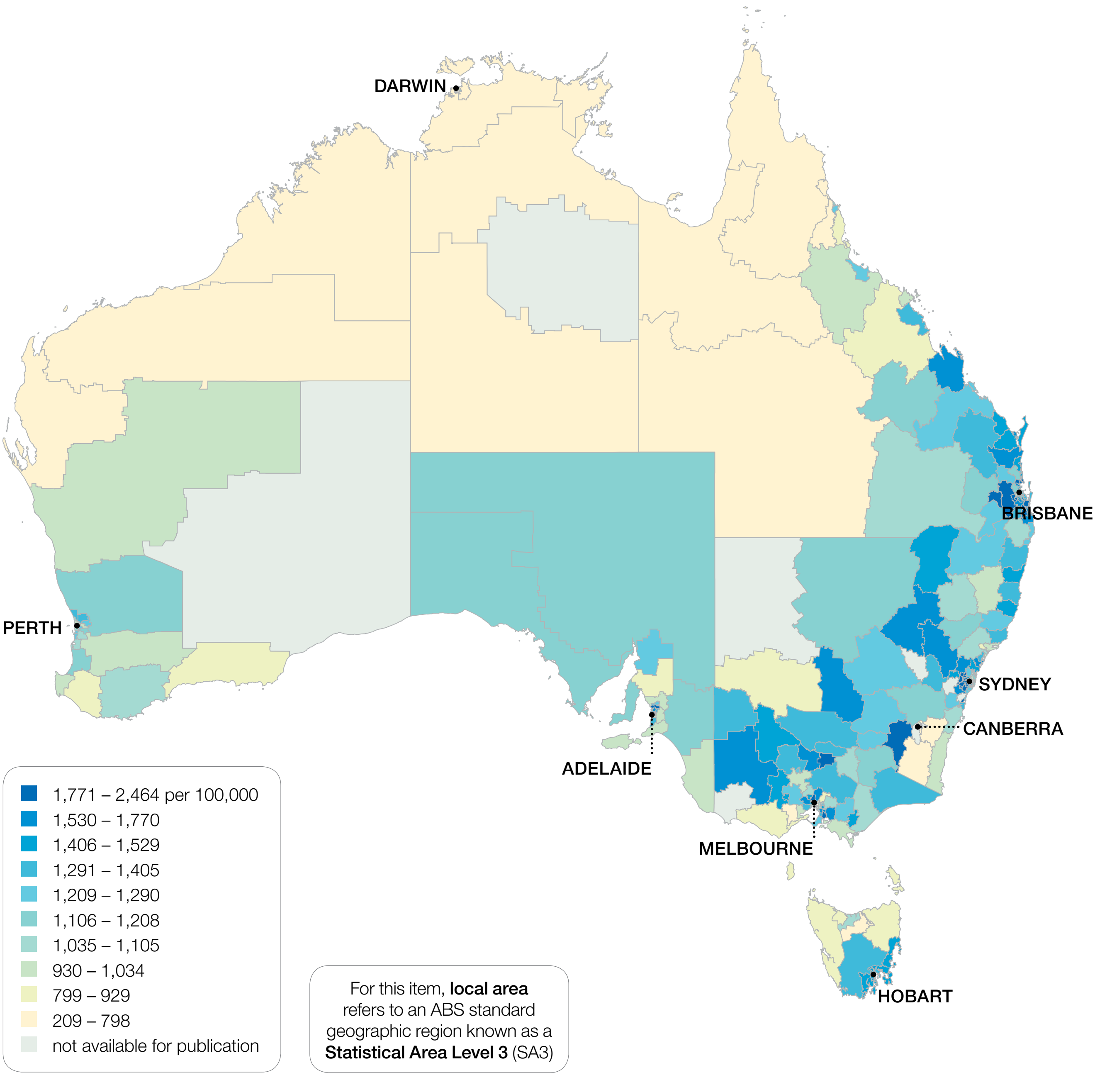
MBS statistics exclude services provided free of charge to public patients in hospitals, to Department of Veterans' Affairs beneficiaries, some patients under compensation arrangements and through other publicly funded programs. SA3 analysis excludes approximately 190 services from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

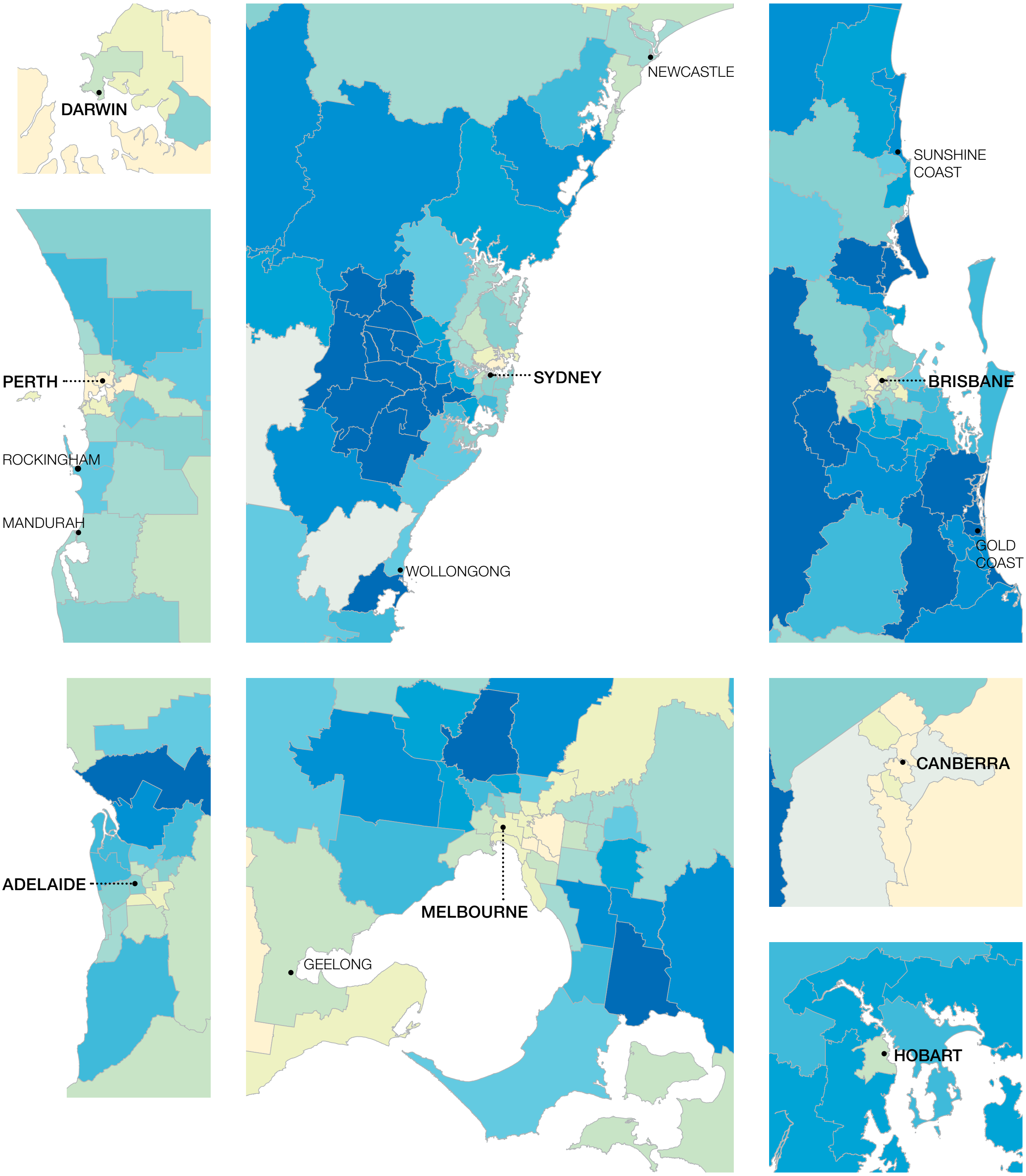
Computed tomography of the lumbar spine

Figure 26: Number of MBS-funded services for CT imaging of the lumbar spine per 100,000 people, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of MBS-funded services for CT imaging of the lumbar spine across 320 local areas (SA3s) ranged from 209 to 2,464 per 100,000 people. The number of services was **11.8 times higher** in the area with the highest rate compared to the area with the lowest rate.

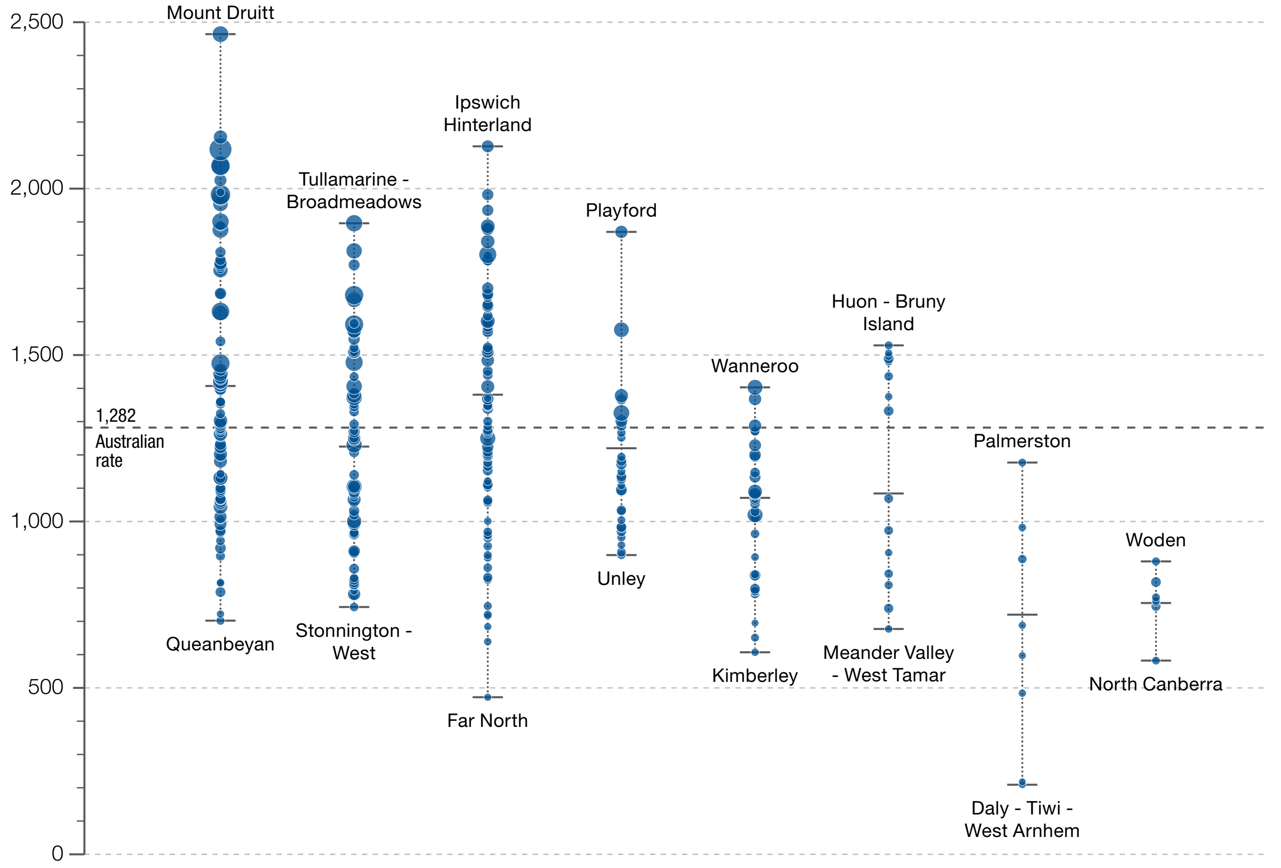


Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Computed tomography of the lumbar spine

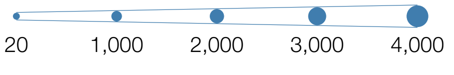
Figure 27: Number of MBS-funded services for CT imaging of the lumbar spine per 100,000 people, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	2,464	1,896	2,127	1,870	1,403	1,529	1,177	880
State/territory	1,407	1,225	1,381	1,220	1,071	1,084	720	755
Lowest rate	702	743	472	899	607	677	209	582
No. services	112,105	74,753	66,419	22,782	27,336	6,320	1,482	2,825



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

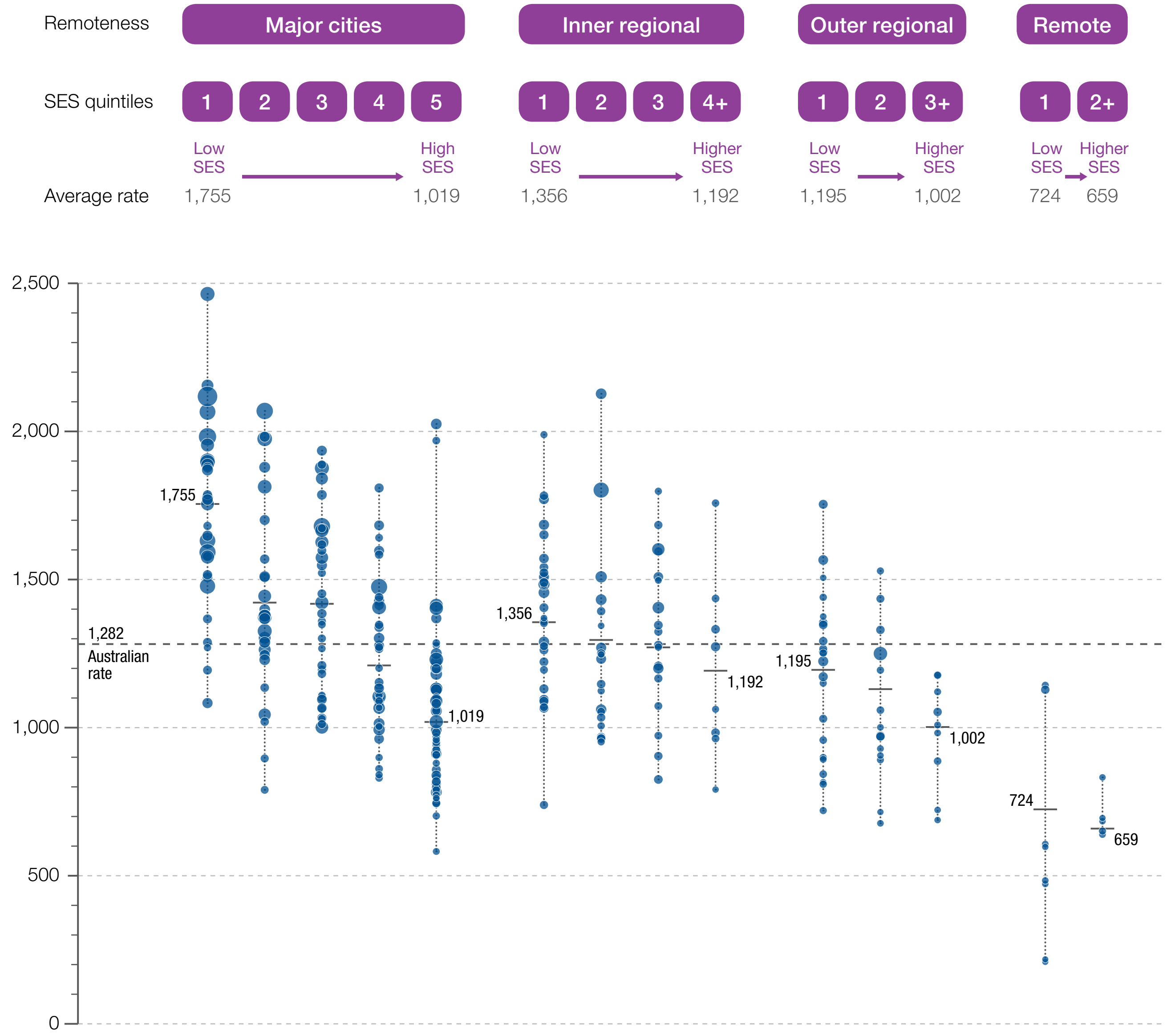
The size of each circle represents the number of services in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of services and people in the geographic area.

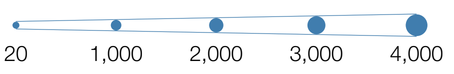
Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 28: Number of MBS-funded services for CT imaging of the lumbar spine per 100,000 people, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of services in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of services and people in Australia.
Average rates are based on the total number of services and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Computed tomography of the lumbar spine

Resources

- National Health and Medical Research Council. *Lumbar Imaging in Acute Non-Specific Low Back Pain*. 2008. Available at www.nhmrc.gov.au/_files_nhmrc/file/nics/news_events/080221_lumbar_imaging.pdf.
- Royal Australian and New Zealand College of Radiologists. *Education Modules for Appropriate Imaging Referrals*. Available at: www.ranzcr.edu.au/quality-a-safety/program/key-projects/education-modules-for-appropriate-imaging-referrals).
- Royal Australian and New Zealand College of Radiologists. *Inside Radiology*. Available at: http://insideradiology.com.au/.
- Choosing Wisely, Royal Australian and New Zealand College of Radiologists. *Tests, treatments and procedures clinicians and consumers should question*. 2015. Available at: www.choosingwisely.org.au/recommendations/ranzcr.
- Choosing Wisely, American College of Emergency Physicians. *Lumbar spine imaging in the ED*. 2014. Available at: www.choosingwisely.org/clinician-lists/acep-lumbar-spine-imaging-in-the-ed/.

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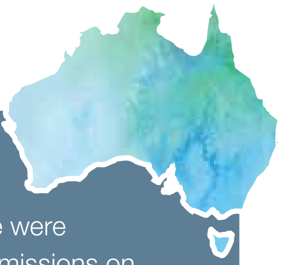
1 Vos T, Barber RM, Bell B, Bertozzi-Villa A, Biryukov S, Bolliger I, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the global burden of disease study 2013. The Lancet. 2015;386(9995):743.
2 Australian Institute of Health and Welfare. Australia's Health 2010. Canberra: AIHW, 2010.
3 Dagenais S, Galloway EK, Roffey DM. A systematic review of diagnostic imaging use for low back pain in the United States. The spine journal. 2014;14(6):1036–48.
4 Goergen S, Maher C, Leech M, Kuang R. Acute low back pain. Education modules for appropriate imaging referrals. Sydney: Royal Australian and New Zealand College of Radiologists, 2015.
5 Choosing Wisely, Royal Australian and New Zealand College of Radiologists. Tests, treatments and procedures clinicians and consumers should question. 2015. (Accessed 7 October 2015 at: www.choosingwisely.org.au/recommendations/ranzcr).
6 Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juntura E. The association between obesity and low back pain: a meta-analysis. American Journal of Epidemiology, 2010;171(2):135–154.

Chapter 3
Surgical interventions



At a glance

The atlas examined seven surgical interventions and found highly variable use across Australia. In some areas, people 55 years and over had rates of knee arthroscopy that were more than seven times those of people living elsewhere. Even when the areas with the highest and lowest rates were excluded, knee arthroscopy hospital admission rates were more than four times higher in one local area compared to another. Despite the evidence that knee arthroscopy is of limited value for people with osteoarthritis and may cause harm, more than 33,000 operations were performed on this age group during 2012–13. Many of these people will have degenerative disease in their knees and will not benefit from this intervention.

The number of patients undergoing Medicare Benefits Schedule (MBS) funded cataract surgery was over seven times higher in some parts of Australia than in others. Even when the highest and lowest rates were excluded, the cataract surgery rate was almost three times higher in one local area compared to another.

From 2010–11 to 2012–13, there were 17,000 lumbar spine surgery admissions on average each year. This includes spinal fusion procedures. There is limited evidence to support lumbar spine fusion surgery for painful degenerative back conditions. The outcomes for patients who receive these interventions are unknown.

Women living in regional areas of Australia were more than five times more likely to undergo a hysterectomy or endometrial ablation than those living in metropolitan areas. Even when the highest and lowest rates were excluded, the rate was almost three times higher in one local area compared to another.

The atlas includes two ear, nose and throat procedures, tonsillectomy and myringotomy. Each procedure was performed more than 30,000 times during 2012–13, with people in some areas more than six times more likely to undergo the procedure. Even when the highest and lowest rates were excluded, tonsillectomy and myringotomy rates were around three times higher in one local area compared to another. Australia does not have recent evidence-based guidelines for performing tonsillectomy and myringotomy.

Surgical interventions

Recommendations

Knee arthroscopy hospital admissions 55 years and over

3a. The Commission recommends to the MBS Review Taskforce that, given the lack of clinical evidence for the efficacy of knee arthroscopy for people with degenerative changes in the knee that the relevant MBS item(s) be amended to remove knee arthroscopy for this group.

3b. The Commission develops a Clinical Care Standard[1] for investigating and managing osteoarthritic knee pain based on recommendations from the Commission's Knee Pain Expert Working Group.[2]

3c. State and territory health departments consider mechanisms to improve coding, analytics and collection of outcome data for knee arthroscopy.

3d. Relevant clinical colleges ensure education and training material, as well as continuing professional development requirements, are in keeping with the applicable Clinical Care Standard for management of osteoarthritic knee pain.

3e. The Commission promotes the collection of patient-reported outcome measures for surgical interventions for knee pain.

Cataract surgery 40 years and over

3f. The Commission works with the relevant clinical colleges to develop a Clinical Care Standard for cataract surgery, including considering pre- and post-operative visual acuity scoring.

3g. The Commission undertakes a quality review of existing patient information about cataract surgery as part of developing supporting material for a Clinical Care Standard on cataract surgery.

3h. The MBS Review Taskforce reviews the relevant MBS item(s) for cataract surgery to require adherence to an applicable Clinical Care Standard for the surgery.

3i. State and territory health departments consider mechanisms to improve coding, analytics and collection of outcome data on cataract surgery.

3j. Relevant clinical colleges ensure education and training material, as well as continuing professional development requirements, are in keeping with the applicable Clinical Care Standard on cataract surgery.

3k. The Commission promotes the collection of patient-reported outcome measures for cataract surgery.

Lumbar spine surgery hospital admissions 18 years and over

3l. State and territory health departments consider mechanisms to improve coding, analytics and collection of outcome data on lumbar spine surgery in adults.

3m. The Commission promotes the collection of patient-reported outcome measures for lumbar spine surgery.

Radical prostatectomy hospital admissions 40 years and over

3n. State and territory health departments consider mechanisms to improve coding, analytics and collection of outcome data on radical prostatectomy.

3o. The Commission promotes the collection of patient-reported outcome measures for radical prostatectomy.

1 Further information about Clinical Care Standards is at the Australian Commission on Safety and Quality in Health Care website: www.safetyandquality.gov.au/our-work/clinical-care-standards/.

2 The Commission's Australian Atlas of Healthcare Variation Expert Advisory Group on Knee Pain has investigated and provided advice on means for addressing unwarranted variation in the clinical management of knee pain in Australia. It has considered strategies such as reimbursement arrangements, patient information, collection of outcome data, and standards and guidelines.

Hysterectomy, endometrial ablation hospital admissions

3p. The Commission works with the Royal Australian and New Zealand College of Obstetricians and Gynaecologists and consumer groups to develop a Clinical Care Standard for managing menorrhagia.

3q. The Commission develops a patient decision aid to increase women's knowledge of treatment options for menorrhagia and their benefits and risks. In addition, mechanisms are considered so that relevant clinical colleges can train clinicians to use this patient decision tool.

3r. Relevant clinical colleges ensure education and training material, as well as continuing professional development requirements, are in keeping with the applicable Clinical Care Standard for menorrhagia.

Tonsillectomy hospital admissions 17 years and under

3s. The Commission reviews the need for evidence-based clinical guidelines on tonsillectomy in children as part of the ongoing national guideline prioritisation processes.

3t. The Commission reviews current patient information about tonsillectomy in Australia, in conjunction with relevant clinical colleges and consumer groups, to determine the need for better patient and carer information, and shared decision making tools, and also the need to update existing materials.

Myringotomy hospital admissions 17 years and under

3u. The Commission reviews the need for evidence-based clinical guidelines on myringotomy in children as part of ongoing national guideline prioritisation processes.

3v. State and territory health departments, in conjunction with the National Aboriginal Community Controlled Health Organisation, monitor adherence to the guidelines for managing otitis media in Aboriginal and Torres Strait Islander children and implement improvement activities.

Hip fracture hospital admissions and average length of stay in hospital 65 years and over

3w. Primary health networks and state and territory health departments work together to increase access to evidence-based falls prevention programs in hospitals, care facilities and the community.

3x. Private and public hospitals ensure patients have access to care that aligns with the Clinical Care Standard for acute management of hip fracture.

3y. Public hospitals implement the Clinical Care Standard for acute management of hip fracture through best practice pricing.

3z. Relevant clinical colleges ensure educational and training material, as well as continuing professional development requirements, are in keeping with the Clinical Care Standard for acute management of hip fracture.

Surgical interventions

Background

Important improvements have been made in the safety and quality of surgical interventions with substantial advances in surgical methods. Considerable variation exists in admission rates for many common surgical interventions, much of which is either unexplained or potentially unwarranted.

Chapter overview

This chapter includes the following items:

- knee arthroscopy hospital admissions 55 years and over
- cataract surgery 40 years and over
- lumbar spine surgery hospital admissions 18 years and over
- radical prostatectomy hospital admissions 40 years and over
- hysterectomy and endometrial ablation hospital admissions
- tonsillectomy hospital admissions 17 years and under
- myringotomy hospital admissions 17 years and under
- hip fracture hospital admissions 65 years and over
- hip fracture average length of stay in hospital by peer group 65 years and over.

This chapter presents a selection of interventions in a range of areas rather than covering all aspects of surgical activity in Australian hospitals. While a large number of interventions were nominated and considered for inclusion, many were not suitable. This was either because of data quality issues or small numbers, which limited the ability to present the data. The final selection reflects areas where there was significant interest in the topic and where, depending on the item, variation raises questions about underlying patterns of disease, equity, treatment options and appropriateness of interventions.

International comparisons

Considerable variations in rates of hospital admissions for surgical interventions have been noted internationally. Comparisons relevant to the items in this chapter include:

- **Knee arthroscopy** – Australia has one of the highest per capita rates of knee arthroscopies of the nine Organisation for Economic Co-operation and Development (OECD) countries participating in a study of variation in healthcare use[1]
- **Cataract surgery** – in England, the *National Health Service (NHS) Atlas of Variation in Healthcare* reported a two times variation in cataract surgery rates across primary care trusts, compared to nearly three times variation in Australia documented in this atlas. The NHS atlas notes that several factors can influence variation, including demography and local needs, as well as access to, and uptake of, NHS services[2]
- **Lumbar spine surgery** – rates for lumbar spine surgery have increased internationally in the past decade and considerable variations in surgery rates have been reported. For example, in the United States, an eight times variation has been reported in rates of decompression surgery (laminectomy) and a 14 times variation is seen in fusion surgery[3]
- **Prostatectomy** – Australia has high crude rates of prostatectomy compared to other OECD countries. Switzerland is the only OECD country with higher rates. Both Australia and Switzerland have seen a substantial increase in rates in the last decade, whereas other OECD countries have seen a decrease.[4] Radical prostatectomy admissions vary considerably internationally, with the United States reporting a four times regional variation[5]
- **Hysterectomy** – while the number of hysterectomies performed in OECD countries is generally decreasing[6], Australia has a higher rate than many OECD nations.[1] Most OECD countries show a two to three times variation in hysterectomy rates across geographical areas[6]

- **Tonsillectomy** – wide variations in tonsillectomy rates have been reported internationally.[7] Regional variation within countries is also common, including in the United States[8] and England.[9] The Health Safety and Quality Commission in New Zealand has consistently found a two to three times variation in longitudinal tracking of tonsillectomy rates[10]
- **Myringotomy** – admission rates for myringotomy have considerable variation in other countries, with a 12 times variation reported across primary care trusts in England[11]
- **Hip fracture** – international studies have found a variation in both the quality of care and patient outcomes for hip fracture care.[12] A number of measures to improve care have been introduced in the United Kingdom, including a hip fracture best-practice tariff scheme and a national clinician-led audit. Preliminary evaluations have shown that the best practice tariff scheme has reduced hip fracture mortality[13], and that since the audit was launched in 2007, the quality of care and the survival of older people with hip fractures have improved.[12]

Routine data systems can provide information about variation in intervention rates but it is much more difficult to obtain information about the outcomes of interventions. Interest is increasing in identifying ways to gather information about health outcomes and in involving patients and carers in assessing the outcomes of care. Patient-reported outcome measures use information from patients and their carers about symptoms, functional status and health-related quality of life. In England, NHS healthcare providers are required to collect patient-reported outcome measures for four common elective surgery procedures: hip replacements, knee replacements, groin hernias and varicose veins. When used appropriately, patient-reported outcome measures are a strong determinant of quality clinical outcomes, and their use in Australia for monitoring outcomes of some interventions should be promoted.[14,15]

Australian initiatives

The information in this chapter complements national work presently underway. This includes the Australian Institute of Health and Welfare's (AIHW) reporting of Australian hospital data. In particular, the AIHW published *Australian hospital statistics 2013–14: Elective surgery waiting times* in 2014.[16]

The Commission has formed an expert advisory group on knee pain that is identifying strategies to detect and address unwarranted variation in the management of knee pain.

The Australian and New Zealand Hip Fracture Registry Steering Group has developed the *Australian and New Zealand Guideline for Hip Fracture Care – Improving Outcomes in Hip Fracture Management of Adults*.[17]

The Commission and other organisations are exploring the implementation of a national best-practice pricing approach for hip fracture care in public hospitals. Best-practice pricing refers to purchasing healthcare services for a specific procedure or intervention at a price that reflects the elements constituting best practice. Two Australian states, Western Australia and Queensland, have implemented state-based hip fracture best-practice pricing initiatives.

The Commission's Hip Fracture Care Clinical Care Standard[18] aims to improve the assessment and management of patients with a hip fracture to optimise outcomes and reduce their risk of another fracture. This includes timely assessment and surgery if needed, and the early initiation of a tailored care plan aimed at restoring function and minimising the risk of another fracture.

States and territories are also undertaking activities to enhance surgical outcomes.

Surgical interventions

About the data

Data on admissions to hospital include public and private admissions and are reported by residence of patient, not location of hospital. Data for cataract surgery are not based on admission to hospital, but on services charged to the MBS. The average length of stay in hospital is reported by hospital, not by the geographic residence of the patient. Hospital admission data are obtained from the Admitted Patient Care National Minimum Data Set.

Data analysis in this chapter presented challenges including:

- data outliers have been incorporated and, accordingly, caution should be used when interpreting the analysis
- variations in small areas may reflect chance variations and can be influenced by clustering of high-risk individuals or many repeat events for some individuals
- data have not been linked to investigate how rates of hospital admission relate to health outcomes
- differences in hospital practice for administrative care type changes when the classification is changed from acute to subacute care
- difficulty in comparing admissions and average length of stay for the two hip fracture items. The two datasets are different because the hospital admissions item includes data from all private and public hospitals, whereas the average length of stay item includes data only from major and large public hospitals.

1 Australian Commission on Safety and Quality in Health Care and Australian Institute of Health and Welfare. Exploring healthcare variation in Australia: analyses resulting from an OECD study. Sydney: ACSQHC, 2014.
2 Right Care. The NHS atlas of variation in healthcare: reducing unwarranted variation to increase value and improve quality. London: NHS, 2010
3 Goodney PR, Dzebisashvili N, Goodman DC, Bronner KK. Variation in the care of surgical conditions: spinal stenosis. A Dartmouth atlas of health care series. Hanover, NH: The Dartmouth Institute for Health Policy and Clinical Practice, 2014.
4 McPherson K, Gon G, Scott M. International Variations in a Selected Number of Surgical Procedures. OECD Health Working Paper, No. 61.Paris: OECD Publishing, 2013.
5 Goodney PR, Dzebisashvili N, Goodman DC, Bronner KK. Variation in the Care of Surgical Conditions. A Dartmouth Atlas of Health Care Series. Hanover, NH: The Dartmouth Institute for Health Policy and Clinical Practice; 2014.
6 Organisation for Economic Co-operation and Development. Focus on health: geographic variations in health care: What do we know and what can be done to improve health system performance? Paris: OECD Publishing, 2014
7 American Academy of Otolaryngology – Head and Neck Surgery Foundation. Clinical practice guideline: tonsillectomy in children. Alexandria, VA: American Academy of Otolaryngology - Head and Neck Surgery Foundation, 2011.
8 The Dartmouth Institute for Health Policy and Clinical Practice, 2013. The Dartmouth atlas of children's health care in northern New England.
9 Suleman M, Clark MP, Goldacre M, Burton M, 2010. Exploring the variation in paediatric tonsillectomy rates between English regions: a 5-year NHS and independent sector data analysis. Clinical Otolaryngology, 35.2;2010;111–17.
10 Health Safety and Quality Commission. Surgical procedures. 2014. (Accessed 8 September 2015 at: www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/atlas-of-healthcare-variation/surgical-procedures).
11 Appleby J, Raleigh V, Frosini F, Bevan G, Gao H, Lyscom T. Variations in health care: the good, the bad and the inexplicable. London: The King's Fund 2011.
12 Neuburger J, Currie C, Wakeman R, Tsang C, Plant F, De Stavola B, Cromwell D.A, van der Meulen J, The impact of a national clinician-led audit initiative on care and mortality after hip fracture in England, 2015, Medical Care 53(8):686–91.
13 Royal College of Physicians. National Hip Fracture Database - National report 2013. United Kingdom: RCP, 2013.
14 NHS England. Patient reported outcome measures (PROMS). 2015. (Accessed 2 October 2015 at: www.england.nhs.uk/statistics/statistical-work-reas/proms/).
15 Black N. Patient reported outcome measures could help transform healthcare. BMJ. 2013;346.
16 Australian Institute of Health and Welfare. Australian hospital statistics 2013–14: elective surgery waiting times. Health services series no. 56. Cat. no. HSE 151. Canberra: AIHW, 2014.
17 Australian and New Zealand hip fracture registry steering group. Australian and New Zealand guideline for hip fracture care – improving outcomes in hip fracture management of adults. Sydney: Australian and New Zealand Hip Fracture Registry Steering Group; 2014.
18 Australian Commission on Safety and Quality in Healthcare. Hip fracture care clinical care standard. ACSQHC, 2015. (Accessed 8 September 2015 at: www.safetyandquality.gov.au/our-work/clinical-care-standards/hip-fracture-care-clinical-care-standard).

3.1 Knee arthroscopy hospital admissions 55 years and over

Context

This data item examines hospital admissions for knee arthroscopy for people 55 years and over. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set. This includes both public and private hospitals. Rates are described as the number of admissions per 100,000 people. Repeat admissions for one person and transfers to other hospitals are both counted as separate admissions.

Knee arthroscopy is a surgical technique which is used to treat a limited number of pathologies in the knee joint. A fibre optic telescope incorporating a camera is introduced through a small incision. Instruments can be inserted through other small incisions to assist with some surgical interventions inside the knee joint.

Systematic reviews of randomised placebo-controlled trials have found arthroscopy for degenerative knee disease (particularly osteoarthritis) delivers an inconsequential benefit.[1] According to recent guidelines, arthroscopic debridement does not help manage knee osteoarthritis.[2]

Clinicians should consider the options for managing knee pain only after comprehensive assessment and clinical examination. Plain X-rays with standing films are often an appropriate investigation method. Magnetic resonance imaging (MRI) is often unnecessary. Guidelines exist for general practitioners on MRI for acute knee injury; however, they are not helpful for patients with ongoing degenerative knee pain. MRI for ongoing knee pain can lead to unwarranted expense, over-investigation and unnecessary treatment.[3]

Osteoarthritic knee pain management should begin with a comprehensive discussion between the clinician and patient about weight loss, exercise, physiotherapy and pharmaceuticals for pain relief. Exercise therapy has been shown to relieve osteoarthritic knee pain with a moderate to larger effect than knee arthroscopy.[1] Despite this, the use of arthroscopic knee surgery has not decreased in recent years.[4]

Consumer understanding of the diagnosis and treatment options for osteoarthritic knee pain varies. Cartilage tears in the knee are common in the normal ageing process.[5] A number of international patient decision aids are available on treatment options for osteoarthritis, but they are yet to be validated in Australian clinical settings.

Knee arthroscopy hospital admissions 55 years and over

Health services are beginning to prioritise use of patient-reported outcome measures, but in relation to knee arthroscopy, these are not coordinated or contained in clinical registries around Australia. Emerging evidence also suggests that people who attend an orthopaedic surgery triage clinic, run by advanced scope physiotherapists, are satisfied with good health outcomes with these clinics.[6,7,8]

The Commission has formed an expert advisory group on knee pain that is identifying strategies to detect and address unwarranted variation in the management of knee pain.

Magnitude of variation

In 2012–13, there were 33,682 knee arthroscopy admissions to hospital, representing 560 admissions per 100,000 people aged 55 years and over (the Australian rate).

The number of knee arthroscopy admissions to hospital across 304* local areas (SA3s) ranged from 185 to 1,319 per 100,000 people aged 55 years and over. The number of admissions was **7.1 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of admissions varied across states and territories, from 264 per 100,000 people aged 55 years and over in the Australian Capital Territory, to 980 in South Australia.

After excluding the highest and lowest results, the knee arthroscopy hospital admission rate across the 290 remaining local areas was **4.2 times higher** in one local area compared to another.

Hospital admission rates for knee arthroscopy tended to be higher in inner and outer regional areas than in major cities. There was a trend towards rates rising with increasing socioeconomic status in major cities and inner regional areas. However, in outer regional and remote areas, this socioeconomic correlation was reversed.

Interpretation

Potential reasons for the variation include differences in:

- clinicians adopting evidence-based practice in clinical decision making
- rates of private health insurance cover and the accessibility of private hospitals – about 80 per cent of admissions for knee arthroscopies are in the private sector[1]
- the occurrence of risk factors for knee problems, including obesity and occupational injuries[9]
- access to imaging and alternatives to surgery such as physiotherapy for people in remote locations
- rates of repeat procedures for one person, which are counted in the data.

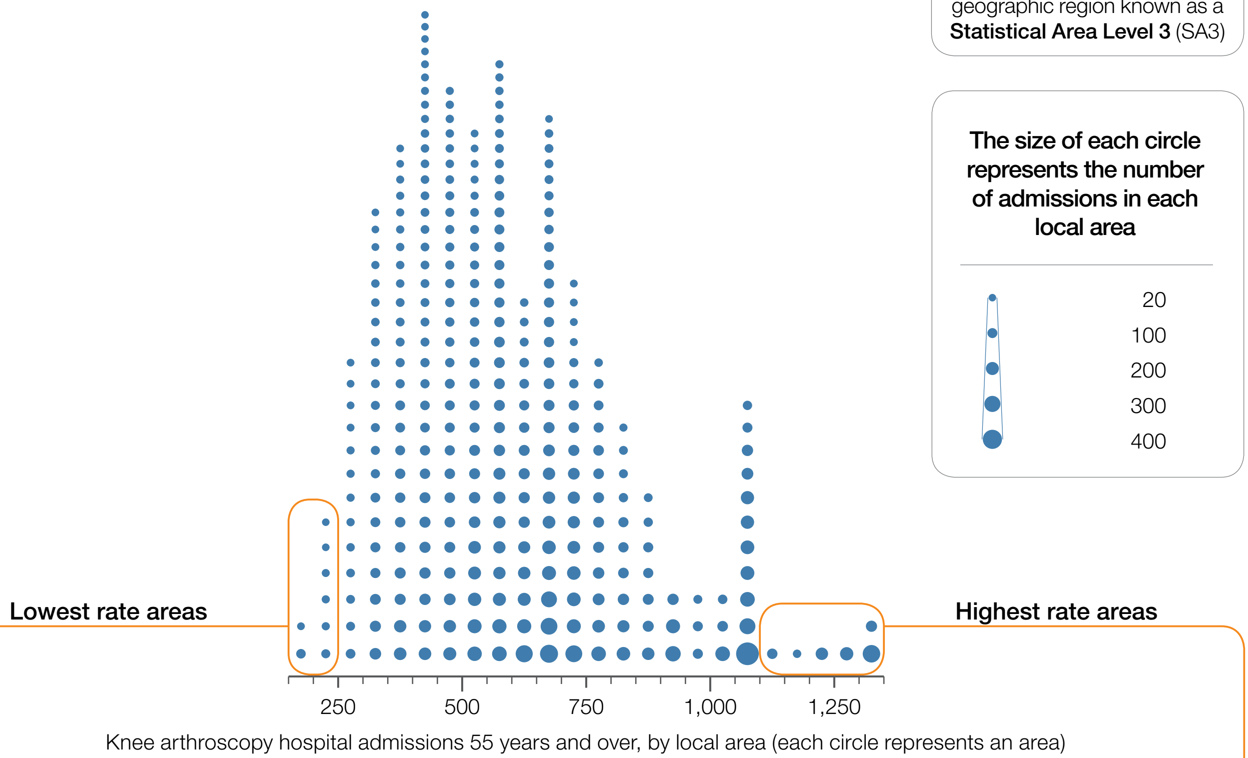
To explore this variation, further analysis could focus on:

- investigating repeat knee arthroscopies, rates of MRI that progress to knee arthroscopy and rates of knee arthroscopy that progress to knee replacements
- the influence of the private and public sectors on rates of knee arthroscopy.

*There are 333 SA3s. For this item, data were suppressed for 29 SA3s. This is because of confidentiality requirements given the small numbers of admissions in these areas.

Figure 29: **Number of knee arthroscopy admissions to hospital per 100,000 people aged 55 years and over, age standardised, by local area, 2012–13**

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3).



Local area	State	Rate	Admissions
Fairfield	NSW	185	87
Auburn	NSW	186	29
Tuggeranong	ACT	201	42
Southern Highlands	NSW	211	37
Merrylands - Guildford	NSW	212	70
Marrickville - Sydenham - Petersham	NSW	212	24
Woden	ACT	231	22
Maryborough	Qld	249	42

Local area	State	Rate	Admissions
Bunbury	WA	1,319	347
Yorke Peninsula	SA	1,306	140
Eyre Peninsula and South West	SA	1,251	209
Campbelltown	SA	1,217	180
Serpentine - Jarrahdale	WA	1,151	50
Norwood - Payneham - St Peters	SA	1,123	115

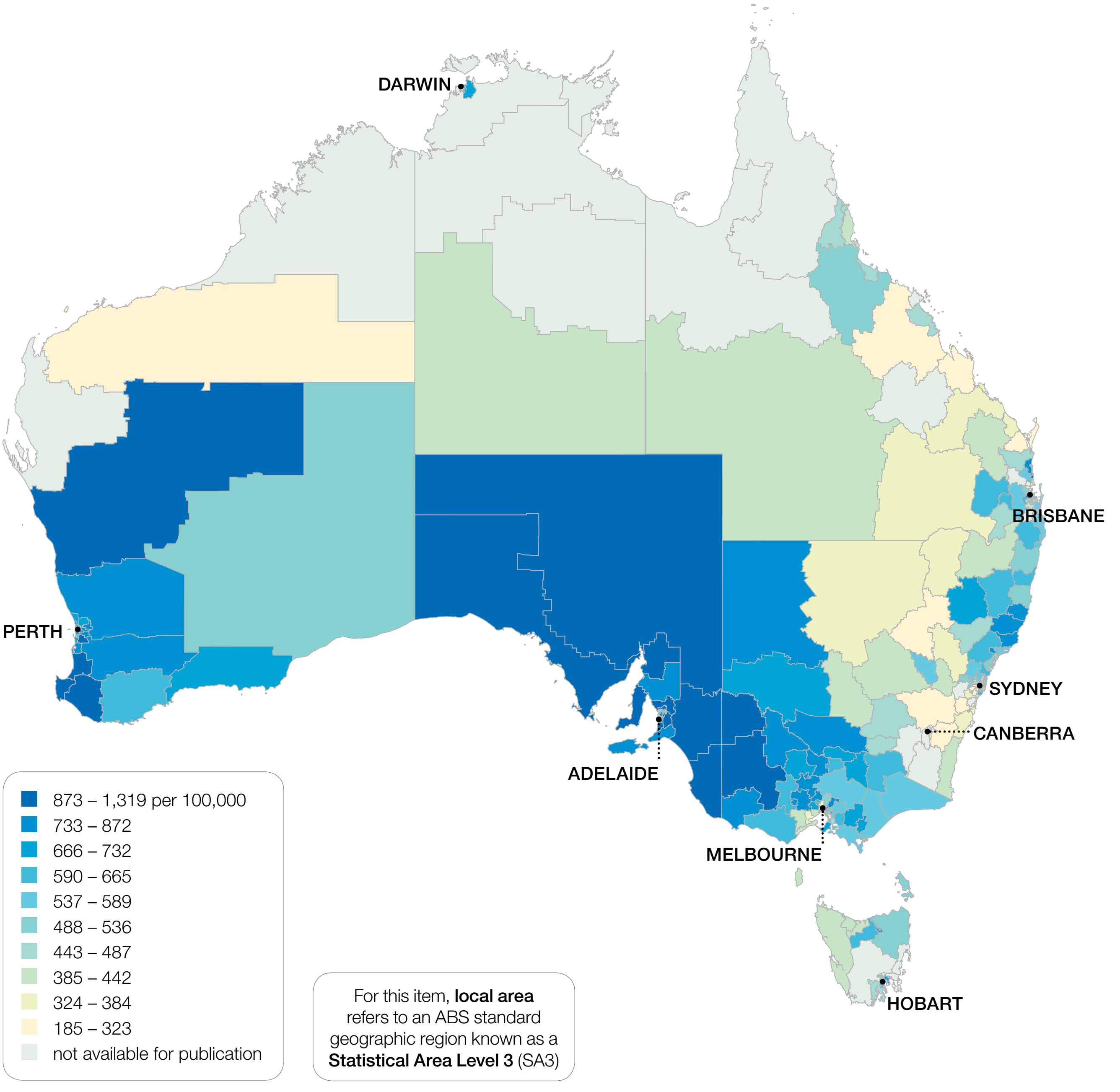
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
Includes all public hospitals, private hospitals and day hospital facilities.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Knee arthroscopy hospital admissions 55 years and over

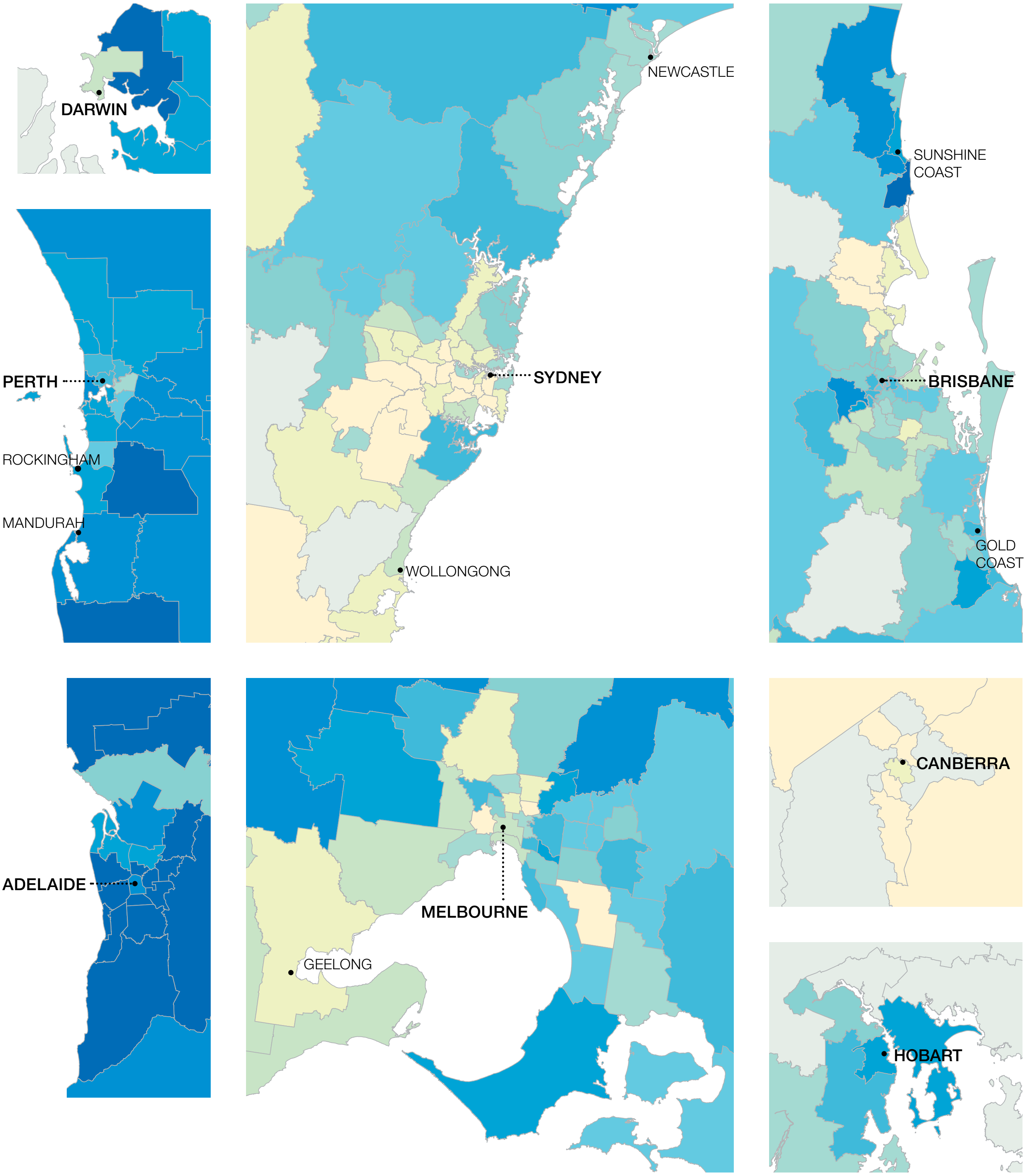
Figure 30: Number of knee arthroscopy admissions to hospital per 100,000 people aged 55 years and over, age standardised, by local area, 2012–13



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of knee arthroscopy admissions to hospital across 304 local areas (SA3s) ranged from 185 to 1,319 per 100,000 people aged 55 years and over. The number of admissions was **7.1 times higher** in the area with the highest rate compared to the area with the lowest rate.

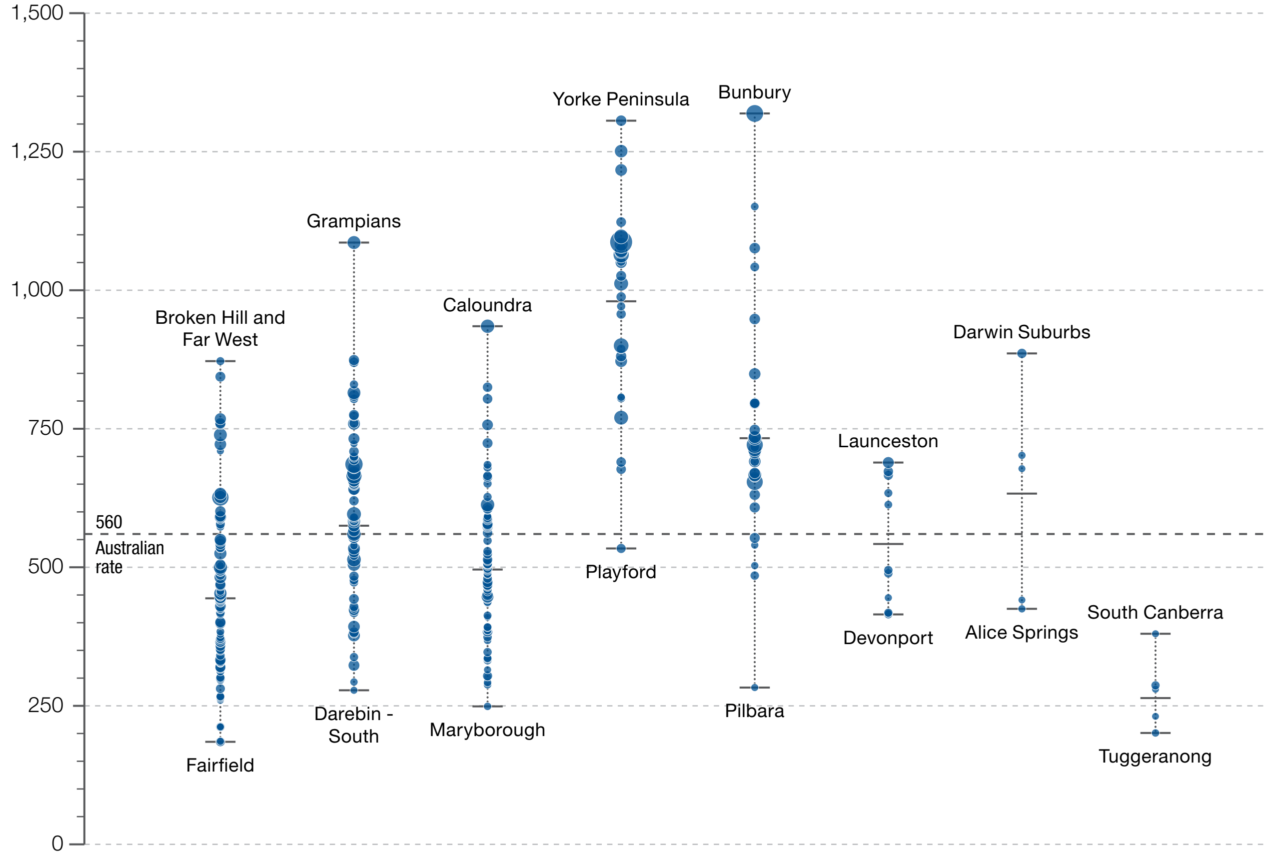


Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Knee arthroscopy hospital admissions 55 years and over

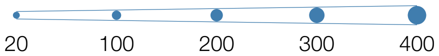
Figure 31: Number of knee arthroscopy admissions to hospital per 100,000 people aged 55 years and over, age standardised, by local area, state and territory, 2012–13

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	872	1,086	935	1,306	1,319	689	886	380
State/territory	444	575	496	980	733	542	633	264
Lowest rate	185	278	249	534	283	415	425	201
No. admissions	8,796	8,507	5,888	4,683	4,421	868	271	225



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

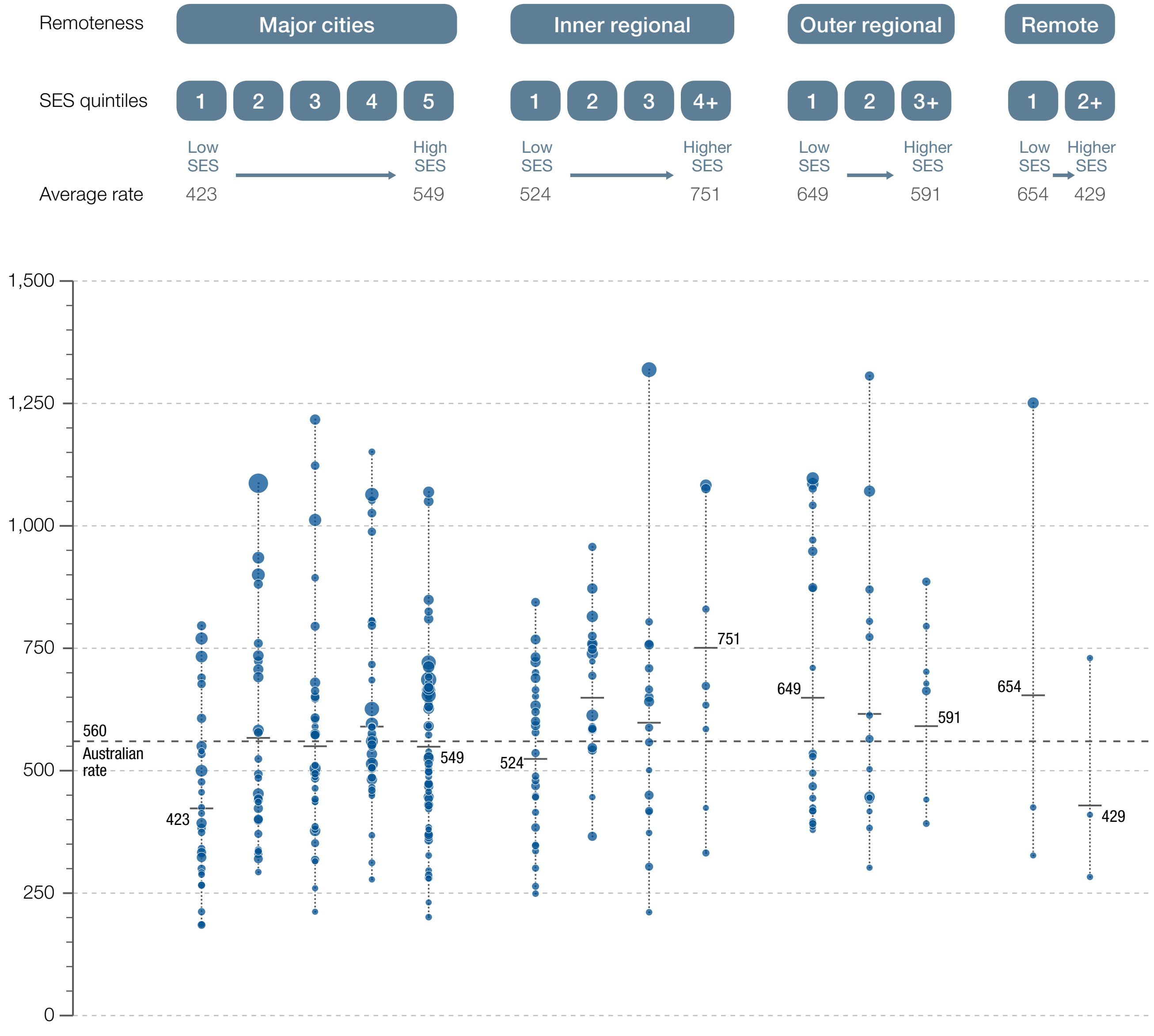
The size of each circle represents the number of admissions in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 32: Number of knee arthroscopy admissions to hospital per 100,000 people aged 55 years and over, age standardised, by local area, remoteness and socioeconomic status (SES), 2012–13



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of admissions in each local area 20 100 200 300 400

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of admissions and people in Australia.
Average rates are based on the total number of admissions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Knee arthroscopy hospital admissions 55 years and over

Resources

- Arthritis Australia. *My Joint Pain*. Available at: www.myjointpain.org.au.

- Arthritis Australia. Available at: www.arthritisaustralia.com.au.

- Australian Orthopaedic Society and Australian Knee Society. *Position statement from the Australian Knee Society on Arthroscopic Surgery of the Knee, with particular reference to the presence of osteoarthritis*. 2014. Available at: www.aoa.org.au/docs/default-source/subspecialties/aks-aoa-position-statement-on-arthroscopic-surgery-of-the-knee.pdf?sfvrsn=2.

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1 Thorlund JB, Juhl CB, Roos EM, Lohmander LS. Arthroscopic surgery for degenerative knee: systematic review and meta-analysis of benefits and harms. BMJ. 2015;350.
2 Australian Orthopaedic Association. Position statement from the Australian Knee Society on Arthroscopic Surgery of the Knee, with particular reference to the presence of osteoarthritis. Sydney: AOA, 2014
3 Bohensky M, Sundararajan V, Andrianopolous N, de Steiger R, Bucknill A, Kondogiannis CM, et al. Trends in elective knee arthroscopies in a population-based cohort, 2000–2009. MJA 2012;197(7):399–403.
4 Harris IA, Madan NS, Naylor JM, Chong S, Mittal R, Jalaludin BB. Trends in knee arthroscopy and subsequent arthroplasty in an Australian population: a retrospective cohort study. BMC Musculoskeletal Disorders. 2013;14:143.
5 Buchbinder R, Harris IA, Sprowson A. Management of degenerative meniscal tears and the role of surgery. BMJ 2015;350.
6 Hattam P, Smeatham A. Evaluation of an orthopaedic screening service in primary care. Clinical performance and quality health care 1999;7:121–4.
7 Oldmeadow LB, Bedi HS, Burch HT, Smith JS, Leahy ES, Goldwasser M. Experienced physiotherapists as gatekeepers to hospital orthopaedic outpatient care. MJA 2007;186(12):625–8.
8 Burn D, Beeson E. Orthopaedic triage: cost effectiveness, diagnostic/surgical and management rates. Clinical Governance: An International Journal 2014;19(2).
9 Blagojevic M, Jinks C, Jeffery A, Jordan KP. Risk factors for onset of osteoarthritis of the knee in older adults: a systematic review and meta-analysis. Osteoarthritis Cartilage 2010;18:24–33.

3.2 Cataract surgery 40 years and over

Context

This data item examines cataract surgery rates for people 40 years and over. Data for cataract surgery is counted as services charged to the MBS, which is private cataract surgery performed in either a public or private hospital.

Cataract surgery is one of the most common operations performed in Australia. A cataract is the clouding of the eye's clear lens and is a very common cause of visual loss. Among Australians aged 55 and over, cataract is the primary cause of visual impairment in 40 per cent of cases.[1] The two most common presenting symptoms are reduced visual function and sensitivity to glare. The most common risk factor for cataracts is age. Diabetes, smoking and exposure to ultraviolet light also increase the risk.

The presence of a cataract does not necessarily indicate the need for surgery. In the very initial stages, symptoms may improve with new glasses, brighter lighting or magnifying lenses. Surgery is indicated when reduced vision affects the patient's daily functioning. However, the preferences of the surgeon or patient may affect the decision on whether and when to perform surgery. Surgery involves replacing the cloudy lens with a clear, permanent, artificial lens.

This item analyses data only on MBS item number 42702, which captures the lens extraction and insertion of the artificial lens in a single surgery. Where extraction and insertion cannot be done in the same operation, separate MBS items are used, which are not included in these data. This analysis also does not include publicly funded cataract surgery performed in public hospitals. It is known that cataract surgery performed in public hospitals and not funded by the MBS accounts for about 50 per cent of cataract procedures in the Northern Territory and Australian Capital Territory, 38 per cent in Western Australia and South Australia, 30 per cent in New South Wales[2] and Victoria, 12 per cent in Queensland and 11 per cent in Tasmania.[3]

Cataract surgery 40 years and over

Magnitude of variation

In 2013–14, there were 160,489 MBS-funded services for cataract surgery, representing 1,436 services per 100,000 people aged 40 years and over (the Australian rate).

The number of MBS-funded services for cataract surgery across 320* local areas (SA3s) ranged from 357 to 2,555 per 100,000 people aged 40 years and over. The number of services was **7.2 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of services varied across states and territories, from 1,132 per 100,000 people aged 40 years and over in the Northern Territory, to 1,685 in Queensland.

After excluding the highest and lowest results, the cataract surgery rate across the 298 remaining local areas was **2.8 times higher** in one local area compared to another.

As the rate of cataract surgery decreased, remoteness increased. Generally rates were lowest in areas of low socioeconomic status and increased in areas with higher socioeconomic status.

Interpretation

Potential reasons for the variation include differences in:

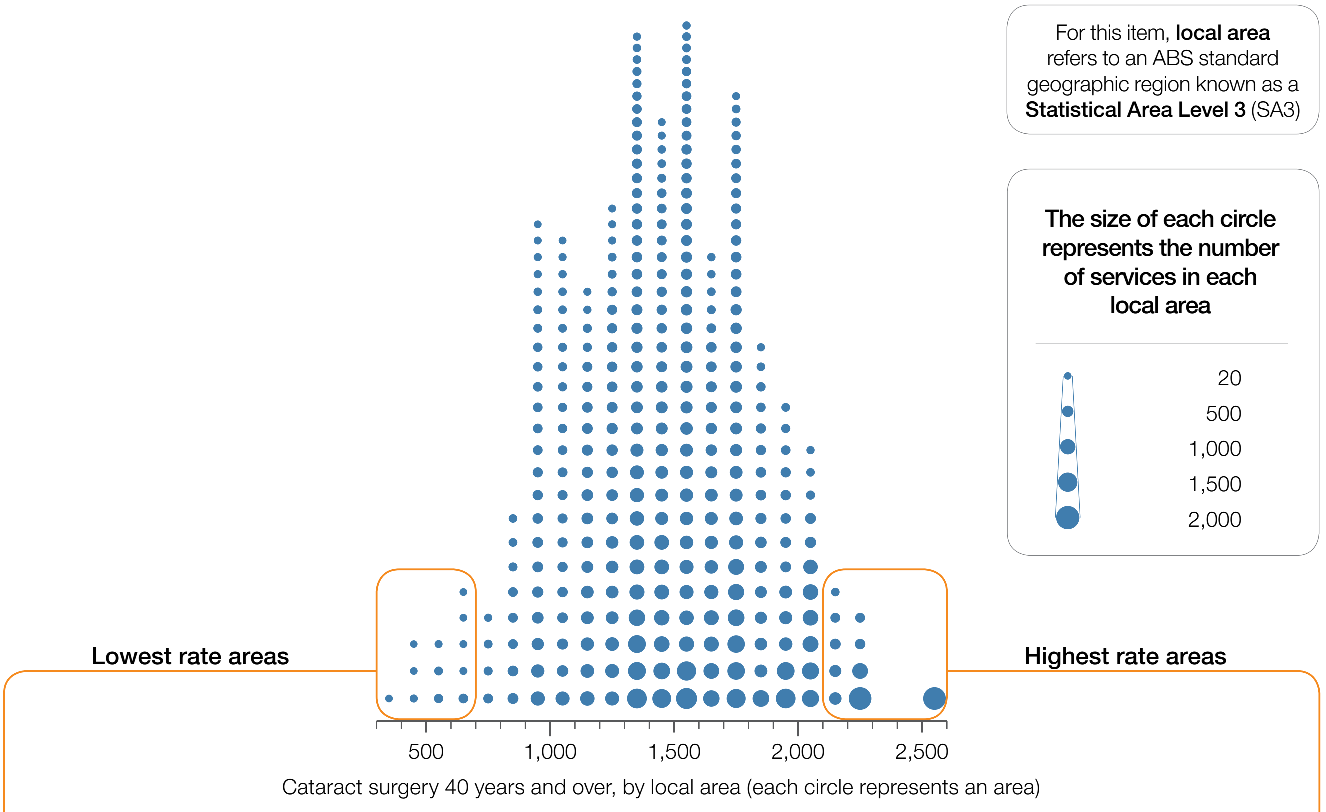
- risk factors for cataracts
- levels of private health insurance, and access to specialists and private hospitals (noting that the data are limited to procedures funded by the MBS)
- rates of private health insurance and levels of access to private hospitals among some population groups. For example, Aboriginal and Torres Strait Islander peoples have low rates of private health insurance and reduced access to private hospitals. In NSW, 80 per cent of Indigenous cataract surgery patients are public patients, compared with 28 per cent of non-Indigenous patients[2]
- availability of specialists in rural and remote locations
- the decision making criteria of patients and specialists about the level of acuity that indicates the need for surgery
- government policies, whereby governments purchase the services of private providers in private hospitals for public patients.

To explore this variation, further analysis could focus on:

- examining data on publically funded cataract surgery, including waiting times and the number of people operated on within 90 days of booking
- the influence of the private and public sectors on rates of cataract surgery
- waiting times for surgery for Indigenous people to determine the extent of any under-servicing of this population
- data linkage to investigate whether issues such as access to care are lengthening the time between first and second eye surgeries, which has been shown to influence the risk of falls
- determining the visual acuity of patients at the time of cataract surgery to establish whether variation is due to different thresholds for surgery.

*There are 333 SA3s. For this item, data were suppressed for 13 SA3s. This is because of confidentiality requirements given the small numbers of services in these areas.

Figure 33: **Number of MBS-funded services for cataract surgery per 100,000 people aged 40 years and over, age standardised, by local area, 2013–14**



Local area	State	Rate	Services
Pilbara	WA	357	43
Alice Springs	NT	438	43
Gascoyne	WA	484	22
Mid North	SA	492	94
Grampians	Vic	564	248
Eyre Peninsula and South West	SA	593	192
Broken Hill and Far West	NSW	596	84
Outback - North and East	SA	608	76
Goldfields	WA	652	67
Esperance	WA	660	54
Murray and Mallee	SA	679	300
Kimberley	WA	683	57

Local area	State	Rate	Services
Lake Macquarie - East	NSW	2,555	1,924
Newcastle	NSW	2,241	1,923
Brisbane Inner - West	Qld	2,232	388
Centenary	Qld	2,220	324
Lake Macquarie - West	NSW	2,212	1,057
Hills District	Qld	2,189	587
South Perth	WA	2,178	436
Darwin City	NT	2,144	157
Hobart - North East	Tas	2,143	645
Nundah	Qld	2,104	318

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of services and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

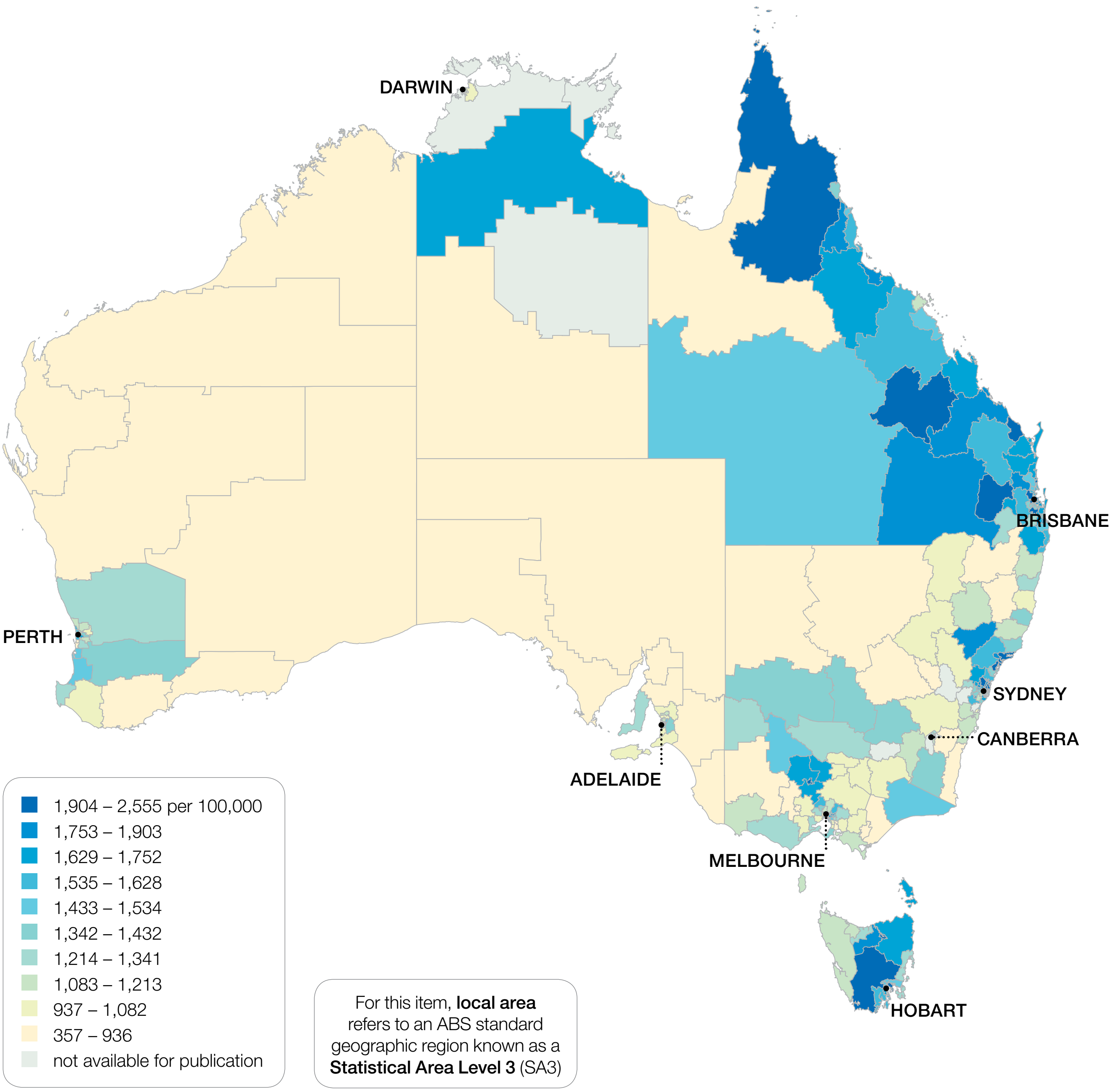
MBS statistics exclude services provided free of charge to public patients in hospitals, to Department of Veterans' Affairs beneficiaries, some patients under compensation arrangements and through other publicly funded programs. SA3 analysis excludes approximately 115 services from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

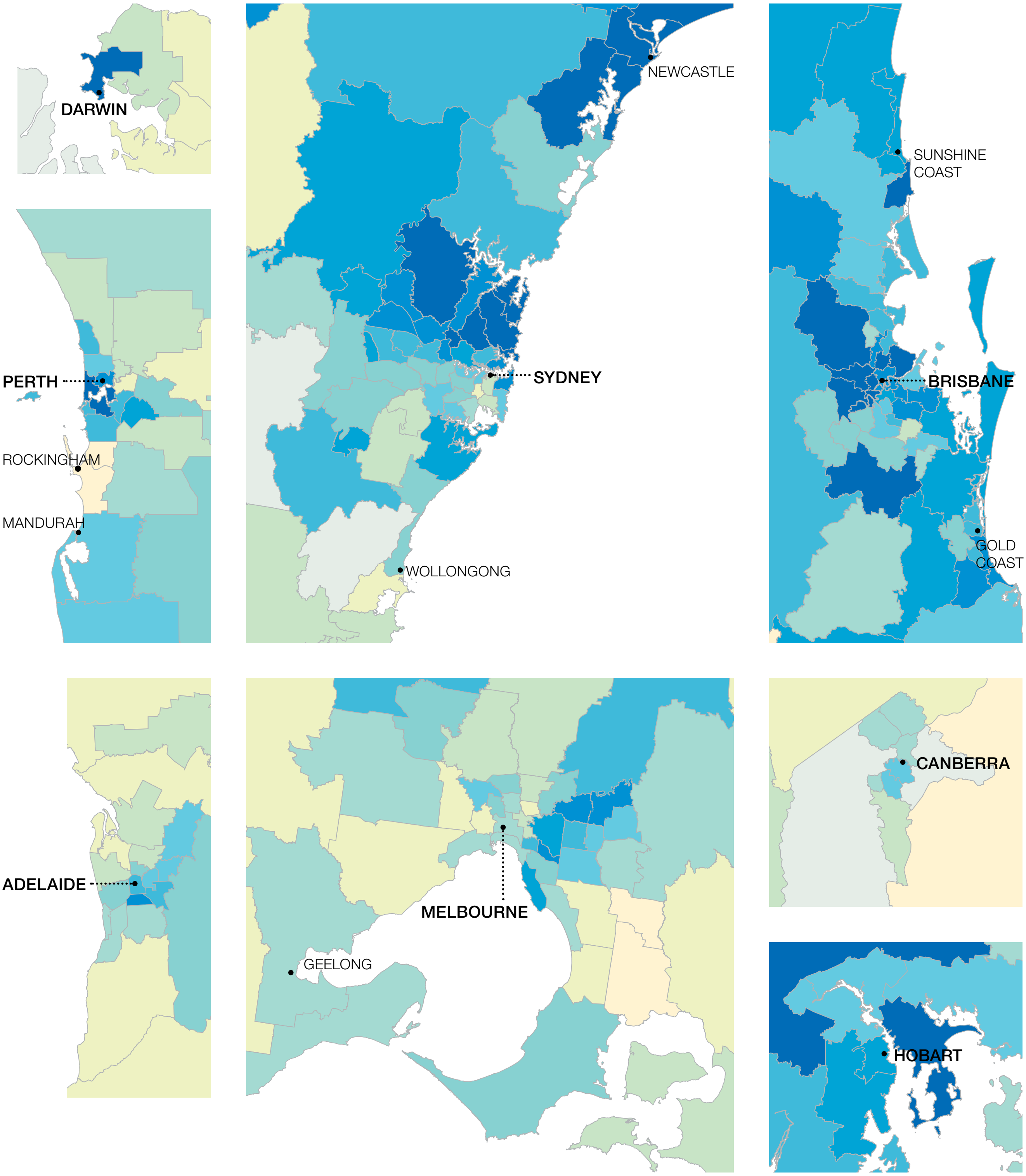
Cataract surgery 40 years and over

Figure 34: **Number of MBS-funded services for cataract surgery per 100,000 people aged 40 years and over, age standardised, by local area, 2013–14**



Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of MBS-funded services for cataract surgery across 320 local areas (SA3s) ranged from 357 to 2,555 per 100,000 people aged 40 years and over. The number of services was **7.2 times higher** in the area with the highest rate compared to the area with the lowest rate.

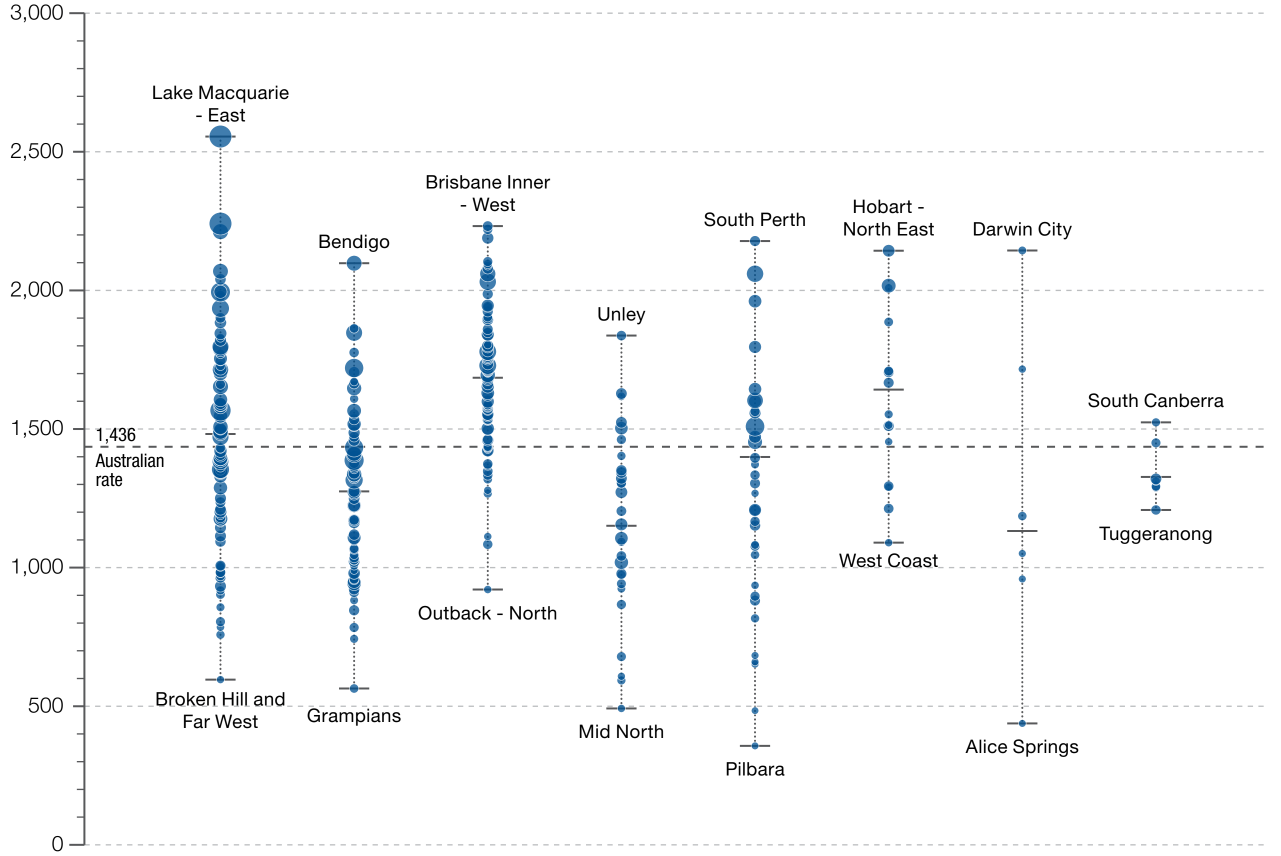


Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Cataract surgery 40 years and over

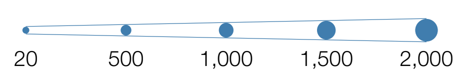
Figure 35: **Number of MBS-funded services for cataract surgery per 100,000 people aged 40 years and over, age standardised, by local area, state and territory, 2013–14**

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	2,555	2,098	2,232	1,837	2,178	2,143	2,144	1,524
State/territory	1,482	1,275	1,685	1,151	1,399	1,642	1,132	1,327
Lowest rate	596	564	921	492	357	1,090	438	1,208
No. services	55,481	35,950	35,789	10,781	15,014	4,843	686	1,936



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

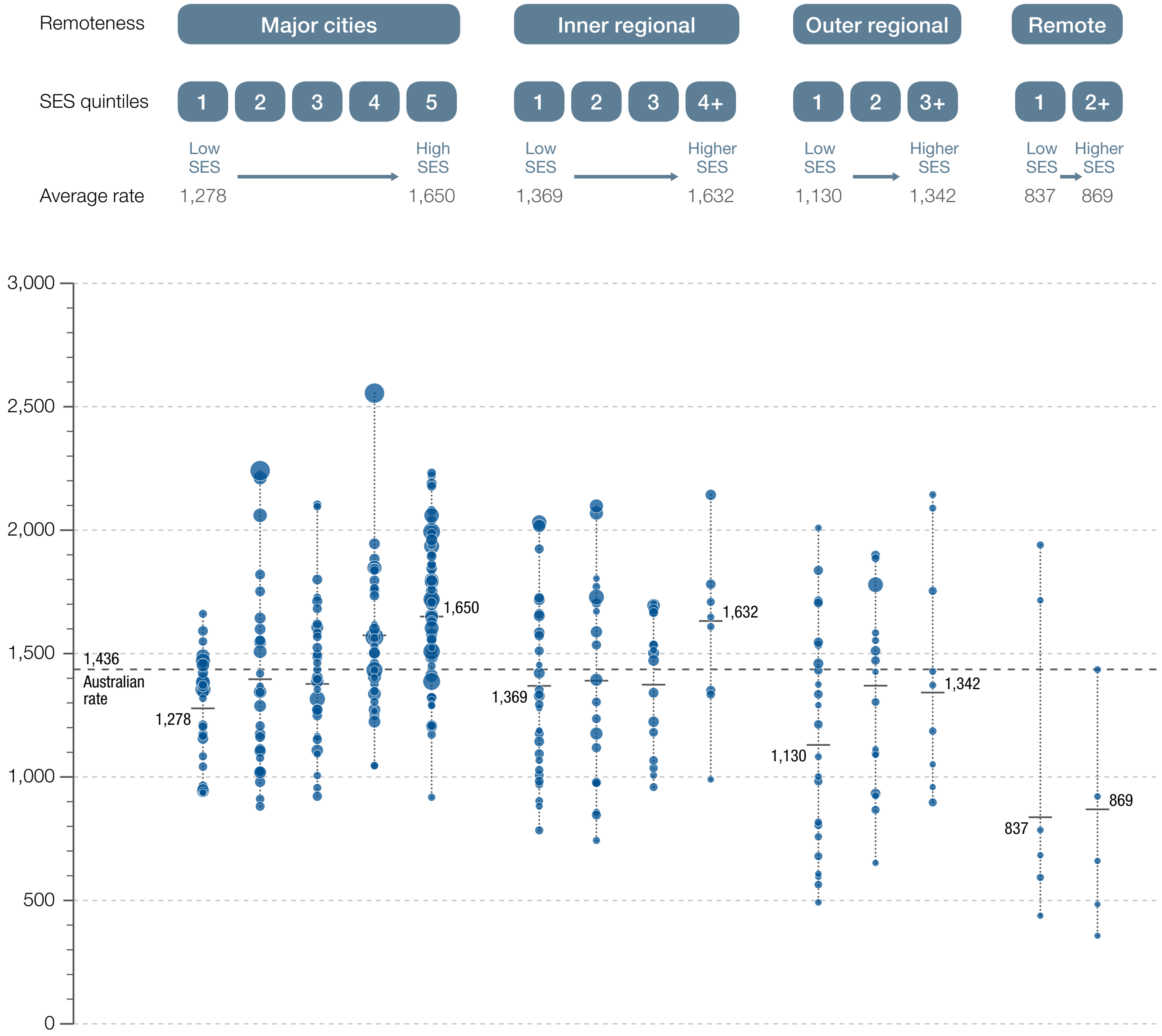
The size of each circle represents the number of services in each local area



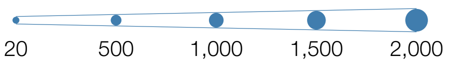
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of services and people in the geographic area.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 36: Number of MBS-funded services for cataract surgery per 100,000 people aged 40 years and over, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of services and people in Australia.
Average rates are based on the total number of services and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Cataract surgery 40 years and over

Resources

- American Academy of Ophthalmology Cataract and Anterior Segment Panel. American Academy of Ophthalmology. *Preferred Practice Pattern® guidelines*. Cataract in the Adult Eye. 2011. Available at: www.aao.org/ppp.

- Royal College of Ophthalmologists. *Cataract Surgery Guidelines*. 2010. Available at: www.rcophth.ac.uk/wp-content/uploads/2014/12/2010-SCI-069-Cataract-Surgery-Guidelines-2010-SEPTEMBER-2010.pdf.

- Australian Institute of Health and Welfare. *Eye health in Australia: A hospital perspective*. 2008. Available at: www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=6442459888.

1 Australian Institute of Health and Welfare. Vision problems among older Australians. Bulletin no. 27. Canberra: AIHW, 2005.
2 Randall DA, Reinten T, Maher L, Lujic S, Stewart J, Keay L, Leyland AH, Jorm LR. Disparities in cataract surgery between Aboriginal and non-Aboriginal people in New South Wales, Australia. Clinical and Experimental Ophthalmology 2014;42(7):629–36.
3 Australian Institute of Health and Welfare Australian hospital statistics 2011–12. Health services series no. 50. Cat. no. HSE 134. Canberra: AIHW, 2013.

3.3 Lumbar spine surgery hospital admissions 18 years and over

Context

This data item examines hospital admissions for lumbar spine surgery for people 18 years and over. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set. This includes both public and private hospitals. Rates are described as the number of admissions per 100,000 people. Repeat admissions for one person and transfers to other hospitals are both counted as separate admissions.

Lumbar spine surgery refers to any type of surgery in the lumbar spine or lower back. Most admissions for back surgery are for people aged 45 years and over.[1] Two common procedures are decompression and fusion.

Lumbar spine decompression (often termed 'laminectomy') is undertaken to relieve pain caused by nerve root pressure, usually caused by a herniated disc or spinal stenosis. It may involve removal of any or a combination of, herniated disc material, bone, thickened ligaments and arthritic facet joints in order to free trapped nerves. The indications for decompression surgery are well developed and accepted.[2]

Lumbar spine fusion surgery is performed to stabilise the spine, sometimes in combination with decompression surgery. It is also performed for painful degenerative conditions, deformity (scoliosis and spondylolisthesis) and trauma. Despite the increasing rate of fusion surgery, insufficient evidence is available to support its use for painful degenerative back conditions.[2]

Spinal surgery is usually the last resort in the treatment of back problems. Most back problems are managed non-operatively by general practitioners, physiotherapists and other primary care health professionals.

Lumbar spine surgery hospital admissions 18 years and over

Magnitude of variation

From 2010–11 to 2012–13, there were 17,305 lumbar spine surgery admissions to hospital on average per annum, representing 96 admissions per 100,000 people aged 18 years and over (the Australian rate).

The estimated annual number of lumbar spine surgery admissions to hospital across 322* local areas (SA3s) ranged from 36 to 173 per 100,000 people aged 18 years and over. The number of admissions was **4.8 times higher** in the area with the highest rate compared to the area with the lowest rate. The estimated annual average number of admissions varied across states and territories, from 60 per 100,000 people aged 18 years and over in the Australian Capital Territory, to 113 in Tasmania.

After excluding the highest and lowest results, the lumbar spine surgery hospital admission rate across the 297 remaining local areas was **2.3 times higher** in one local area compared to another.

Rates of admission for lumbar spine surgery were higher in inner regional areas than in major cities or outer regional areas, and lowest in remote areas. In major cities, inner regional areas and remote areas, rates increased with increasing socioeconomic status, but this socioeconomic correlation was not present in outer regional areas.

Interpretation

Potential reasons for the variation include differences in:

- clinicians adopting evidence-based practice in clinical decision making
- rates of private health insurance and access to private hospitals. Most lumbar spine surgery is performed in private hospitals.[3] Under-servicing in the public sector and over-servicing in the private sector could contribute to variation[3]
- patient and doctor preferences, particularly relating to lumbar spine fusion surgery
- the presence of risk factors for back pain such as obesity[4]
- the incidence and prevalence of back injury and back pain.

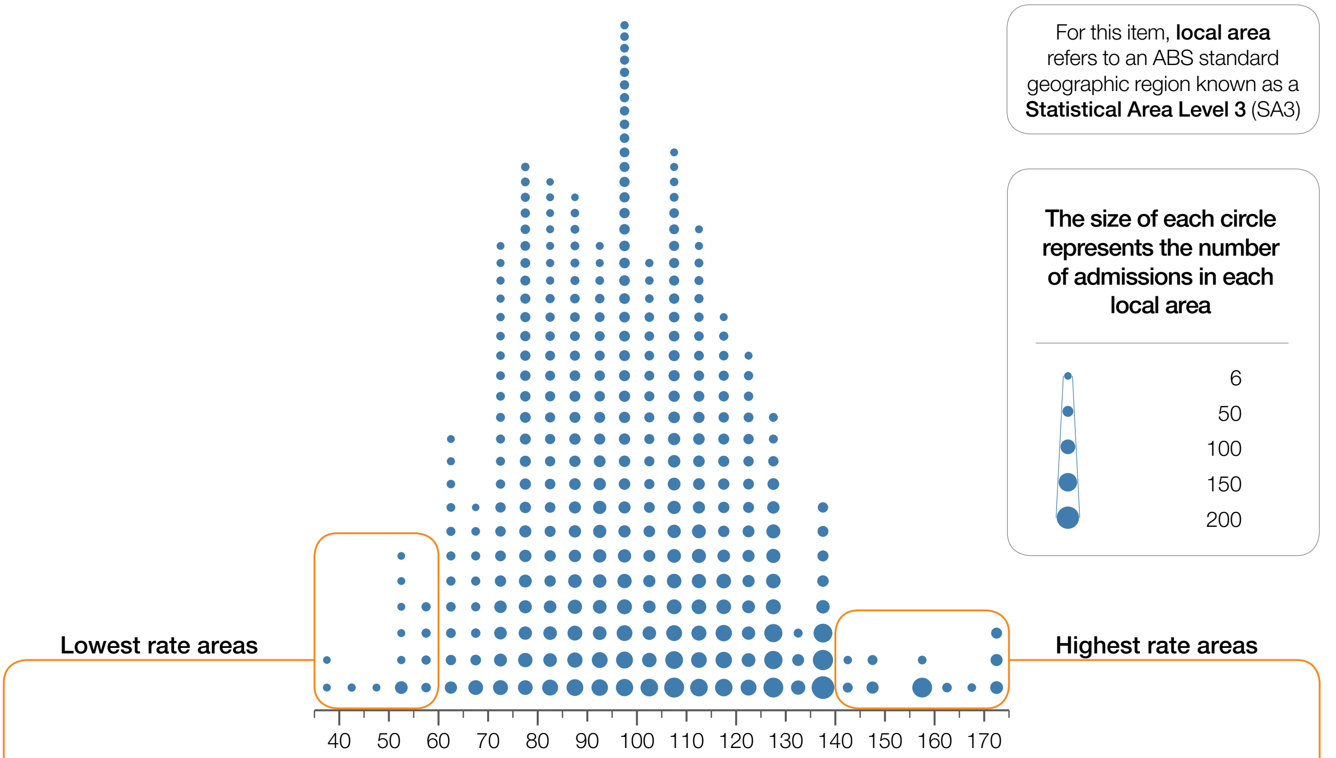
No obvious explanation exists for the higher admission rates in regional centres compared to major cities, and it is not possible to state how much variation is unwarranted. In addition, it is unclear whether the considerably higher rates in some states correlate with the higher rates in regional centres in those states or whether they are due to other factors.

To explore this variation, further analysis could focus on:

- identifying the reasons for the higher rates in regional centres
- accessing data that distinguishes between fusion and decompression surgery to help determine the extent to which variation represents clinician preferences, particularly relating to fusion surgery
- the influence of the private and public sectors on rates of lumbar spine surgery
- potential under-servicing of people without private health insurance. Data on waiting times for public outpatient clinic appointments, the waiting-list time for an operation once seen, and the indications for and type of surgery performed in the public hospital system would be useful in this regard. This data would also need to be compared with that for people with private insurance
- the relationship between higher rates of surgery and access to non-surgical forms of treatment such as physiotherapy and pain clinics.

*There are 333 SA3s. For this item, data were suppressed for 11 SA3s. This is because of confidentiality requirements given the small numbers of admissions in these areas.

Figure 37: Estimated annual number of lumbar spine surgery admissions to hospital per 100,000 people aged 18 years and over, age standardised, by local area, 2010–11 to 2012–13



Lumbar spine surgery hospital admissions 18 years and over, by local area (each circle represents an area)

Local area	State	Rate	Admissions
Far North	Qld	36	8
Alice Springs	NT	39	11
North Canberra	ACT	42	15
Kimberley	WA	49	11
Outback - North and East	SA	50	12
Weston Creek	ACT	52	11
Dandenong	Vic	53	74
South Canberra	ACT	53	11
Katherine	NT	53	8
Gungahlin	ACT	54	16
Pilbara	WA	55	29
Port Adelaide - East	SA	56	28
Maribyrnong	Vic	58	32
Port Adelaide - West	SA	59	28

Local area	State	Rate	Admissions
Hobart - North East	Tas	173	75
Wollondilly	NSW	172	51
Camden	NSW	170	65
Brighton	Tas	167	20
Dural - Wisemans Ferry	NSW	161	33
Eastern Suburbs - North	NSW	159	167
Serpentine - Jarrahdale	WA	157	22
Southern Highlands	NSW	147	67
Hobart - South and West	Tas	145	38
Richmond - Windsor	NSW	143	38
Sorell - Dodges Ferry	Tas	142	18

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

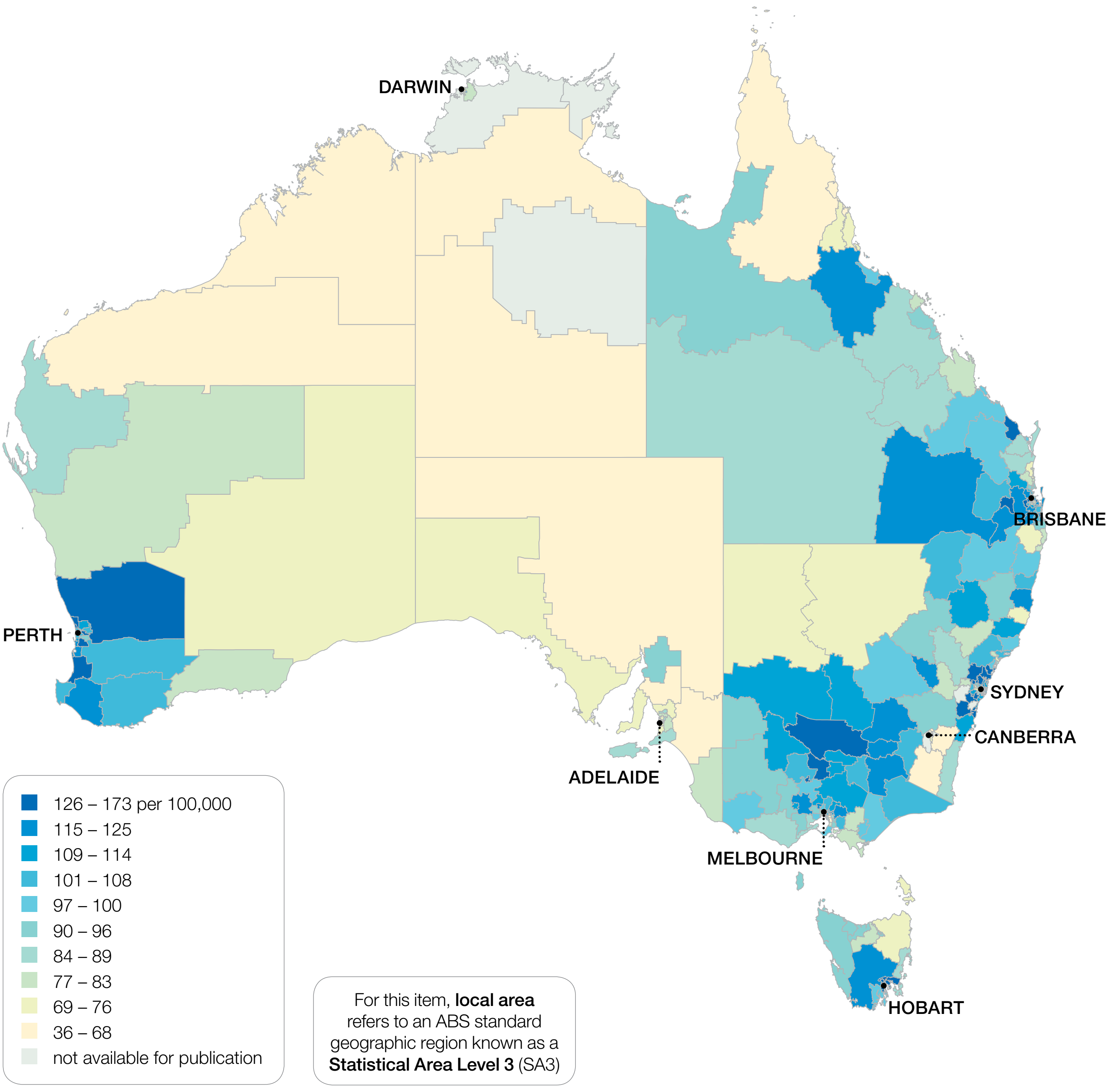
Includes all public hospitals, private hospitals and day hospital facilities.
The rate and number of admissions is the average per annum over three years.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Lumbar spine surgery hospital admissions 18 years and over

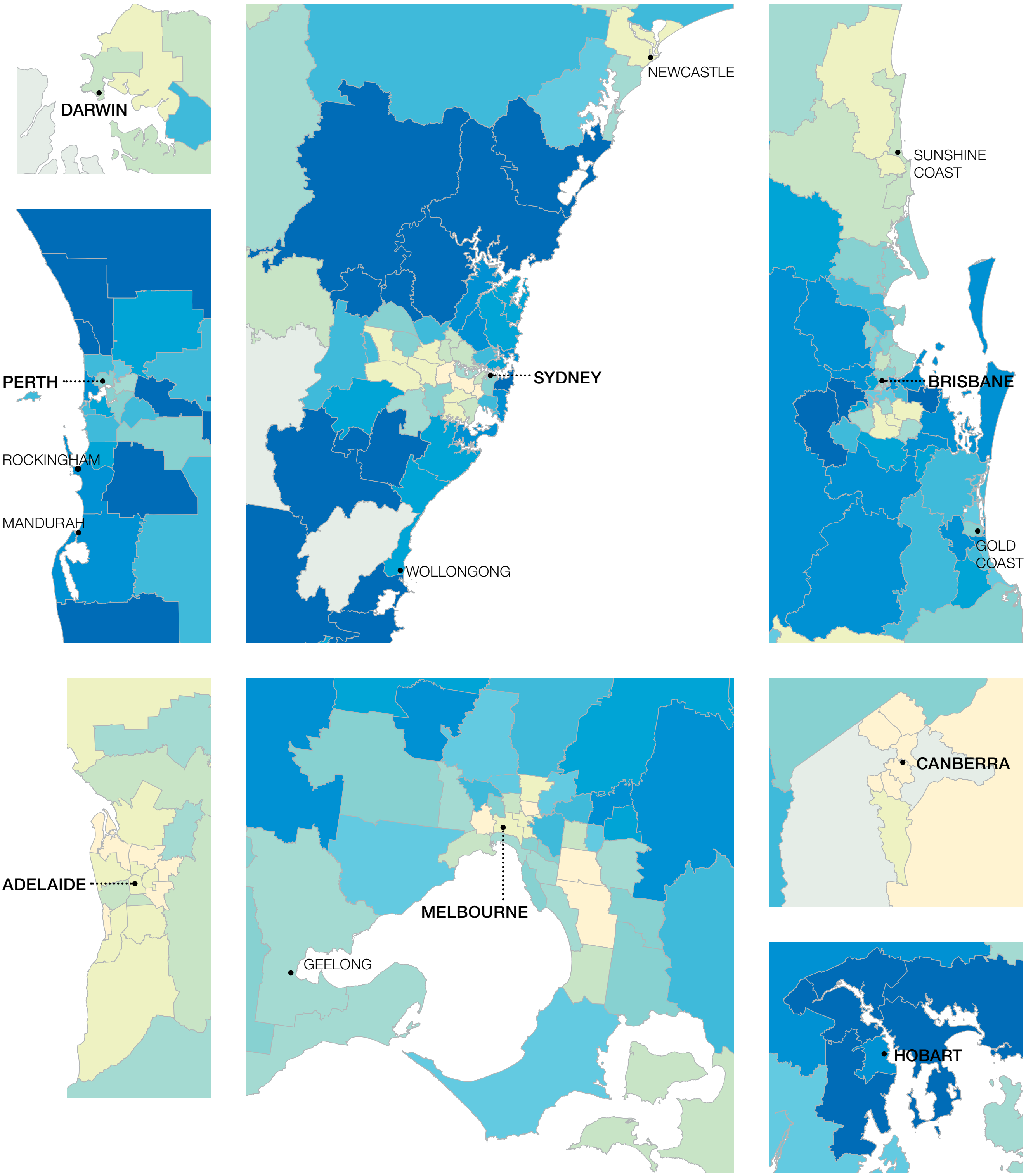
Figure 38: Estimated annual number of lumbar spine surgery admissions to hospital per 100,000 people aged 18 years and over, age standardised, by local area, 2010–11 to 2012–13



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The estimated annual number of lumbar spine surgery admissions to hospital across 322 local areas (SA3s) ranged from 36 to 173 per 100,000 people aged 18 years and over. The number of admissions was **4.8 times higher** in the area with the highest rate compared to the area with the lowest rate.

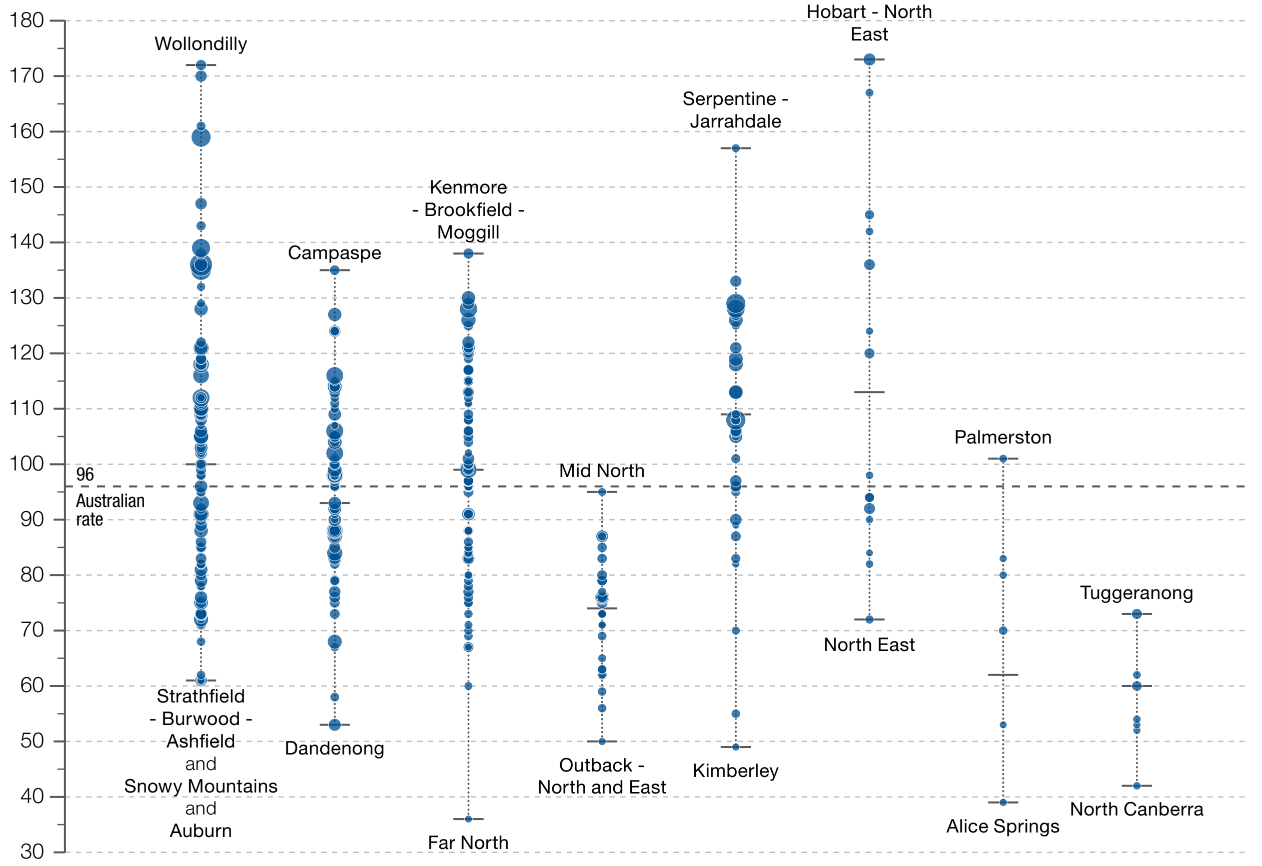


Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Lumbar spine surgery hospital admissions 18 years and over

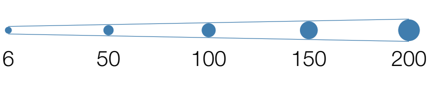
Figure 39: Estimated annual number of lumbar spine surgery admissions to hospital per 100,000 people aged 18 years and over, age standardised, by local area, state and territory, 2010–11 to 2012–13

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	172	135	138	95	157	173	101	73
State/territory	100	93	99	74	109	113	62	60
Lowest rate	61	53	36	50	49	72	39	42
No. admissions	5,867	4,160	3,477	1,005	2,028	480	101	165



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

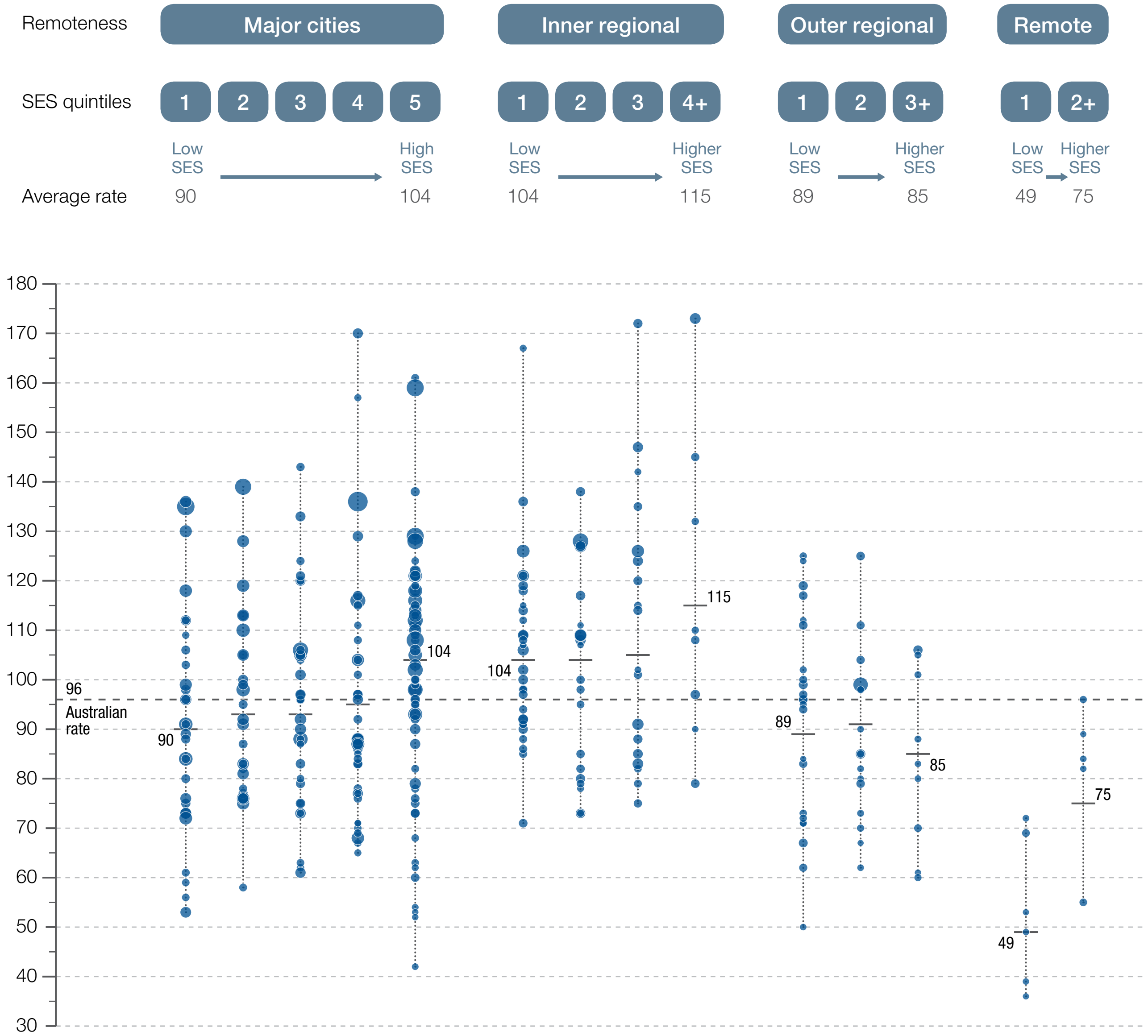
The size of each circle represents the number of admissions in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 40: **Estimated annual number of lumbar spine surgery admissions to hospital per 100,000 people aged 18 years and over, age standardised, by local area, remoteness and socioeconomic status (SES), 2010–11 to 2012–13**



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of admissions in each local area

6 50 100 150 200

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of admissions and people in Australia.
Average rates are based on the total number of admissions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Lumbar spine surgery hospital admissions 18 years and over

Resources

- North American Spine Society. *Evidence-Based Clinical Guidelines for Multidisciplinary Spine Care – Diagnosis and Treatment of Degenerative Lumbar Spinal Stenosis*. 2011. Available at: www.spine.org/Documents/ResearchClinicalCare/Guidelines/LumbarStenosis.pdf.
- North American Spine Society. *Evidence-based Clinical Guidelines for Multidisciplinary Spine Care – Diagnosis and Treatment of Degenerative Lumbar Spondylolisthesis*. 2014. Available at: www.spine.org/Documents/ResearchClinicalCare/Guidelines/Spondylolisthesis.pdf.
- North American Spine Society. *Evidence-Based Clinical Guidelines for Multidisciplinary Spine Care – Diagnosis and Treatment of Lumbar Disc Herniation with Radiculopathy*. 2012. Available at: www.spine.org/Portals/0/Documents/ResearchClinicalCare/Guidelines/LumbarDiscHerniation.pdf.

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1 Australian Institute of Health and Welfare. What role do hospitals play in treating back problems? 2015. (Accessed 6 October 2015 at: www.aihw.gov.au/back-problems/treatment-by-hospitals/).
2 Gibson JN, Grant IC, Waddell G. The Cochrane review of surgery for lumbar disc prolapse and degenerative lumbar spondylosis. Spine 24.17. 1999;1820–32.
3 Harris IA, Dao ATT. Trends of spinal fusion surgery in Australia: 1997 to 2006. ANZJS. 2009;79(11):783–8.
4 Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juntura E. The association between obesity and low back pain: a meta-analysis. AJE. 2010;171(2):135–54.

3.4 Radical prostatectomy hospital admissions 40 years and over

Context

This data item examines hospital admission for radical prostatectomy in men aged 40 years and over. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set. This includes both public and private hospitals. Rates are described as the number of admissions per 100,000 people. Repeat admissions for one person and transfers to other hospitals are both counted as separate admissions.

Radical prostatectomy is a treatment option for prostate cancer. The prostate is an organ that is part of the male reproductive system. It is located immediately below the bladder and just in front of the bowel. Its main function is to produce fluid that protects and enriches sperm.

Prostate cancer is the most commonly diagnosed cancer in Australia. It is the fourth leading cause of death among Australian males[1] and the second leading cause of male cancer death.[1] The strongest risk factors for prostate cancer are age and genetic or family history. Prostate cancer in men is rare under the age of 50.[2]

Radical prostatectomy involves removing the prostate gland and the seminal vesicles, which are small glands located immediately above the prostate that produce seminal fluid. Three other evidence-based approaches to management of prostate cancer are active surveillance, radiotherapy and androgen deprivation therapy. These are both clinically valid management options for prostate cancer, reporting similar 10-year survival rates to radical prostatectomy.[3,4]

Radical prostatectomy is indicated for men who:

- have localised prostate cancer
- are fit for surgery
- have a life expectancy of greater than seven years.

Radical prostatectomy hospital admissions 40 years and over

Magnitude of variation

In 2012–13, there were 8,496 radical prostatectomy admissions to hospital, representing 150 admissions per 100,000 men aged 40 years and over (the Australian rate).

The number of radical prostatectomy admissions to hospital across 82* local areas (SA4s) ranged from 69 to 282 per 100,000 men aged 40 years and over. The number of admissions was **4.1 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of admissions varied across states and territories, from 64 per 100,000 men aged 40 years and over in the Northern Territory, to 211 in the Australian Capital Territory.

After excluding the highest and lowest results, the radical prostatectomy hospital admission rate across the 67 remaining local areas was **2.2 times higher** in one local area compared to another.

Interpretation

The number of radical prostatectomies was relatively small, even at the SA4 level, increasing the likelihood that chance fluctuations might influence the observed variation.

Potential reasons for the variation include differences in:

- rates of surgical versus non-surgical management options
- ability to access specialist surgical urological services in some locations, particularly in regional and rural areas, where rates of radical prostatectomy are estimated to be 29 per cent lower than in the capital cities[5]
- the availability of radiation therapy services, leading to referrals for this treatment modality rather than surgery
- the uptake of routine prostate examination and prostate-specific antigen testing. Reduced rates of radical prostatectomy are observed among men from socioeconomically disadvantaged backgrounds; those whose access to services may be compromised by geography; and those without private health insurance'.[6]

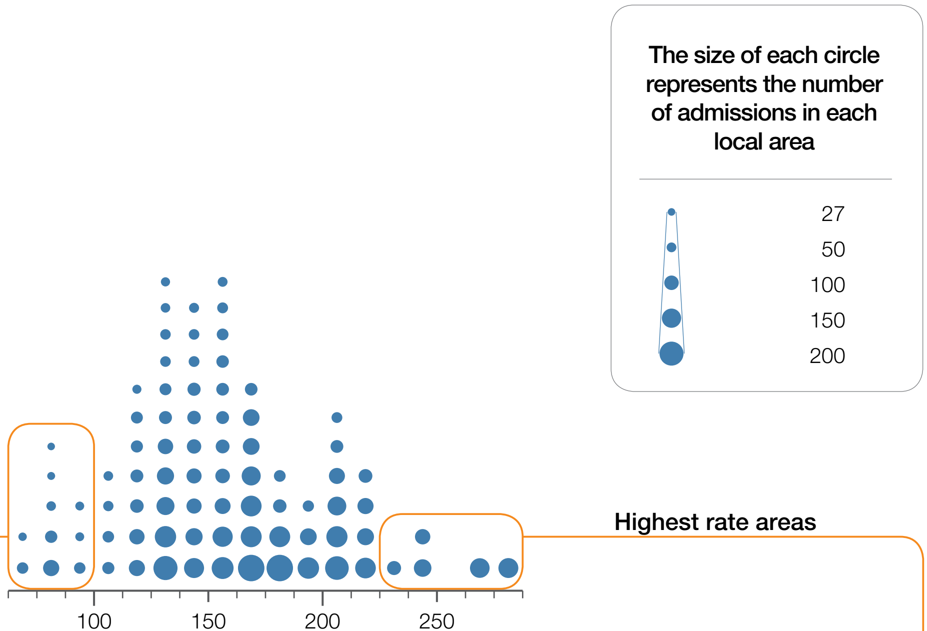
To explore this variation, further analysis could focus on:

- exploring opportunities for linkage of cancer registration data with data for hospital admissions and outpatient treatment to enable analysis of variations for radical prostatectomy surgery and radiation therapy for prostate cancer[7]
- more detailed data mapping within smaller geographical areas (such as inner and outer regions of major cities or regional areas within each state) and analysis of the split between public and private admissions to develop a more comprehensive understanding of local variation.

*There are 88 SA4s. For this item, data were suppressed for 6 SA4s. This is because of confidentiality requirements given the small numbers of admissions in these areas.

Figure 41: Number of radical prostatectomy admissions to hospital per 100,000 men aged 40 years and over, age standardised, by local area, 2012–13

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 4** (SA4)



Radical prostatectomy hospital admissions 40 years and over, by local area (each circle represents an area)

Local area	State	Rate	Admissions
Western Australia - Outback	WA	69	36
Adelaide - North	SA	73	68
Barossa - Yorke - Mid North	SA	79	27
Adelaide - West	SA	85	48
Latrobe - Gippsland	Vic	86	77
Warrnambool and South West	Vic	86	31
Melbourne - West	Vic	87	118
Bendigo	Vic	94	41
Ballarat	Vic	95	41
Geelong	Vic	96	68

Local area	State	Rate	Admissions
New England and North West	NSW	282	157
Sydney - Baulkham Hills and Hawkesbury	NSW	265	154
Brisbane Inner City	Qld	239	109
Sydney - Sutherland	NSW	238	132
Riverina	NSW	230	95

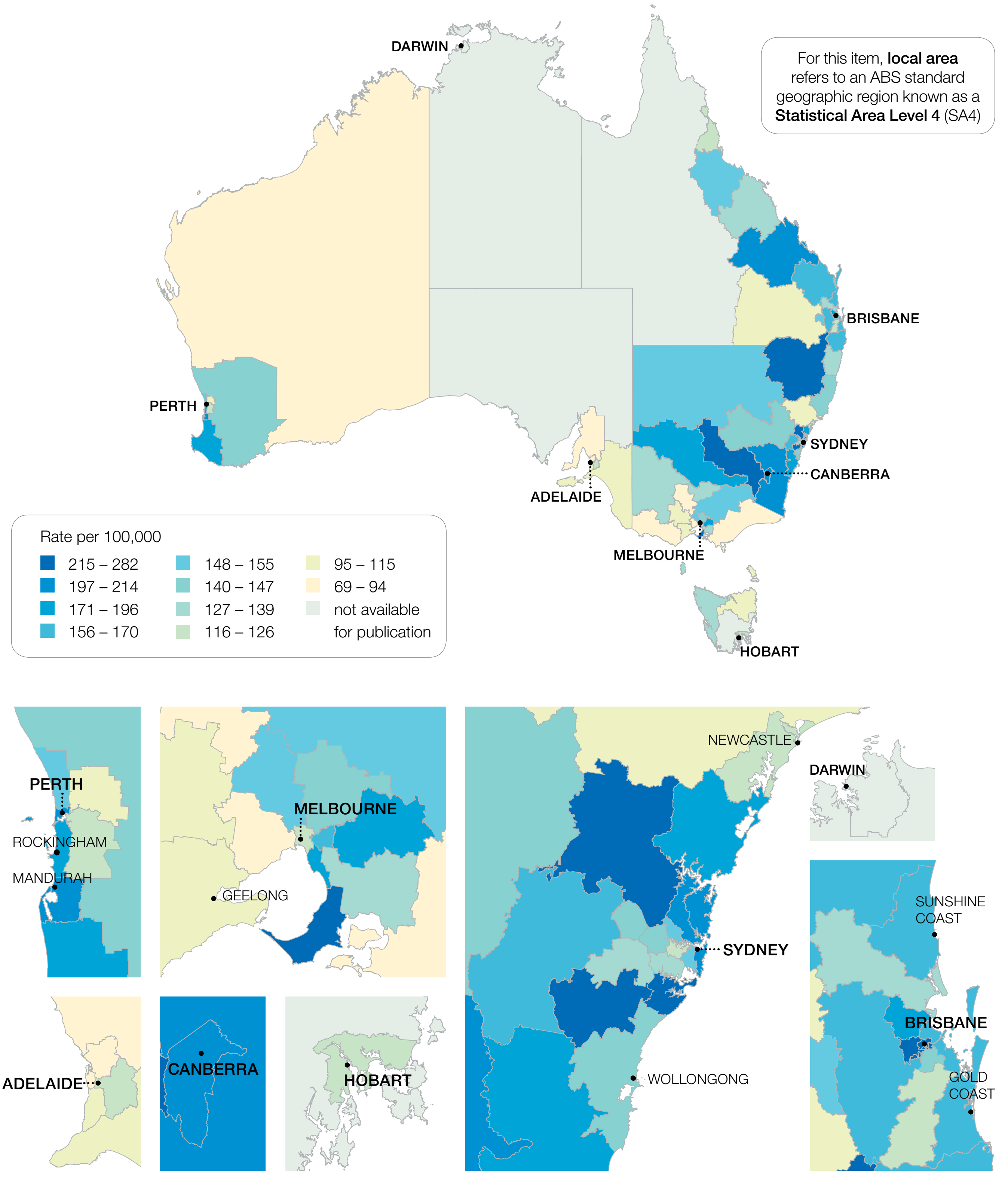
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and men in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 4 (SA4).
Includes all public hospitals, private hospitals and day hospital facilities.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Radical prostatectomy hospital admissions 40 years and over

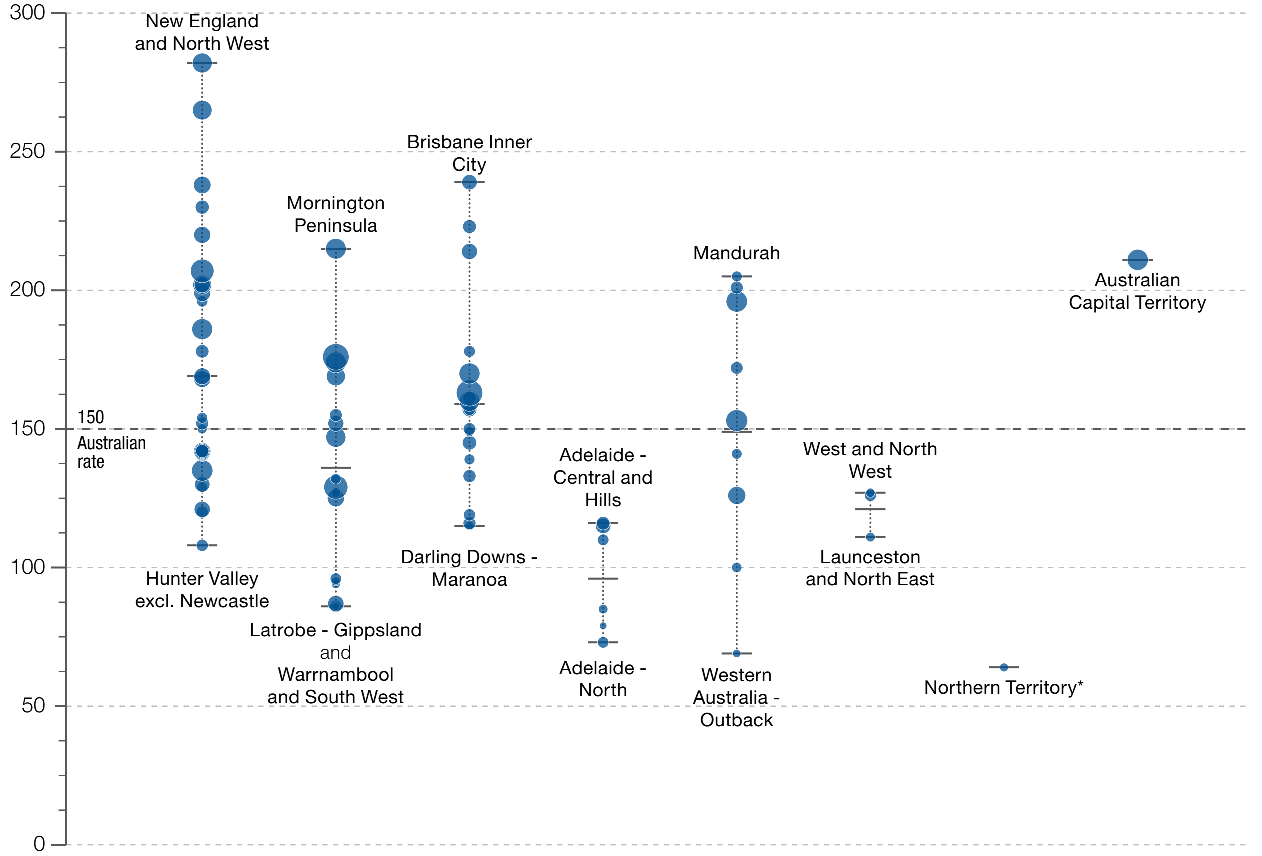
Figure 42: **Number of radical prostatectomy admissions to hospital per 100,000 men aged 40 years and over, age standardised, by local area, 2012–13**



Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

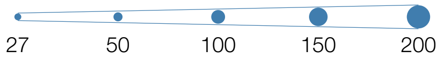
Figure 43: Number of radical prostatectomy admissions to hospital per 100,000 men aged 40 years and over, age standardised, by local area, state and territory, 2012–13

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	282	215	239	116	205	127		211
State/territory	169	136	159	96	149	121	64	211
Lowest rate	108	86	115	73	69	111		211
No. admissions	3,131	1,869	1,801	425	862	183	33	170



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 4** (SA4)

The size of each circle represents the number of admissions in each local area



*The overall rate for the Northern Territory is lower than the minimum published SA4 rate as it includes the SA4 rates for Darwin and Outback Northern Territory that have been suppressed due to the small numbers of admissions in these areas.

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and men in the geographic area.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Radical prostatectomy hospital admissions 40 years and over

Resources

- Prostate Cancer Foundation of Australia and Cancer Council Australia. *Clinical Practice Guidelines: PSA Testing and Early Management of Test-Detected Prostate Cancer* (consultation draft 2015). Available at: www.prostate.org.au/media/418708/PSA-Testing-Draft-Clinical-Practice-Guidelines.pdf.

- National Institute for Health and Care Excellence. Prostate Cancer: diagnosis and treatment. *Clinical Guideline*. 2014. Available at: www.nice.org.uk/guidance/cg175/resources/guidance-prostate-cancer-diagnosis-and-treatment-pdf

- Australian Institute of Health and Welfare. *Prostate cancer in Australia*. Cancer series no. 79. 2013. Available at: www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129545133.

- Victorian Prostate Cancer Clinical Registry. *Five-Year Report*. 2015. Available at: http://pcr.registry.org.au/Files/Annual%20Reports/Vic%20PCR%20Five%20Year%20Report.pdf.

1 Australian Institute of Health and Welfare. Prostate cancer in Australia. Cancer series no. 79. Cat. no. CAN 76. Canberra: AIHW, 2013.
2 Alam N, You H, Banks C, Baker D, Bishop J. Prostate cancer in New South Wales. Sydney: Cancer Institute NSW, 2009.
3 Boorjian SA, Karnes RJ, Viterbo R, Rangel LJ, et al. Long-term survival after radical prostatectomy versus external-beam radiotherapy for patients with high-risk prostate cancer. Cancer. 2011;117(13):2883–91.
4 Klotz L, Zhang L, Lam A, Nam R, et al. Clinical results of long-term follow-up of a large, active surveillance cohort with localized prostate cancer. JCO.2010;28(1):126–31.
5 Coory MD, Baade PD. Urban-rural differences in prostate cancer mortality, radical prostatectomy and prostate-specific antigen testing in Australia. MJA. 2005;182(3):112–15.
6 Hall SE, Holman CAJ, Wisniewski ZS, Semmens J. Prostate cancer: socio-economic, geographical and private-health insurance effects on care and survival. BJU International. 2005;95(1):51–8.
7 Evans S, Millar J, Wood J, Davis I, Bolton D, Giles G, Frydenberg M, Frauman A, Costello A, McNeil J. The Prostate Cancer Registry: monitoring patterns and quality of care for men diagnosed with prostate cancer. BJU International, 2013;111,(4b)158–166.

3.5 Hysterectomy and endometrial ablation hospital admissions

Context

This data item examines hospital admissions for hysterectomy and endometrial ablation for women 40 years and over. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set. This includes both public and private hospitals. Rates are described as the number of admissions per 100,000 people. Repeat admissions for one person and transfers to other hospitals are both counted as separate admissions.

Hysterectomy and endometrial ablation are surgical procedures used to treat heavy menstrual bleeding.

Hysterectomy is an operation in which the uterus (womb) is removed. In some cases, the ovaries and/or fallopian tubes are also removed. Common indications for hysterectomy include heavy menstrual bleeding, fibroids and uterine prolapse. Less common indications include chronic pelvic pain, severe endometriosis, endometrial hyperplasia and endometrial cancer. A hysterectomy can be undertaken through abdominal, vaginal or laparoscopic surgery.

Endometrial ablation is a surgical procedure to permanently remove the lining of the uterus, commonly via electrical or thermal (heat) ablation. It is used to treat abnormally heavy menstrual bleeding (menorrhagia), which is commonly caused by hormonal disorders (frequently termed dysfunctional uterine bleeding). Endometrial ablation is less suitable if the bleeding is caused by larger uterine fibroids. Endometrial ablation may be performed where non-surgical treatments, for example, hormonal medications, non-steroidal anti-inflammatory medications or hormone-releasing intrauterine devices have not been effective.

Both endometrial ablation and hysterectomy are effective for treating heavy menstrual bleeding. While hysterectomy is associated with a longer operating time, a longer recovery period and higher rates of post-operative complications, it offers permanent relief from heavy menstrual bleeding.[1]

A hormone-releasing intrauterine device can be an effective alternative to hysterectomy and endometrial ablation for heavy menstrual bleeding. However, for women who have large fibroids, the hormone-releasing intrauterine device is much less likely to be effective.

Hysterectomy and endometrial ablation hospital admissions

Magnitude of variation

In 2012–13, there were 34,181 hysterectomy and endometrial ablation admissions to hospital, representing 297 admissions per 100,000 women (the Australian rate).

The number of hysterectomy and endometrial ablation admissions to hospital across 315* local areas (SA3s) ranged from 131 to 687 per 100,000 women. The number of admissions was **5.2 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of admissions varied across states and territories, from 225 per 100,000 women in the Northern Territory, to 349 in Western Australia.

After excluding the highest and lowest results, the hysterectomy and endometrial ablation hospital admission rate across the 296 remaining local areas was **3.3 times higher** in one local area compared to another.

Admission rates for endometrial ablation or hysterectomy were markedly higher in inner and outer regional areas than in major cities or in remote areas. There was no clear link between rates and socioeconomic status.

Interpretation

Potential reasons for the variation include differences in:

- the criteria used by doctors when deciding what treatment to recommend
- use of the hormone-releasing intrauterine device by general practitioners and specialists
- decision-making criteria of clinicians and patients in assessing the need for hysterectomy and endometrial ablation
- availability of specialists, who may regard travel to very remote areas as a significant barrier.

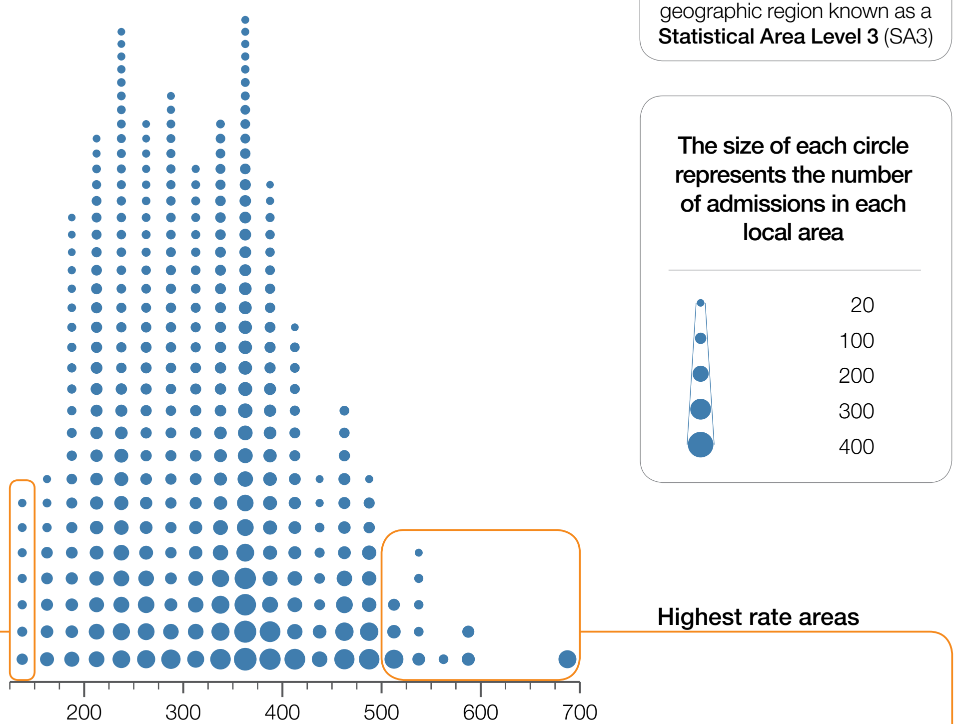
To explore this variation, further analysis could focus on:

- separating the data for ablation and hysterectomy to review the variation for each procedure
- opportunities for data linkage to map admission data against rates of dispensing for hormone-releasing intrauterine devices to determine whether lower use can be linked to higher rates of endometrial ablation and hysterectomy
- the influence of the private and public sectors on rates of ablation and hysterectomy.

*There are 333 SA3s. For this item, data were suppressed for 18 SA3s. This is because of confidentiality requirements given the small numbers of admissions in these areas.

Figure 44: Number of hysterectomy and endometrial ablation admissions to hospital per 100,000 women, age standardised, by local area, 2012–13

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)



Hysterectomy and endometrial ablation hospital admissions, by local area (each circle represents an area)

Local area	State	Rate	Admissions
Melbourne City	Vic	131	49
Sydney Inner City	NSW	137	99
Darebin - South	Vic	144	39
Yarra	Vic	146	56
Maribyrnong	Vic	147	54
Port Phillip	Vic	149	73
Carlingford	NSW	149	52

Local area	State	Rate	Admissions
Latrobe Valley	Vic	687	240
Burnie - Ulverstone	Tas	589	137
Goldfields	WA	577	116
Maryborough - Pyrenees	Vic	553	65
Manjimup	WA	545	60
Loddon - Elmore	Vic	541	28
Mid North	SA	535	65
Serpentine - Jarrahdale	WA	527	54
Taree - Gloucester	NSW	527	130
Grampians	Vic	513	145
Bunbury	WA	511	260
Kempsey - Nambucca	NSW	504	112

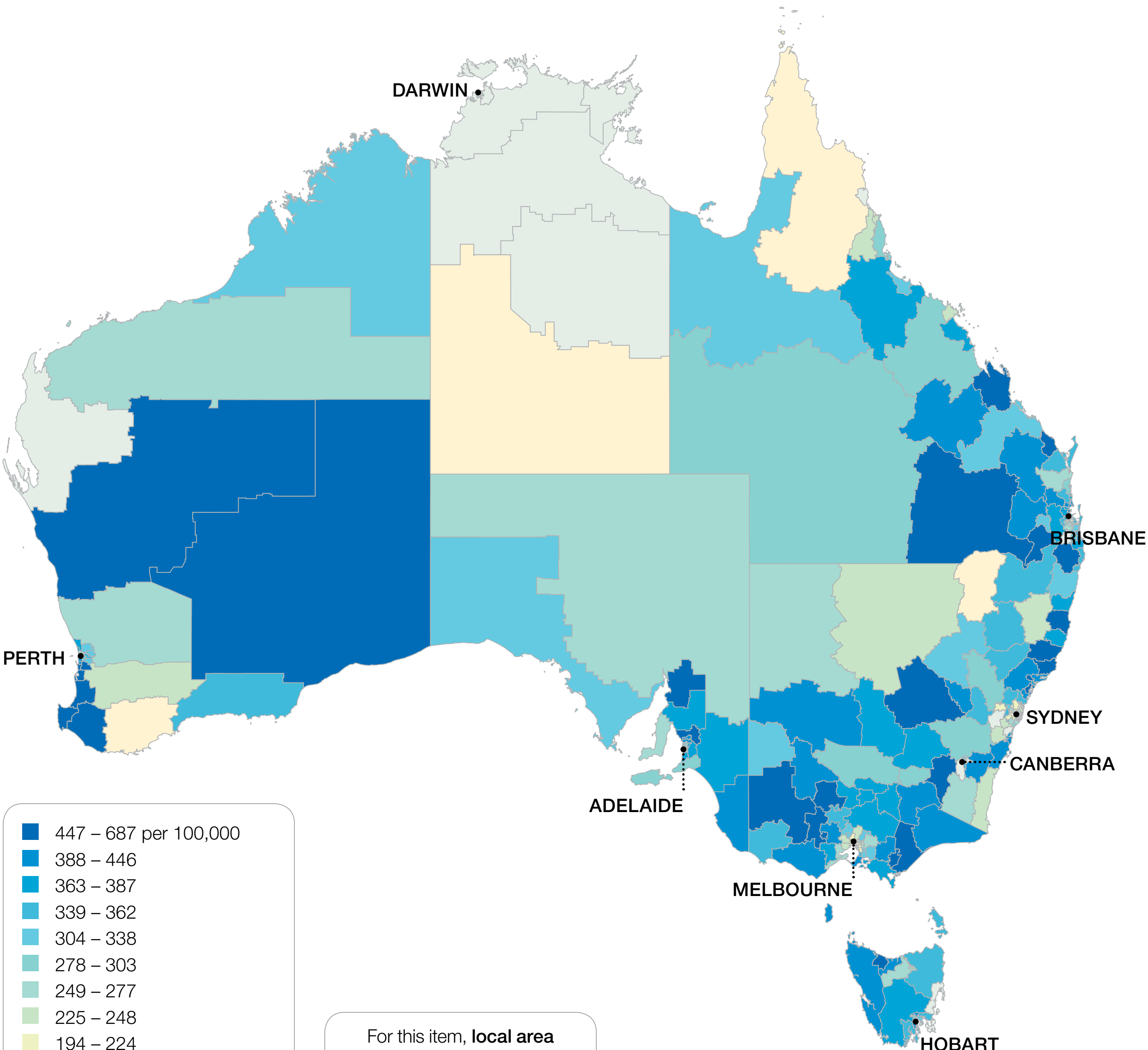
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and women in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
Includes all public hospitals, private hospitals and day hospital facilities.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Hysterectomy and endometrial ablation hospital admissions

Figure 45: Number of hysterectomy and endometrial ablation admissions to hospital per 100,000 women, age standardised, by local area, 2012–13

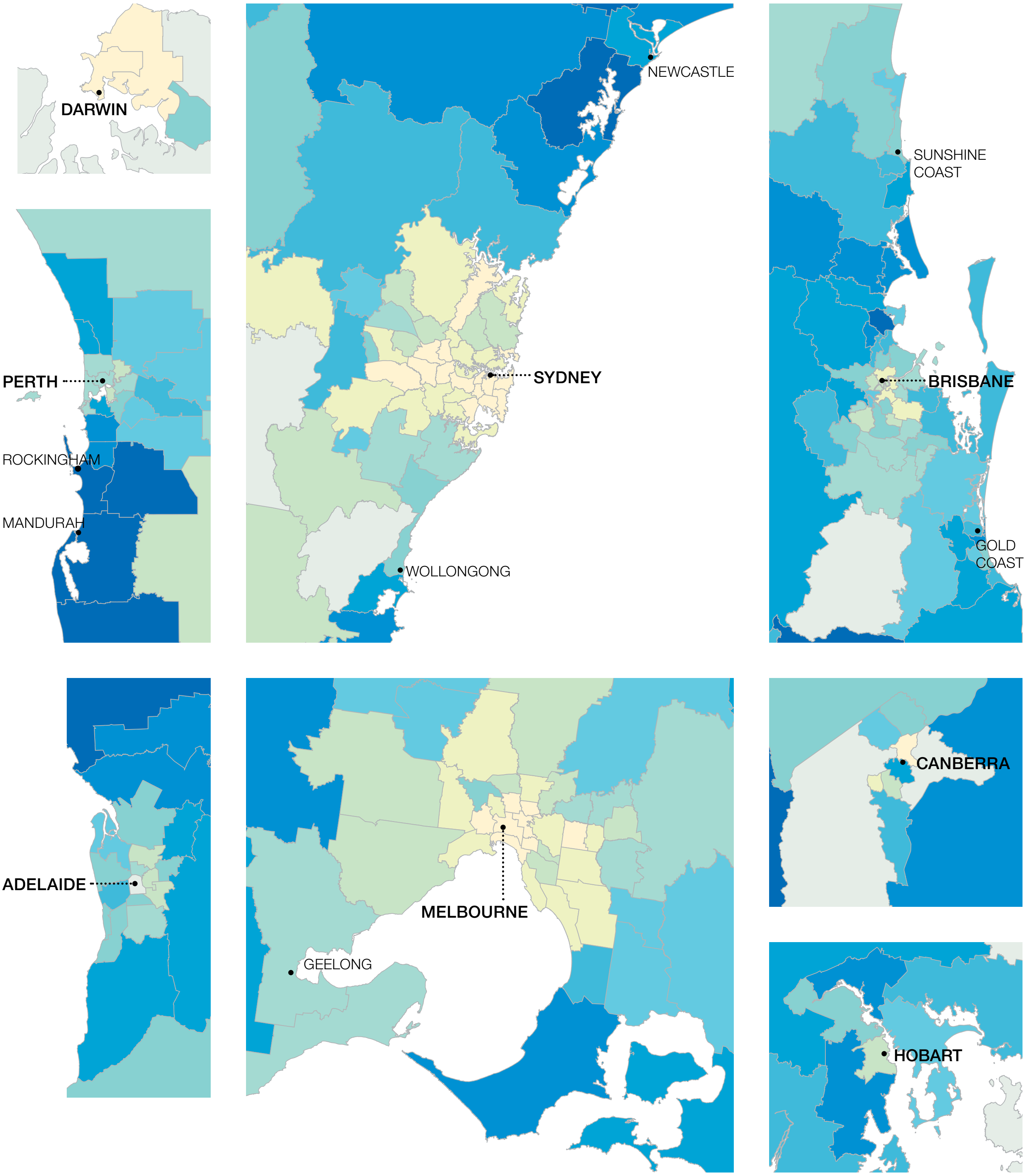


447 – 687 per 100,000
388 – 446
363 – 387
339 – 362
304 – 338
278 – 303
249 – 277
225 – 248
194 – 224
131 – 193
not available for publication

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of hysterectomy and endometrial ablation admissions to hospital across 315 local areas (SA3s) ranged from 131 to 687 per 100,000 women. The number of admissions was **5.2 times higher** in the area with the highest rate compared to the area with the lowest rate.

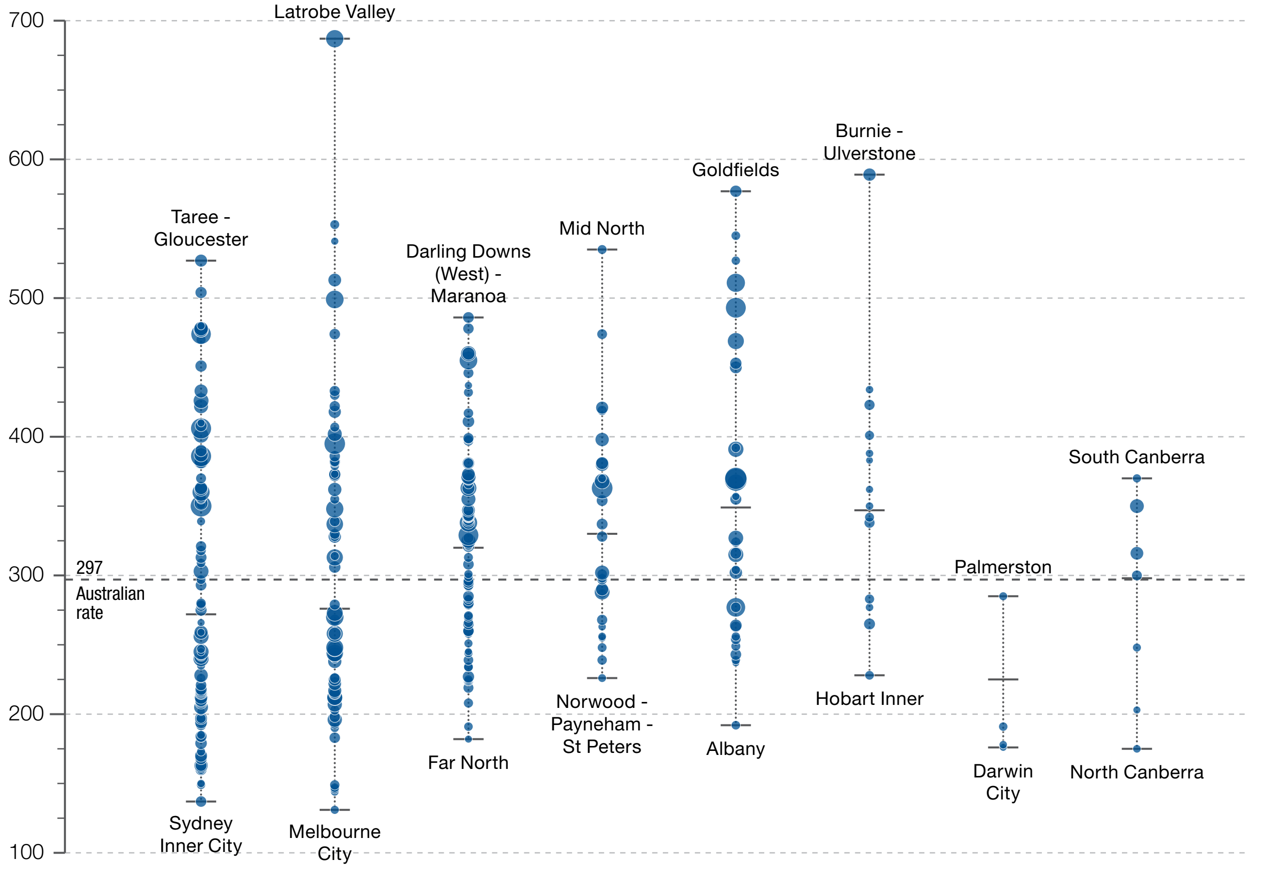


Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Hysterectomy and endometrial ablation hospital admissions

Figure 46: Number of hysterectomy and endometrial ablation admissions to hospital per 100,000 women, age standardised, by local area, state and territory, 2012–13

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	527	687	486	535	577	589	285	370
State/territory	272	276	320	330	349	347	225	298
Lowest rate	137	131	182	226	192	228	176	175
No. admissions	10,042	8,008	7,366	2,782	4,275	874	250	558



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

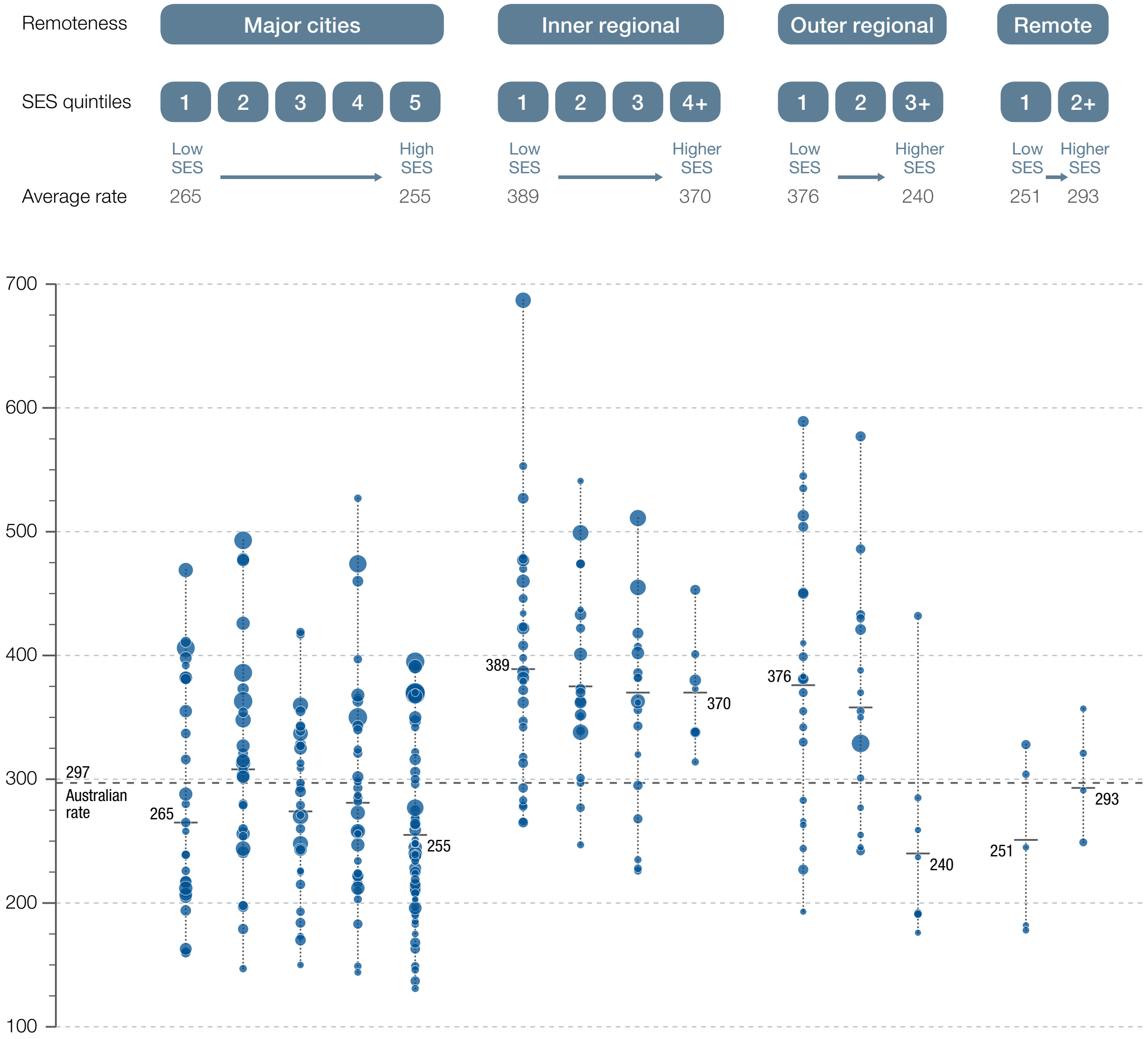
The size of each circle represents the number of admissions in each local area

20 100 200 300 400

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and women in the geographic area.

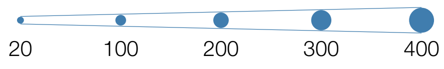
Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 47: Number of hysterectomy and endometrial ablation admissions to hospital per 100,000 women, age standardised, by local area, remoteness and socioeconomic status (SES), 2012–13



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of admissions in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of admissions and women in Australia.
Average rates are based on the total number of admissions and women in the local areas within each group.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Hysterectomy and endometrial ablation hospital admissions

Resources

- American College of Obstetricians and Gynecologists – Committee on Gynecological Practice. *Management of Acute Abnormal Uterine Bleeding in Non-Pregnant Reproductive Aged Women*. 2013. Available at: www.acog.org/-/media/Committee-Opinions/Committee-on-Gynecologic-Practice/co557.pdf?dmc=1&ts=20150713T0336418910.

- Royal College of Obstetricians and Gynaecologists. *Standards for Gynaecology: Report of a Working Party*. 2008. Available at: www.rcog.org.uk/globalassets/documents/guidelines/wprgynstandards2008.pdf.

- Royal College of Obstetricians and Gynaecologists. *National Heavy Menstrual Bleeding Audit: A national audit to assess patient outcomes and experiences of care for women with heavy menstrual bleeding in England and Wales*. 2011. Available at: www.rcog.org.uk/globalassets/documents/guidelines/research--audit/nationalhmbaudit_1stannualreport_may2011_generalpublicsummary.pdf.

1 Fergusson RJ, Lethaby A, Shepperd S, Farquhar C. Endometrial resection and ablation versus hysterectomy for heavy menstrual bleeding. Cochrane Database of Systematic Reviews. 2013;Issue 11.

3.6 Tonsillectomy hospital admissions 17 years and under

Context

This data item examines hospital admissions for tonsillectomy for children aged 17 years and under. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set. This includes both public and private hospitals. Rates are described as the number of admissions per 100,000 people. Repeat admissions for one person and transfers to other hospitals are both counted as separate admissions.

Tonsillectomy is a surgical procedure to remove the tonsils (palatine tonsils), which are soft tissue masses on each side at the back of the throat.

Tonsils are prone to inflammation and enlargement that can lead to tonsillitis. In some children, significant enlargement of the tonsils may cause breathing problems or sleep apnoea.

International evidence-based guidelines recommend that watchful waiting is more appropriate than tonsillectomy for children with mild sore throats.[1]

The indications for tonsillectomy in children and young people include[2]:

- frequent recurring bouts of acute tonsillitis
- peritonsillar abscess
- suspected tumour or abnormality
- frequent ear infections associated with tonsillitis and/or adenoid infection
- upper airway obstruction in children with obstructive sleep apnoea
- failing to thrive because of difficulty in swallowing.

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Tonsillectomy hospital admissions 17 years and under

Magnitude of variation

In 2012–13, there were 38,575 tonsillectomy admissions to hospital, representing 724 admissions per 100,000 people aged 17 years and under (the Australian rate).

The number of tonsillectomy admissions to hospital across 315* local areas (SA3s) ranged from 254 to 1,640 per 100,000 people aged 17 years and under. The number of admissions was **6.5 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of admissions varied across states and territories, from 388 per 100,000 people aged 17 years and under in the Northern Territory, to 898 in South Australia.

After excluding the highest and lowest results, the tonsillectomy hospital admission rate across the 290 remaining local areas was **3.0 times higher** in one local area compared to another.

There was no pattern in the admission rates for tonsillectomy and socioeconomic status. Rates were highest in inner regional areas and lowest in remote areas.

Interpretation

Potential reasons for the variation include differences in:

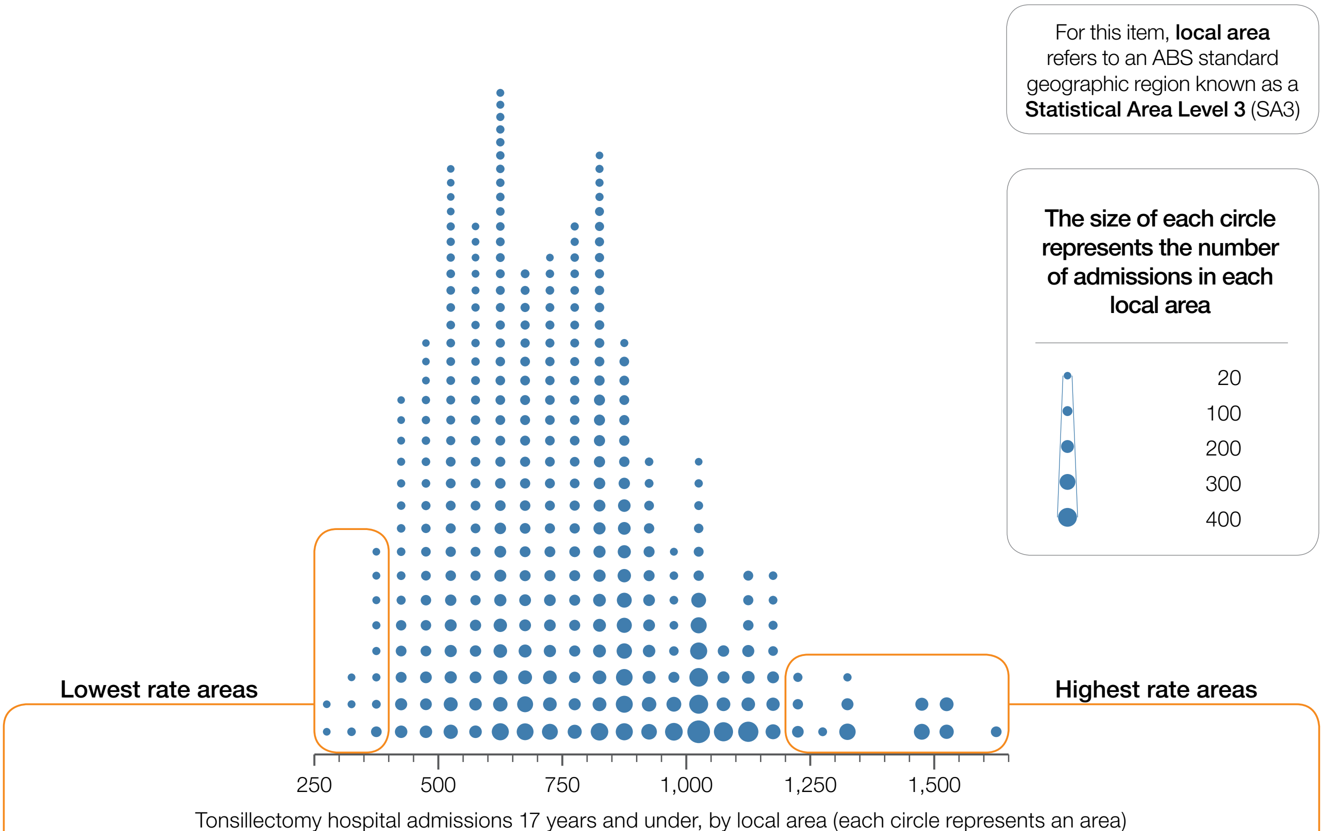
- private health insurance status and the accessibility of private hospitals, where most tonsillectomies are undertaken
- the availability of ear nose and throat surgeons, which varies across states and territories and is lower in remote areas
- public hospital elective surgery waiting times for tonsillectomy. Recent figures suggest the average waiting time for tonsillectomy in a public hospital is about 14 weeks[3]
- the decision-making criteria of individuals and specialists in assessing the need for tonsillectomy.

To explore this variation, further analysis could focus on:

- the influence of the private and public sectors on rates of tonsillectomy
- examining data on public hospital tonsillectomy, including waiting times for surgery, as it may show unequal access for those without private health cover.

*There are 333 SA3s. For this item, data were suppressed for 18 SA3s. This is because of confidentiality requirements given the small numbers of admissions in these areas.

Figure 48: **Number of tonsillectomy admissions to hospital per 100,000 people aged 17 years and under, age standardised, by local area, 2012–13**



Local area	State	Rate	Admissions
Tablelands (East) - Kuranda	Qld	254	25
Far North	Qld	279	26
Alice Springs	NT	313	34
Hobart - South and West	Tas	332	27
Maribyrnong	Vic	345	56
Yarra	Vic	351	43
Stonnington - West	Vic	364	26
Melbourne City	Vic	374	35
Hobart Inner	Tas	384	34
Mount Druitt	NSW	385	126
Richmond Valley - Coastal	NSW	388	64
Sunnybank	Qld	397	43
Devonport	Tas	399	42

Local area	State	Rate	Admissions
Glenelg - Southern Grampians	Vic	1,640	127
Wodonga - Alpine	Vic	1,537	247
Limestone Coast	SA	1,528	232
Warrnambool - Otway Ranges	Vic	1,477	301
Albury	NSW	1,466	205
Griffith - Murrumbidgee (West)	NSW	1,335	171
Ballarat	Vic	1,335	319
Tumut - Tumbarumba	NSW	1,328	46
Maryborough - Pyrenees	Vic	1,289	65
Grampians	Vic	1,243	159
Mid North	SA	1,236	77
Wellington	Vic	1,200	115

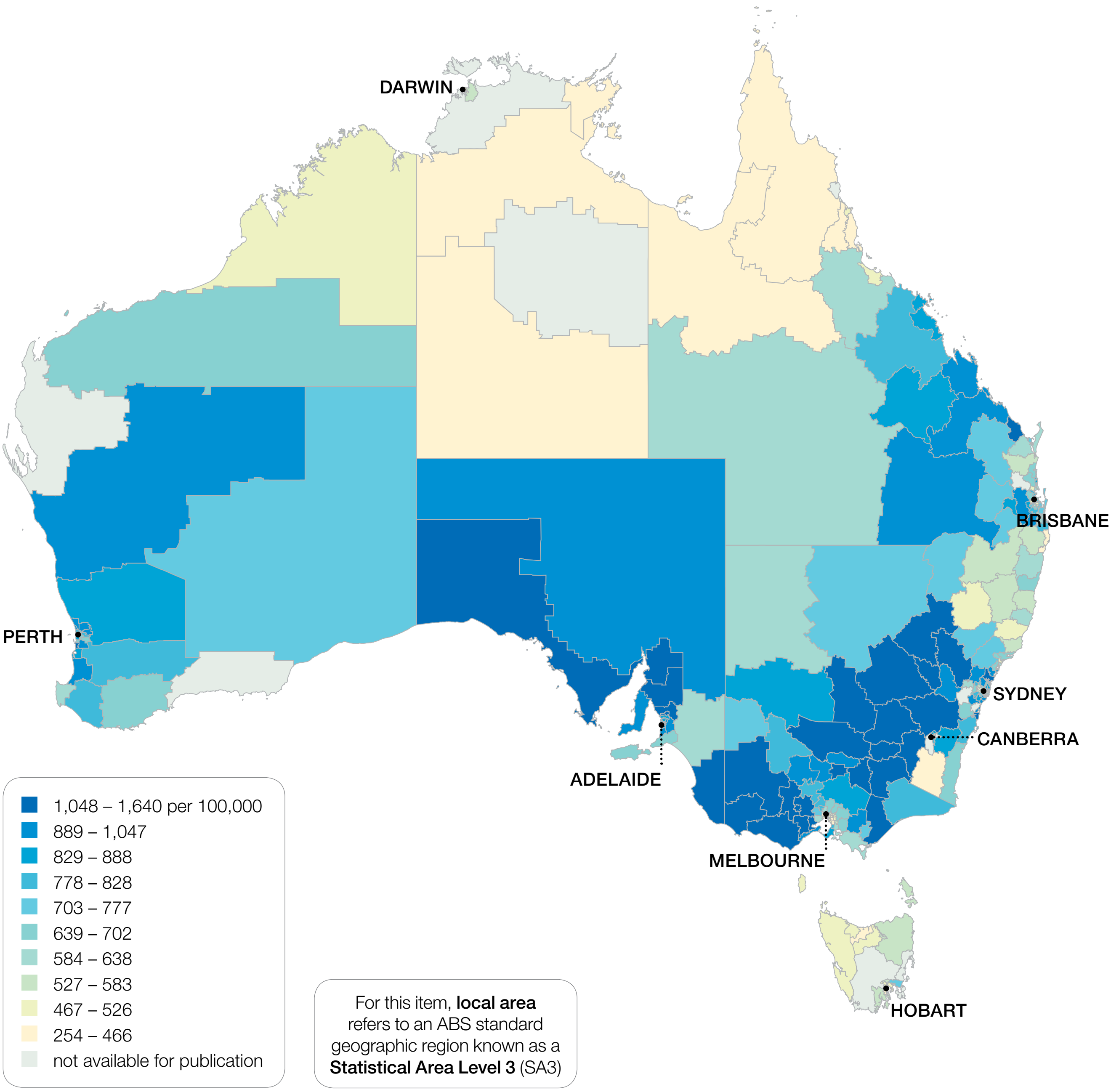
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
Includes all public hospitals, private hospitals and day hospital facilities.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

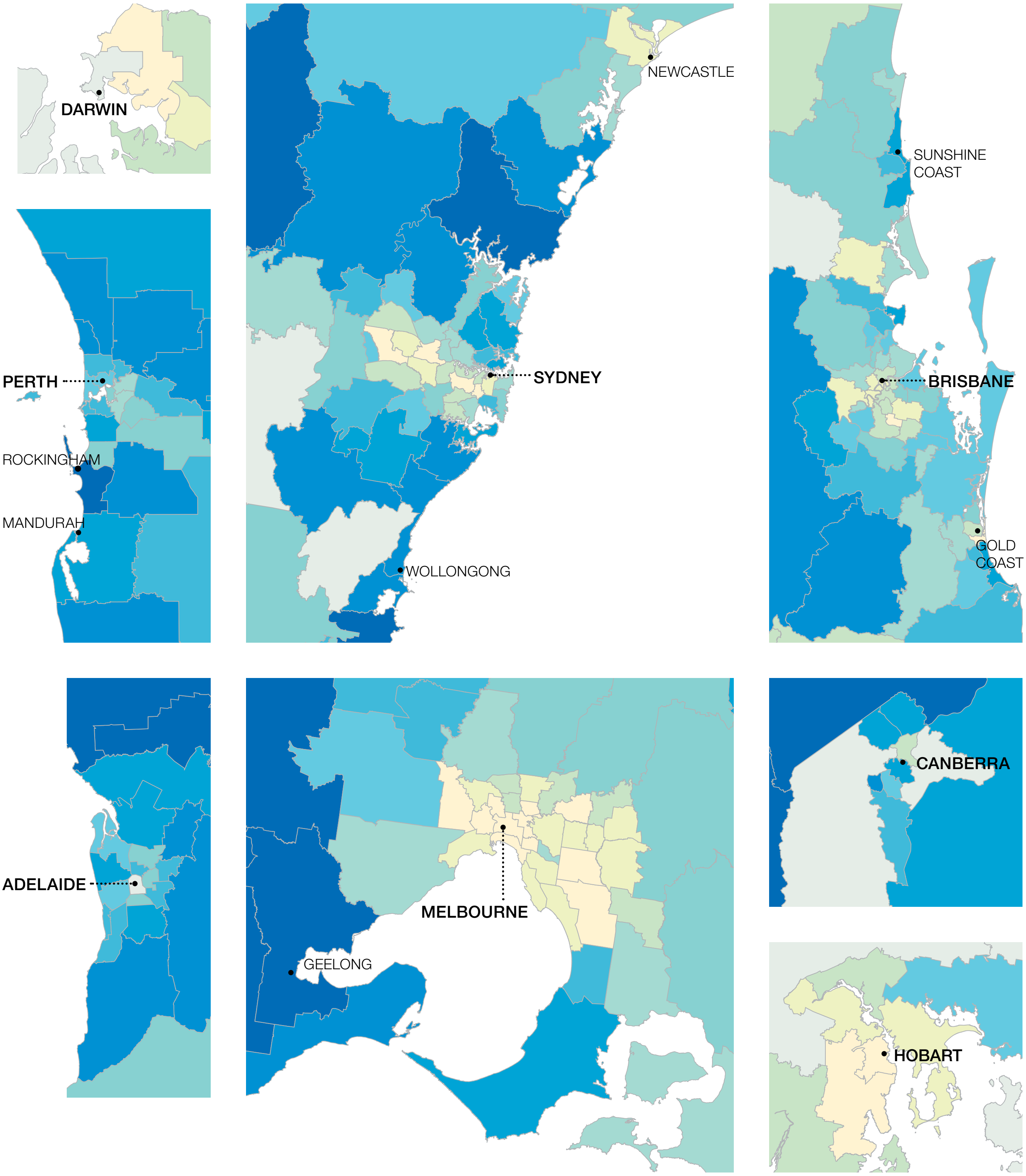
Tonsillectomy hospital admissions 17 years and under

Figure 49: **Number of tonsillectomy admissions to hospital per 100,000 people aged 17 years and under, age standardised, by local area, 2012–13**



Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of tonsillectomy admissions to hospital across 315 local areas (SA3s) ranged from 254 to 1,640 per 100,000 people aged 17 years and under. The number of admissions was **6.5 times higher** in the area with the highest rate compared to the area with the lowest rate.

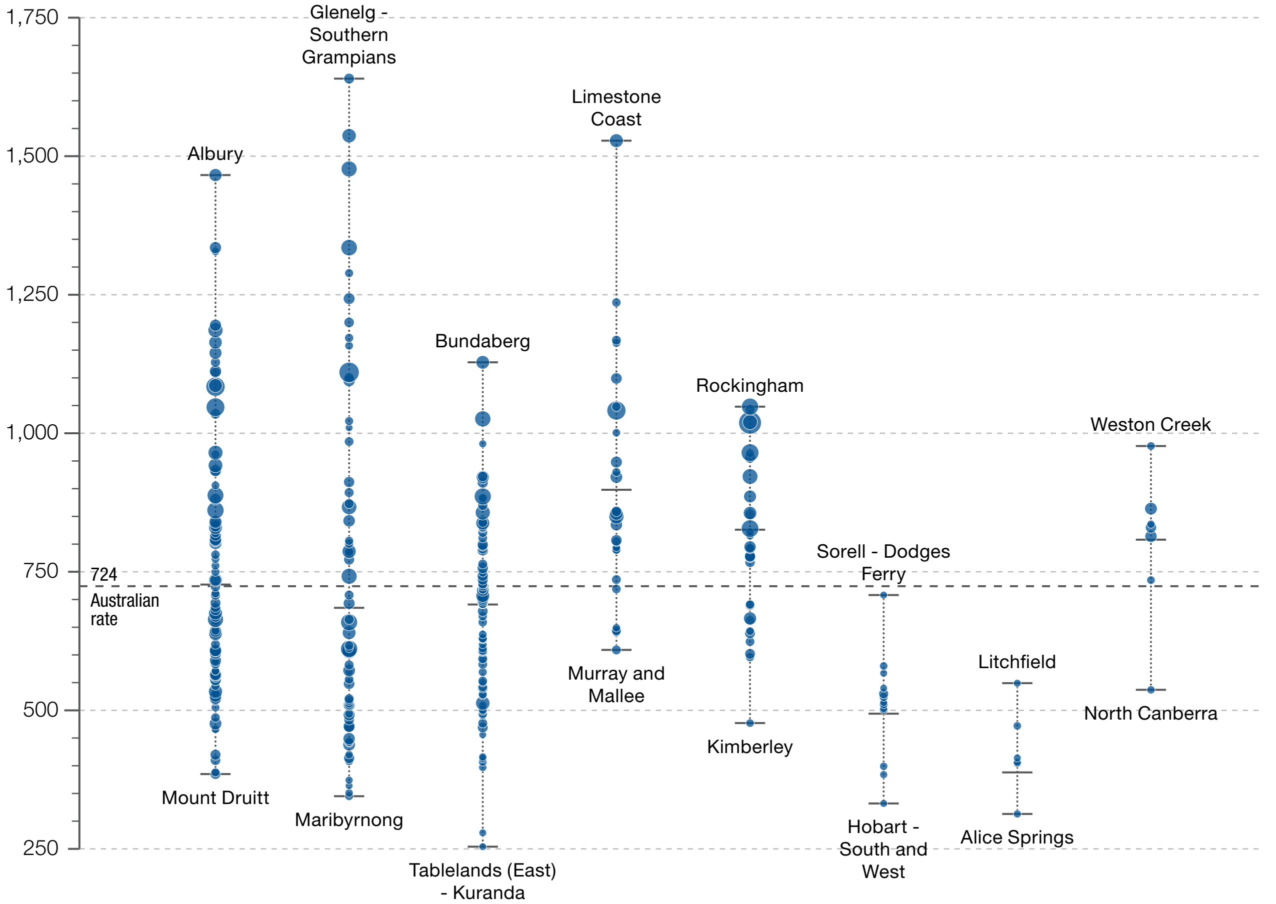


Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Tonsillectomy hospital admissions 17 years and under

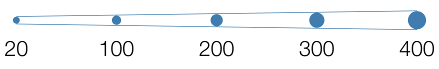
Figure 50: **Number of tonsillectomy admissions to hospital per 100,000 people aged 17 years and under, age standardised, by local area, state and territory, 2012–13**

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	1,466	1,640	1,128	1,528	1,048	708	549	977
State/territory	727	685	691	898	826	494	388	808
Lowest rate	385	345	254	609	477	332	313	537
No. admissions	12,386	8,760	7,780	3,236	4,875	569	249	701



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

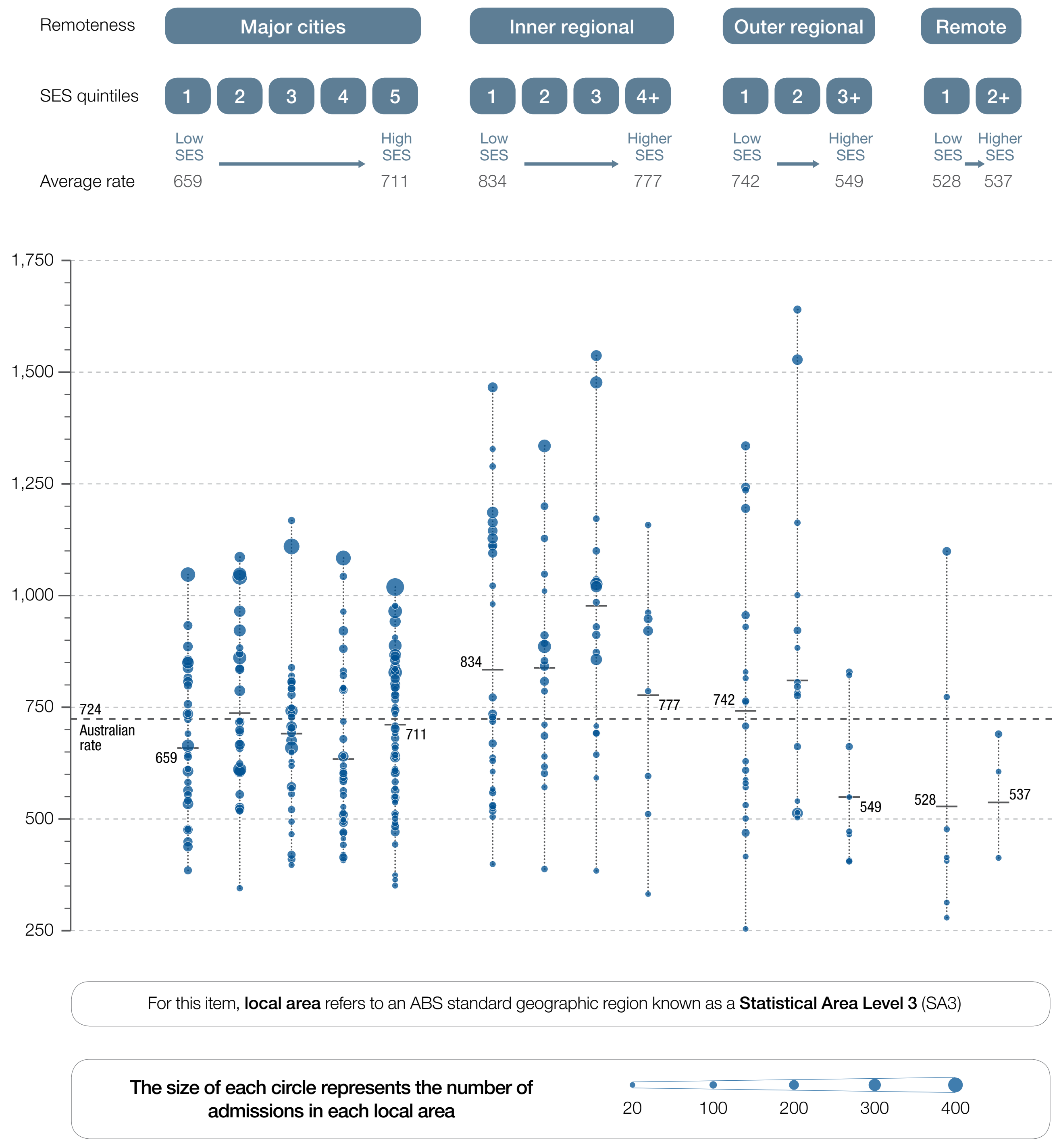
The size of each circle represents the number of admissions in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 51: Number of tonsillectomy admissions to hospital per 100,000 people aged 17 years and under, age standardised, by local area, remoteness and socioeconomic status (SES), 2012–13



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of admissions and people in Australia.
Average rates are based on the total number of admissions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Tonsillectomy hospital admissions 17 years and under

Resources

- Paediatrics & Child Health Division of the Royal Australasian College of Physicians and the Australian Society of Otolaryngology, Head and Neck Surgery. *Indications for Tonsillectomy and Adenotonsillectomy in Children – A joint position paper*. 2008. Available at: www.kidshealth.org.nz/sites/kidshealth/files/pdfs/Final_approved_Tonsillectomy_document-3.pdf.

- National Institute for Health and Care Excellence. *Commissioning guide: Tonsillectomy*. 2013. Available at: www.rcseng.ac.uk/healthcare-bodies/docs/published-guides/tonsillectomy.

1 Scottish Intercollegiate Guidelines Network. Management of sore throat and indications for tonsillectomy. A national clinical guideline. Edinburgh: SIGN, 2010.
2 Paediatrics & Child Health Division of the Royal Australasian College of Physicians and The Australian Society of Otolaryngology, Head and Neck Surgery. Indications for Tonsillectomy and Adenotonsillectomy in Children – A joint position paper. Sydney: RACP, ASOHNS, 2008.
3 Australian Institute of Health and Welfare. Australia's hospitals 2013–14: at a glance. Health services Series no. 61. Cat. no. HSE 157. Canberra: AIHW, 2015.

3.7 Myringotomy hospital admissions 17 years and under

Context

This data item examines hospital admissions for myringotomy for children aged 17 years and under. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set. This includes both public and private hospitals. Rates are described as the number of admissions per 100,000 people. Repeat admissions for one person and transfers to other hospitals are both counted as separate admissions.

Myringotomy is a surgical intervention used to treat otitis media, which is inflammation and infection of the middle ear. Otitis media with effusion (fluid in the middle ear space) is a common condition of early childhood and can cause hearing impairment. It is usually transient and self-limiting over several weeks, but may be more persistent and lead to educational, language and behavioural problems.

In most instances of uncomplicated otitis media with effusion, no intervention is needed because the fluid clears spontaneously and hearing recovers. Children experiencing recurrent symptoms may undergo surgical intervention. This involves a small incision into a membrane in the ear to release fluid (myringotomy), and/or the insertion of ventilation tubes (grommets) to assist with drainage.

Surgical intervention should be considered for children:

- with persistent bilateral otitis media with effusion for more than three months with a moderate to severe conductive hearing loss
- who are at increased risk of speech, language or learning problems from otitis media because of baseline sensory, physical, cognitive or behavioural factors.[1]

Myringotomy hospital admissions 17 years and under

Magnitude of variation

In 2012–13, there were 34,065 myringotomy admissions to hospital, representing 621 admissions per 100,000 people aged 17 years and under (the Australian rate).

The number of myringotomy admissions to hospital across 308* local areas (SA3s) ranged from 205 to 1,398 per 100,000 people aged 17 years and under. The number of admissions was **6.8 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of admissions varied across states and territories, from 384 per 100,000 people aged 17 years and under in the Northern Territory, to 1,046 in South Australia.

After excluding the highest and lowest results, the myringotomy hospital admission rate across the 281 remaining local areas was **3.3 times higher** in one local area compared to another.

There was a correlation between higher rates of myringotomies and higher socioeconomic status. This was seen in metropolitan, inner regional and remote areas, but was reversed in outer regional areas, which also had lower rates of surgery than other remote categories.

Interpretation

Potential reasons for the variation include differences in:

- the influence of the private and public sectors on rates of myringotomy
- the distribution of Indigenous people and their access to targeted ear health services. Despite more cases of otitis media in Aboriginal and Torres Strait Islander peoples, rates of myringotomy in Indigenous children aged under four are about one-third lower than in non-Indigenous children in NSW[2]
- public hospital elective surgery waiting times for myringotomy.[3]

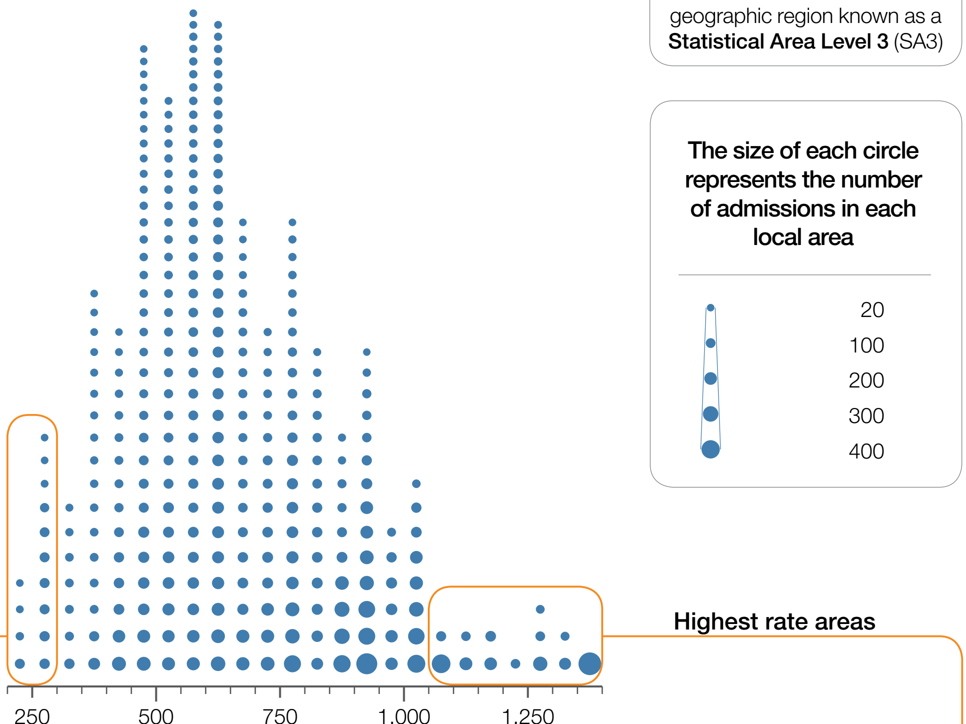
To explore the variation in admissions, further analysis could focus on:

- the influence of the private and public sectors on rates of myringotomy admissions
- the rates of admission for Indigenous children.

*There are 333 SA3s. For this item, data were suppressed for 25 SA3s. This is because of confidentiality requirements given the small numbers of admissions in these areas.

Figure 52: Number of myringotomy admissions to hospital per 100,000 people aged 17 years and under, age standardised, by local area, 2012–13

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)



Myringotomy hospital admissions 17 years and under, by local area (each circle represents an area)

Local area	State	Rate	Admissions
Alice Springs	NT	205	24
Auburn	NSW	238	52
Fairfield	NSW	245	110
Melbourne City	Vic	245	31
Mount Druitt	NSW	254	85
Merrylands - Guildford	NSW	261	108
Dandenong	Vic	265	109
Brimbank	Vic	275	121
Inverell - Tenterfield	NSW	275	25
Sunnybank	Qld	279	32
Armidale	NSW	281	24
Tullamarine - Broadmeadows	Vic	287	118
Blacktown	NSW	288	102
Parramatta	NSW	296	108

Local area	State	Rate	Admissions
Onkaparinga	SA	1,398	554
Lower North	SA	1,348	71
Mitcham	SA	1,309	176
Tea Tree Gully	SA	1,277	258
Gawler - Two Wells	SA	1,263	97
Holdfast Bay	SA	1,253	65
Unley	SA	1,208	94
Adelaide Hills	SA	1,197	200
Kimberley	WA	1,156	131
Barossa	SA	1,149	91
Marion	SA	1,128	209
Far North	Qld	1,094	112
Warringah	NSW	1,054	413

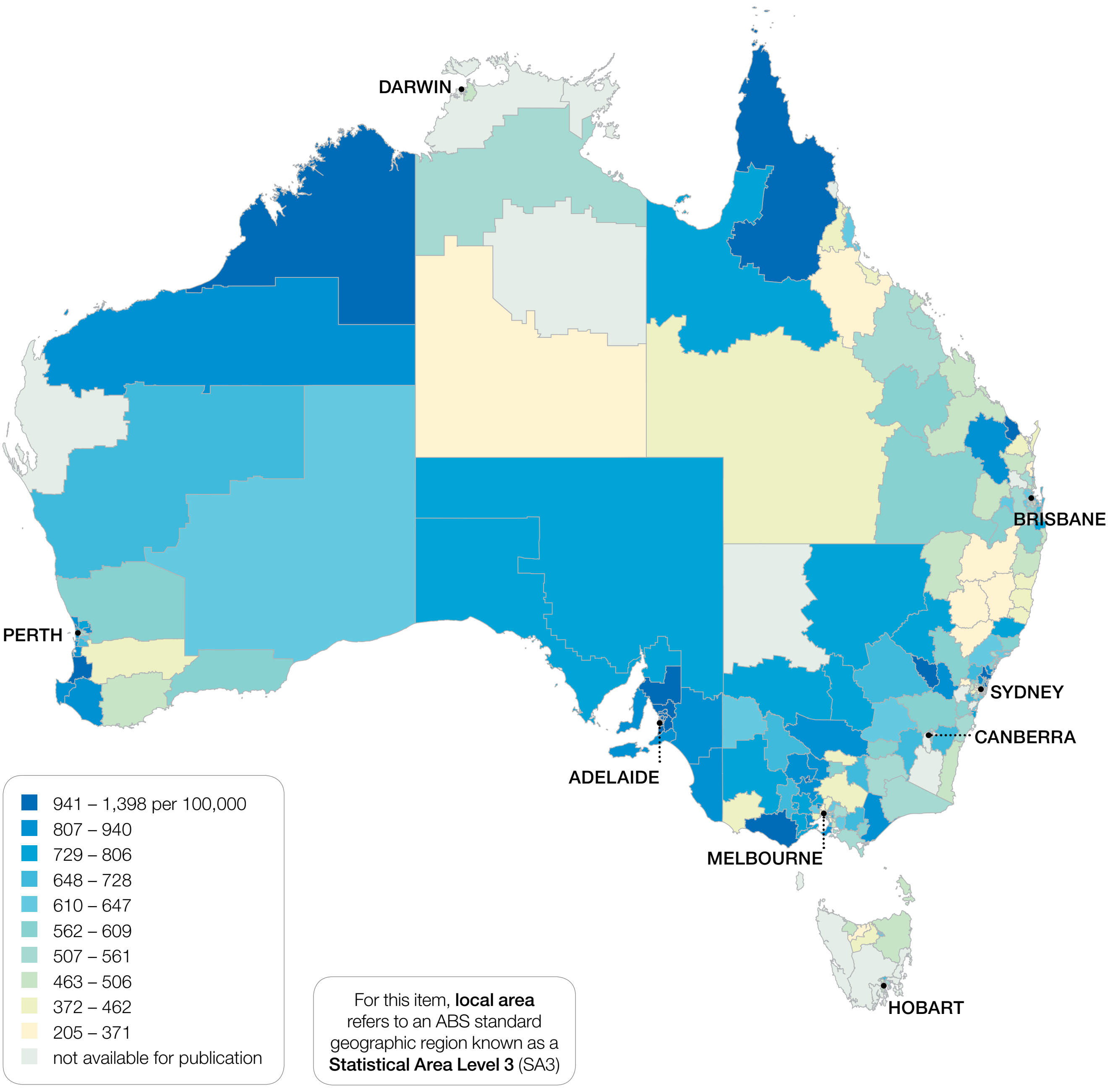
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
Includes all public hospitals, private hospitals and day hospital facilities.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

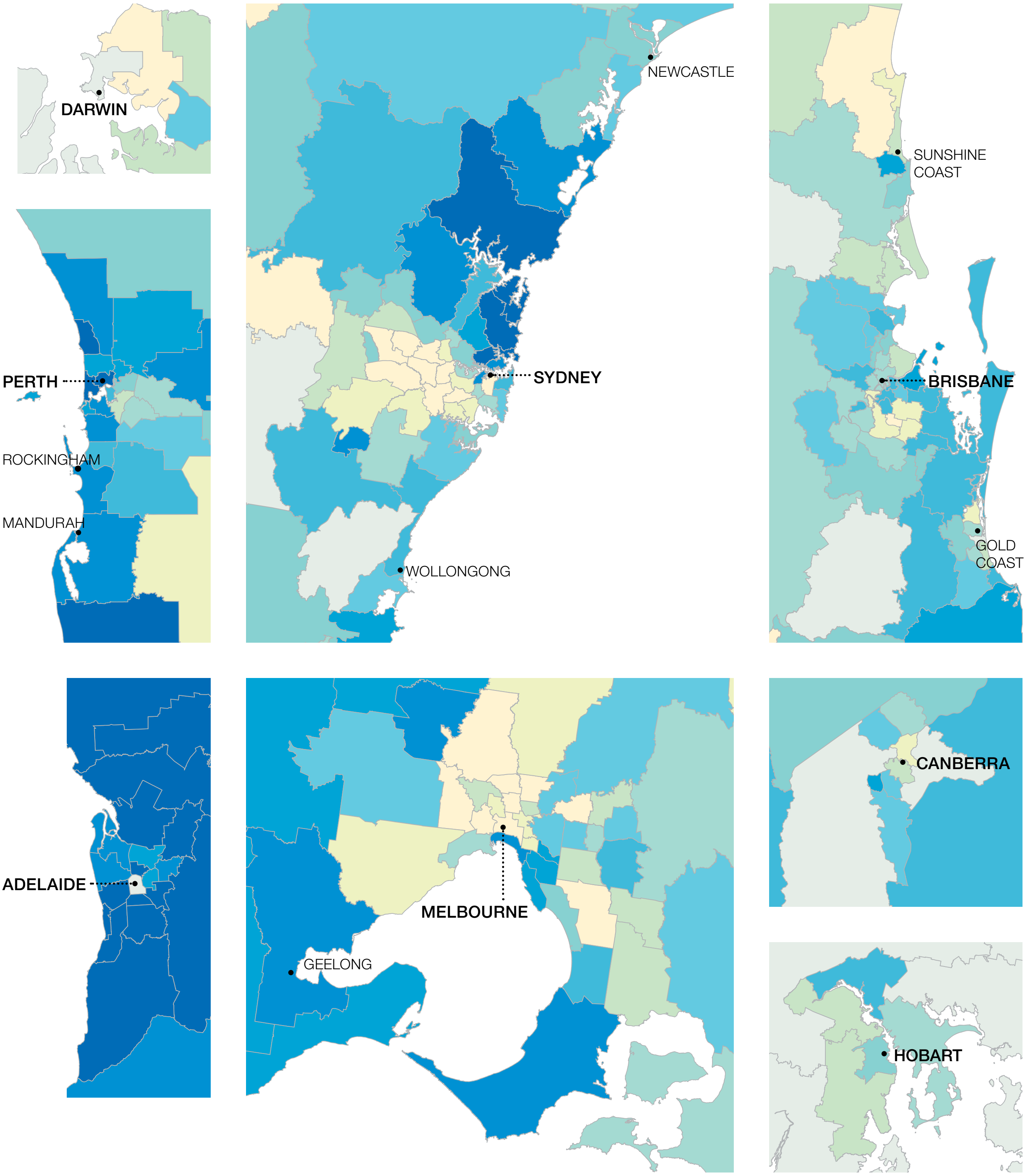
Myringotomy hospital admissions 17 years and under

Figure 53: **Number of myringotomy admissions to hospital per 100,000 people aged 17 years and under, age standardised, by local area, 2012–13**



Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of myringotomy admissions to hospital across 308 local areas (SA3s) ranged from 205 to 1,398 per 100,000 people aged 17 years and under. The number of admissions was **6.8 times higher** in the area with the highest rate compared to the area with the lowest rate.

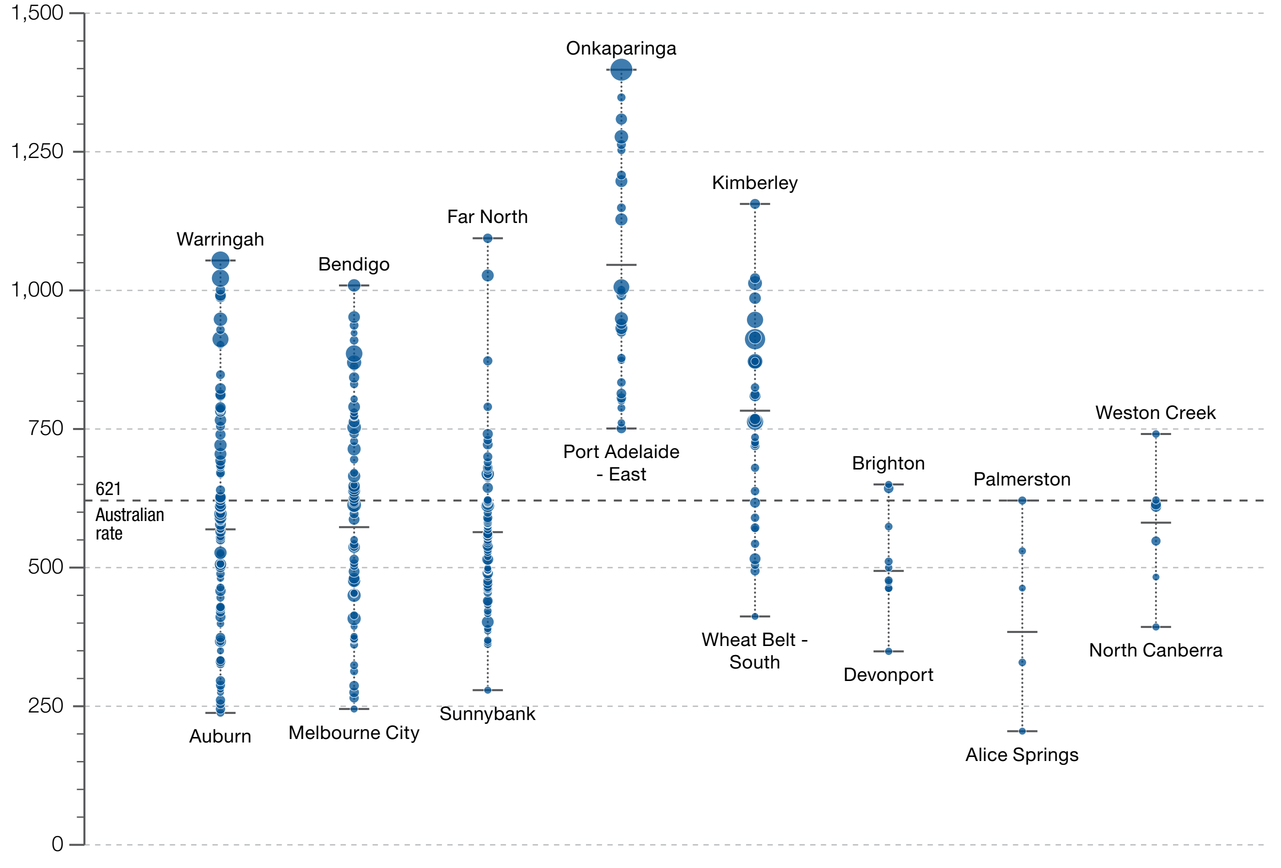


Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Myringotomy hospital admissions 17 years and under

Figure 54: Number of myringotomy admissions to hospital per 100,000 people aged 17 years and under, age standardised, by local area, state and territory, 2012–13

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	1,054	1,009	1,094	1,398	1,156	650	621	741
State/territory	569	573	564	1,046	783	494	384	581
Lowest rate	238	245	279	751	412	349	205	393
No. admissions	10,010	7,597	6,478	3,828	4,766	570	258	532



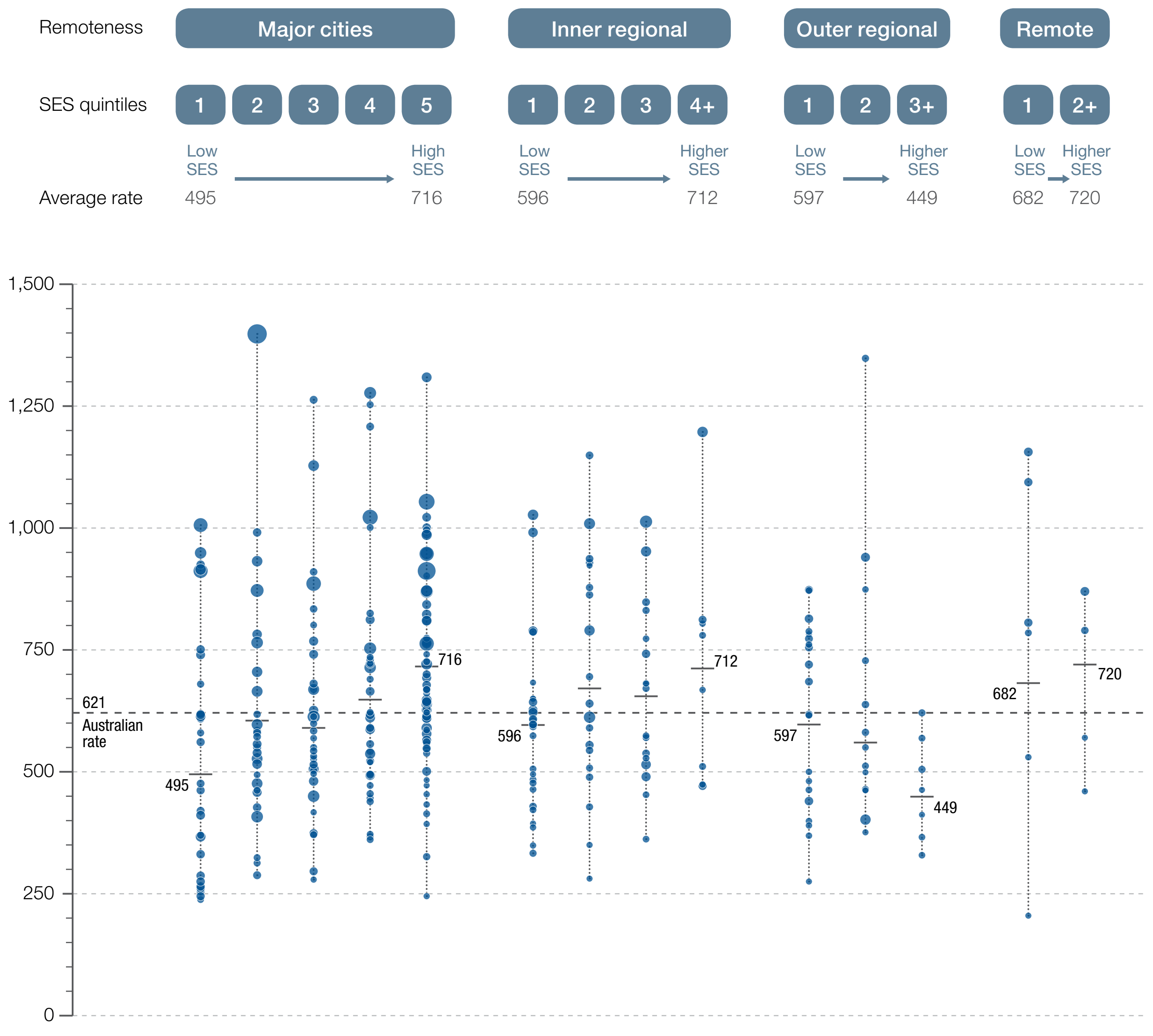
For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of admissions in each local area 20 100 200 300 400

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 55: **Number of myringotomy admissions to hospital per 100,000 people aged 17 years and under, age standardised, by local area, remoteness and socioeconomic status (SES), 2012–13**



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of admissions in each local area

20 100 200 300 400

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of admissions and people in Australia.
Average rates are based on the total number of admissions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Myringotomy hospital admissions 17 years and under

Resources

- National Institute for Health and Care Excellence. *Surgical management of otitis media with effusion in children*. 2008. Available at: www.nice.org.uk/guidance/cg60/resources/guidance-surgical-management-of-otitis-media-with-effusion-in-children-pdf.

- Darwin Otitis Guidelines Group. *Recommendations for Clinical Care Guidelines on the Management of Otitis Media in Aboriginal and Torres Strait Islander Populations*. 2010. Available at: www.healthinfonet.ecu.edu.au/uploads/docs/OM-Guidelines.pdf

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1 Rosenfeld RM, Schwartz SR, Pynnonen MA, Tunkel DE Hussey HM, Fichera JS, et al. Clinical practice guideline: Tympanostomy tubes in children. Otolaryngology Head and Neck Surgery. 2013; 149 (1. Suppl): S1–S35. July 2013.
2 Falster K, Randall D, Banks E, Eades S, Gunasekera H, Reath J, et al. Inequalities in ventilation tube insertion procedures between Aboriginal and non-Aboriginal children in New South Wales, Australia: a data linkage study. BMJ Open. 2013;3(11):e003807.
3 Australian Institute of Health and Welfare. Australian hospital statistics 2012–13: elective surgery waiting times. Cat. No. HSE 140. Health services series no. 51.Canberra: AIHW, 2013.

3.8 Hip fracture hospital admissions 65 years and over

Context

This data item examines hospital admissions for hip fracture for people aged 65 years and over. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set. This includes both public and private hospitals. Rates are described as the number of admissions per 100,000 people. Repeat admissions for one person and transfers between hospitals are both counted as separate admissions.

A hip fracture is a break occurring at the top of the thigh bone (femur), near the pelvis. The rate of hip fracture increases significantly after the age of 50. In Australia, 91 per cent of hip fractures occur in people aged over 65.[1]

The vast majority of hip fractures are associated with falls.[2] The major risk factors for falls are impaired balance and mobility, use of multiple medicines (polypharmacy)[3] and a history of previous falls. Decreased bone strength – due to osteoporosis, for example – increases the risk of fracture among people who fall.

As the Australian population ages, the incidence of fragility fractures is rising. Fragility fractures have characteristic fracture patterns and most hip fractures are associated with osteoporosis or osteopenia. Although a fragility fracture provides an important opportunity for secondary prevention of osteoporosis, most patients are not being investigated.

The Commission has developed a Clinical Care Standard[4] for acute hip fracture care. This is an important national strategy to improve the timely assessment and management of patients with a hip fracture. The standard aims to optimise outcomes for hip fracture patients and reduce their risk of another fracture.

Strategies put in place by hospitals and other health services are likely to be contributing to a decrease in the rate of hip fracture in older people. These include falls prevention programs, balance and strength training, and promoting the appropriate use of medicines for osteoporosis (for example, bisphosphonates).[5,6] However, the total number of people admitted to hospital with hip fractures is expected to increase annually as the Australian population continues to age.[7,8] In addition, the rate of hip fracture among Aboriginal and Torres Strait Islander people is higher and increasing. Indigenous men are twice as likely to fracture their hip as non-Indigenous men. Indigenous women also have an increased risk of hip fracture.[9,10]

Hip fracture hospital admissions 65 years and over

Accurately counting the rate of hip fractures in Australia brings many challenges. This data shows acute admission rates to hospital for hip fracture. There is potential over-counting of cases, which may artificially inflate the rate of admissions. This is because some patients are transferred from one hospital to another. If the length of stay of the acute admission was less than 48 hours, the admission was removed from analysis. However, some patients who stay in hospital for more than 48 hours and are then transferred may be counted more than once in the rate (that is, multiple admissions could be counted for one hip fracture).

Eighty four per cent of hospital admissions for hip fractures in Australia are to public hospitals.[9]

Magnitude of variation

In 2012–13, there were 21,502 hip fracture admissions to hospital, representing 610 admissions per 100,000 people aged 65 years and over (the Australian rate).

The number of hip fracture admissions to hospital across 87* local areas (SA4s) ranged from 484 to 787 per 100,000 people aged 65 years and over. The number of admissions was **1.6 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of admissions varied across states and territories, from 533 per 100,000 people aged 65 years and over in Tasmania, to 727 in the Northern Territory.

After excluding the highest and lowest results, the hip fracture hospital admission rate across the 79 remaining local areas was **1.5 times higher** in one local area compared to another.

Interpretation

Potential reasons for the variation include differences in:

- issues with potential over-counting due to transfers, as described earlier
- distribution of people with a higher risk of hip fracture, such as people in aged-care facilities who may be more frail
- levels of access to and participation in community-based falls prevention programs
- prescribing and uptake of medicines for osteoporosis (for example, bisphosphonates).

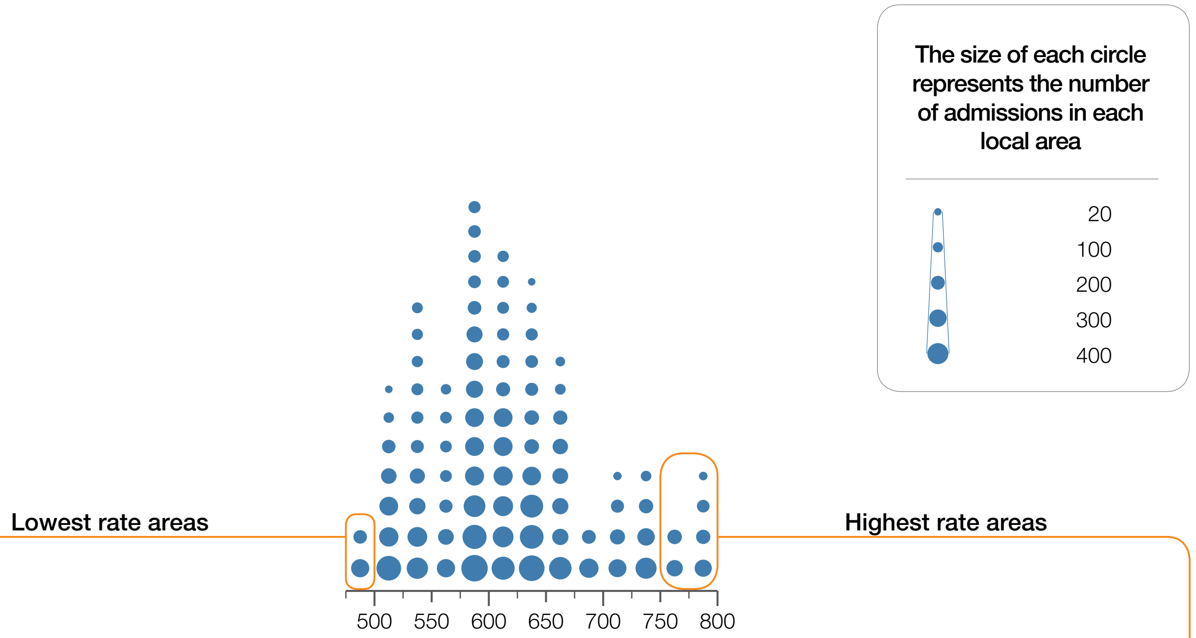
To explore this variation, further analysis could focus on:

- investigating the over-counting of hip fracture admissions due to patient transfers from one hospital to another for acute care
- investigating hip fracture admission rates for both acute and subacute episodes of care
- using PBS data to investigate regional variations in prescribing bisphosphonates.

*There are 88 SA4s. For this item, data were suppressed for 1 SA4. This is because of confidentiality requirements given the small numbers of admissions in this area.

Figure 56: Number of hip fracture admissions to hospital per 100,000 people aged 65 years and over, age standardised, by local area, 2012–13

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 4** (SA4)



Hip fracture hospital admissions 65 years and over, by local area (each circle represents an area)

Lowest rate areas

Local area	State	Rate	Admissions
Melbourne - North East	Vic	484	322
South Australia - South East	SA	487	192

Highest rate areas

Local area	State	Rate	Admissions
Central West	NSW	787	293
Darwin	NT	785	55
Townsville	Qld	783	213
Far West and Orana	NSW	777	167
Coffs Harbour - Grafton	NSW	769	219
Sydney - Outer West and Blue Mountains	NSW	769	272

Notes:
The cohort for this item is different to the cohort used for the **Hip fracture average length of stay** item. Refer to the Technical Supplement for details.

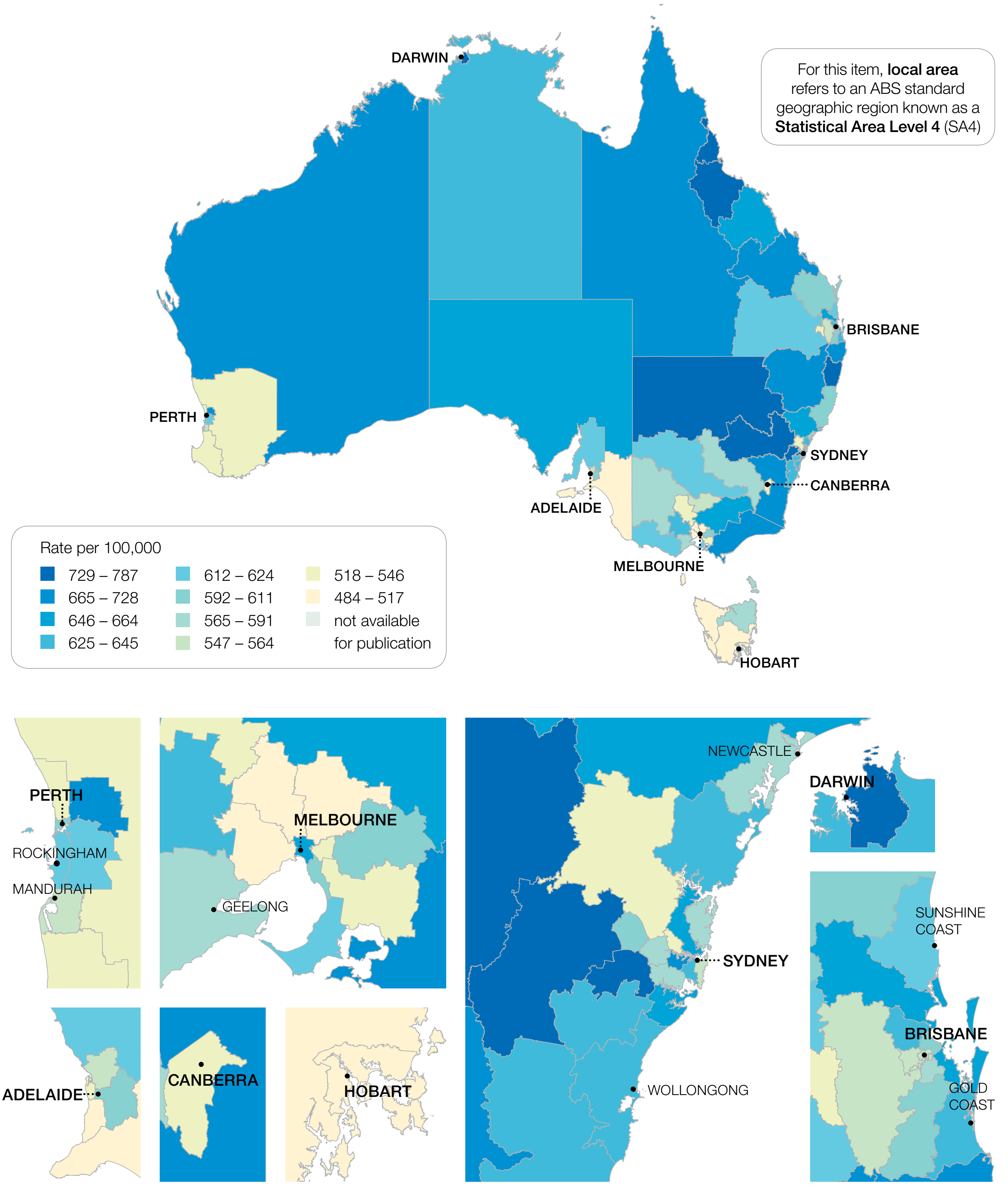
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 4 (SA4).
Includes all public hospitals, private hospitals and day hospital facilities.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Hip fracture hospital admissions 65 years and over

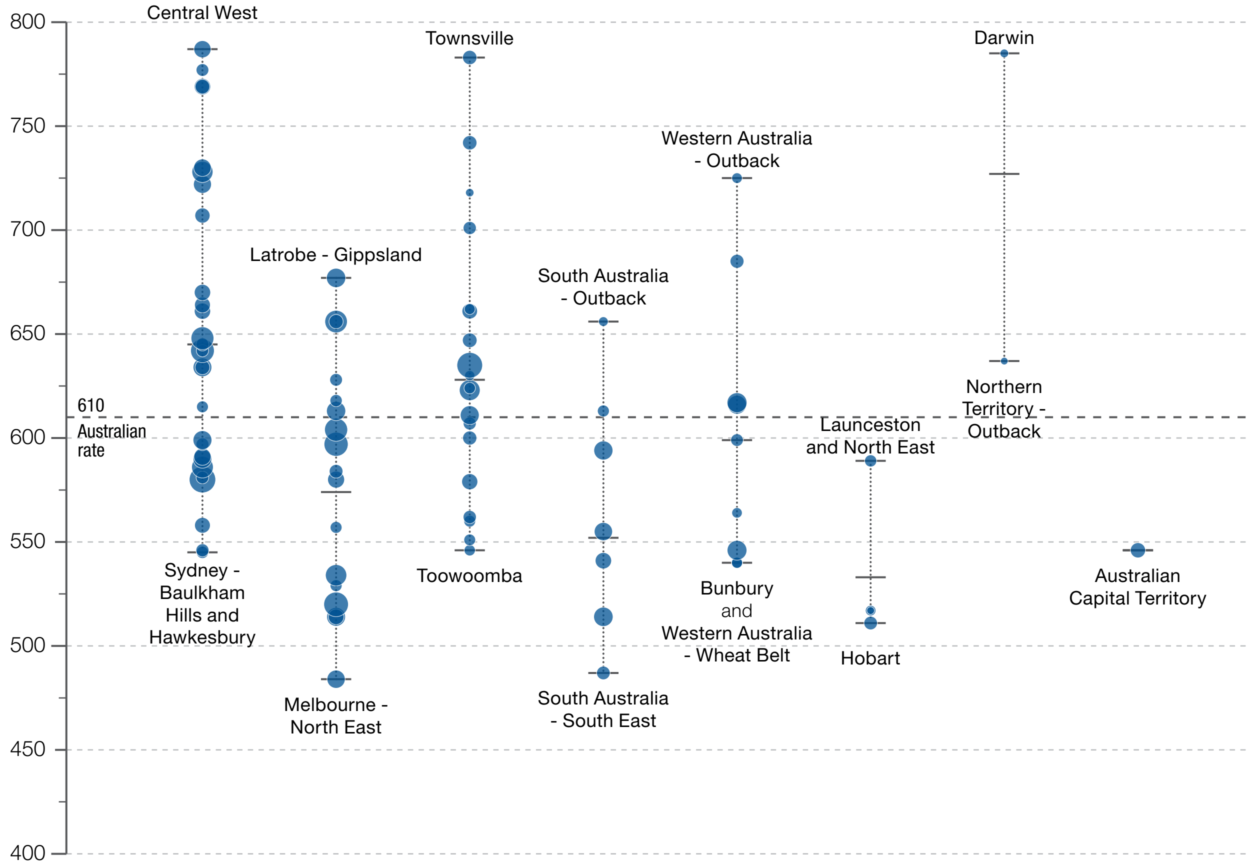
Figure 57: **Number of hip fracture admissions to hospital per 100,000 people aged 65 years and over, age standardised, by local area, 2012–13**



Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

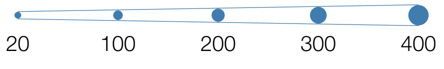
Figure 58: Number of hip fracture admissions to hospital per 100,000 people aged 65 years and over, age standardised, by local area, state and territory, 2012–13

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	787	677	783	656	725	589	785	–
State/territory	645	574	628	552	599	533	727	546
Lowest rate	545	484	546	487	540	511	637	–
No. admissions	7,822	5,211	3,971	1,717	1,901	478	80	238



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 4** (SA4)

The size of each circle represents the number of admissions in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Hip fracture hospital admissions 65 years and over

Resources

- Australian and New Zealand Hip Fracture Registry Steering Group. *Australian and New Zealand guideline for hip fracture care: improving outcomes in hip fracture management of adults*. 2014. Available at: www.anzhfr.org/images/resources/Guidelines/ANZ%20Guideline%20for%20Hip%20Fracture%20Care.pdf.

- Royal Australian College of General Practitioners. *Clinical guideline for the prevention and treatment of osteoporosis in postmenopausal women and older men*. 2010. Available at: www.racgp.org.au/download/documents/Guidelines/Musculoskeletal/racgp_osteo_guideline.pdf.

- Joanna Briggs Institute. *Interventions to reduce the incidence of falls in older adult patients in acute care hospitals*. Best Practice: evidence-based information sheets for health professionals. 2010;14(15):1–4. Available at: http://connect.jbiconnectplus.org/ViewSourceFile.aspx?0=5394.

- Australian Commission on Safety and Quality in Health Care. *National Safety and Quality Health Service Standard 10: Preventing Falls and Harm from Falls. 2012*. Available from: www.safetyandquality.gov.au/wp-content/uploads/2012/10/Standard10_Oct_2012_WEB.pdf

1 Kreisfeld R, Newson R. Hip fracture injuries. In: NSU Briefing. Adelaide: AIHW National Injury Surveillance Unit, 2006.
2 Hindmarsh DM, Hayen A, Finch CF, Close JCT. Relative survival after hospitalisation for hip fracture in older people in New South Wales, Australia. Osteoporosis Int 2009;20:221–9.
3 Ambrose AF, Paul G, Hausdorff JM. Risk factors for falls among older adults: a review of the literature. Maturitas 2013;75(1);51–61.
4 Australian Commission on Safety and Quality in Health Care. Hip Fracture Care Clinical Care Standard. 2015. (Accessed 8 September 2015 at www.safetyandquality.gov.au/our-work/clinical-care-standards/hip-fracture-care-clinical-care-standard).
5 Crisp A, Dixon T, Jones G, Cumming RG, Laslett LL, Bhatia K, et al. Declining incidence of osteoporotic hip fracture in Australia. Arch Osteoporosis 2012;7:179–85.
6 Gillespie LD, Robertson MC, Gillespie WJ, Sherrington C, Gates S, Clemson LM, et al. Interventions for preventing falls in older people living in the community. Cochrane Database Syst Rev 2012.
7 Boufous S, Finch CF, Lord S. Incidence of hip fracture in New South Wales: are our efforts having an effect? MJA 2004;180:623–6.
8 Australian and New Zealand Hip Fracture Registry Steering Group. Australian and New Zealand guideline for hip fracture care: improving outcomes in hip fracture management of adults. Sydney: ANZHFR Steering Group, 2014.
9 Australian Institute of Health and Welfare. The problem of osteoporotic hip fracture in Australia. Bulletin no. 76. Cat. no. AUS 121. Canberra: AIHW, 2010.
10 Wong YYE, Flicker L, Draper G, Lai MMY, Waldron N. Hip fractures among Indigenous people in Western Australia from 1999–2009. IMJ 2012.

3.9 Hip fracture average length of stay in hospital by peer group – 65 years and over

Context

This data item examines the average length of acute stay in hospital for people aged 65 years and over with a hip fracture. These data are from the Admitted Patient Care National Minimum Data Set. Data from major and large public hospitals only are included in this item. Average length of stay in hospital is reported by hospital, not by geographic residence of the patient.

Length of stay in hospital is one marker of the quality of care in hip fracture admissions. It is challenging to measure consistently around Australia due to differences in hospital administrative admission practices. Older people with hip fractures have complex medical, social and rehabilitation needs that may affect their length of stay. Services must be organised to provide high-quality acute care and to ensure clear referral pathways for rehabilitation and returning to home or residential care.

The quality of care provided to people who have a hip fracture depends on a number of factors, including the configuration of orthopaedic and geriatric services, hospital protocols and processes, and the availability of allied health services. Quality of care may also be influenced by the availability of secondary preventive interventions, including osteoporosis assessment and treatment, and falls prevention strategies.[1] In the absence of these services, markers of care quality (including time to surgery, complication rates, hospital re-admission rates and length of stay) vary considerably between different hospitals.[2]

Factors such as patients' rehabilitation discharge destination and the presence of complications arising while in hospital contribute to the total length of stay in hospital after a hip fracture.[3] Managing hip fractures in accordance with evidence and guidelines helps ensure optimal care is delivered and resources are used effectively.[4,5] An audit of compliance has shown that compliance with guidelines improves patient outcomes, including mortality rates.[6] An audit of hip fracture management showed that the prosthesis selection correlates with patient outcomes, the risk of complications and varying mortality rates.[7]

The Commission has developed a Clinical Care Standard[8] for acute hip fracture care. This is an important national strategy to improve the timely assessment and management of patients with a hip fracture. The standard aims to optimise outcomes for hip fracture patients and reduce their risk of another fracture.

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Hip fracture average length of stay in hospital by peer group – 65 years and over

Additionally, the Independent Hospital Pricing Authority (IHPA) and the Commission are collaborating to explore approaches to best-practice pricing in Australian public hospital services for hip fracture care.[9]

In comparing admissions and average length of stay for hip fracture items, the two datasets are different: the hospital admissions for hip fractures item includes data from all private and public hospitals, whereas the average length of stay item includes only data from major and large public hospitals. Eighty-four per cent of hospital admissions for hip fractures in Australia are to public hospitals.[10]

Magnitude of variation

In 2012–13, there were 14,744 admissions for hip fracture patients aged 65 years and over in major and large public hospitals. This includes hospital admissions in 99* of the 120 major and large public hospitals across Australia.

The average length of stay for hip fracture in major and large public hospitals for patients aged 65 years and over ranged from 5.3 to 16.9 days. This was **3.2 times higher** in the hospital with the longest average length of stay compared to the hospital with the shortest. After excluding the highest and lowest results, the average length of stay across the 85 remaining public hospitals was **2.1 times higher** in one hospital compared to another.

The average length of stay for hip fractures varied across states and territories, with the longest stays in the Northern Territory (note: only one Northern Territory hospital was included in the study – the Royal Darwin Hospital), New South Wales and South Australia, and the shortest stays in Western Australia and Victoria.

While there was variation between hospitals, the average length of stay for hip fractures tended to be slightly shorter in regional hospitals than in metropolitan hospitals.

Across all hospital peer groups (major and large metropolitan, and major and large regional), the average acute length of stay for patients with hip fracture varies more than two-fold.

Interpretation

As described in the previous item, there are limitations in ensuring the accuracy of hip fracture data analysis in Australia. They include:

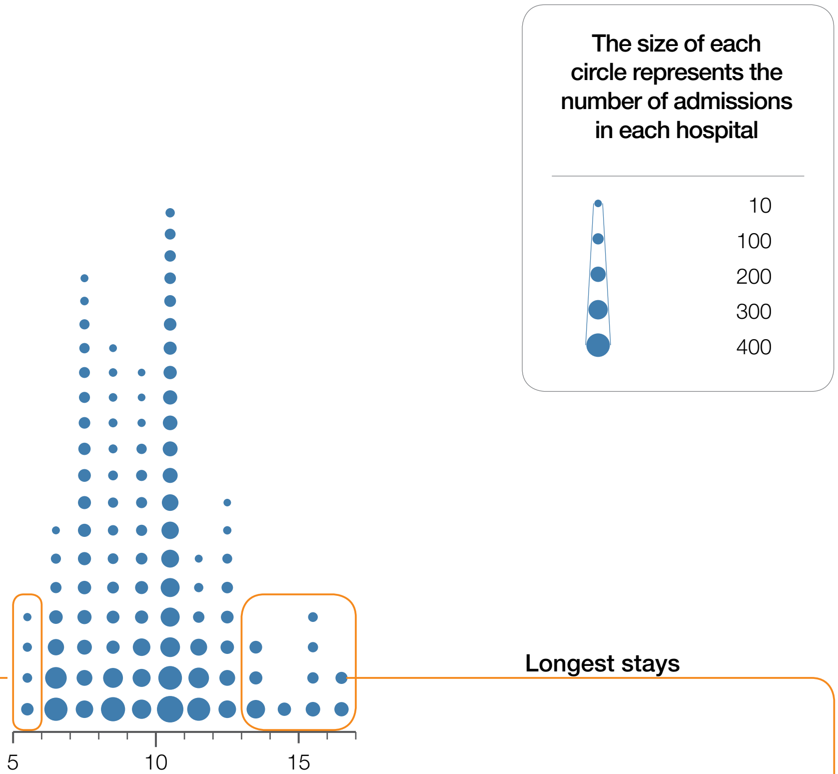
- potential over-counting of cases because some patients are transferred from one hospital to another. If the length of stay of the acute admission was less than 48 hours, the admission was removed from analysis. However, the patients who stayed in hospital for more than 48 hours and were transferred may have been counted more than once in the rate (that is, multiple admissions could have been counted for one hip fracture)
- differences in coding practice between hospitals when the episode of care is changed from acute to subacute (for example, rehabilitation). The acute length of stay reported in this chapter may vary depending on when the hospital changes from an acute to subacute episode of care
- variation in models of care, in particular, access to surgery, rehabilitation and other subacute services that affect length of stay. Collaboration between emergency, anaesthetic, orthopaedic and geriatric departments is required to deliver timely and appropriate surgical care
- some hospitals will also have clinical pathways that facilitate early transfer to subacute multidisciplinary services, while others offer onsite rehabilitation.

To explore this variation, further analysis could focus on:

- linking data so that individual patient journeys can be followed through both acute and subacute episodes (and hospital transfers, where this occurs).

*For this item, data were suppressed for 21 hospitals. This is because of confidentiality requirements given the small numbers of admissions in these hospitals.

Figure 59: Average length of stay for hip fracture patients aged 65 years and over, major and large public hospitals, 2012–13



Average length of stay for hip fracture 65 years and over, by hospital (each circle represents a hospital)

Shortest stays

Hospital	State	Average length of stay (days)	Admissions
Bairnsdale	Vic	5.3	50
Fairfield	NSW	5.5	62
Armadale-Kelmscott	WA	5.6	26
Coffs Harbour	NSW	5.7	130

Longest stays

Hospital	State	Average length of stay (days)	Admissions
Bankstown	NSW	16.9	175
Blacktown	NSW	16.3	121
Royal Darwin	NT	15.9	64
Canterbury	NSW	15.5	77
Concord	NSW	15.5	181
Campbelltown	NSW	15.4	103
Townsville	Qld	14.6	152
Queen Elizabeth	SA	13.6	136
St Vincent’s	NSW	13.5	146
Liverpool	NSW	13.4	278

Notes:
The cohort for this item is different to the cohort used for the **Hip fracture hospital admissions** item.
Analysis is restricted to hospitals with at least 10 admissions.

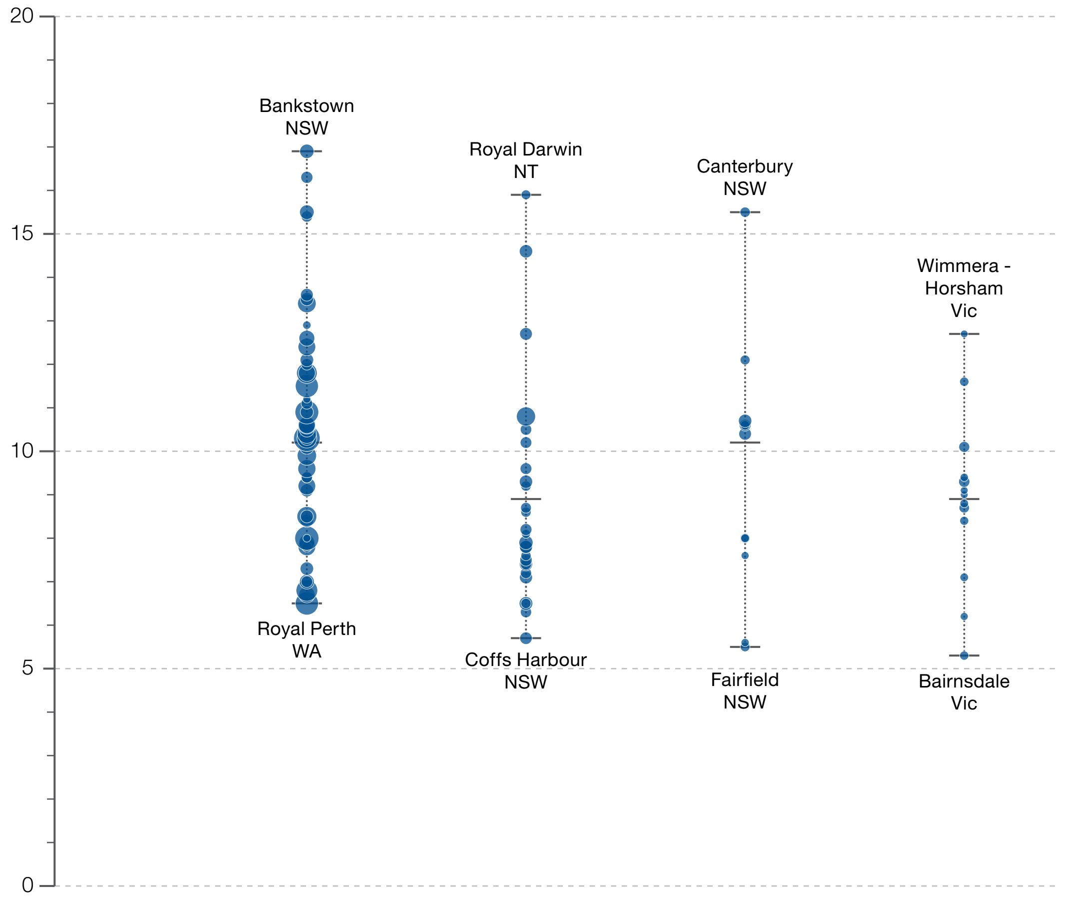
For more technical information please refer to the Technical Supplement.

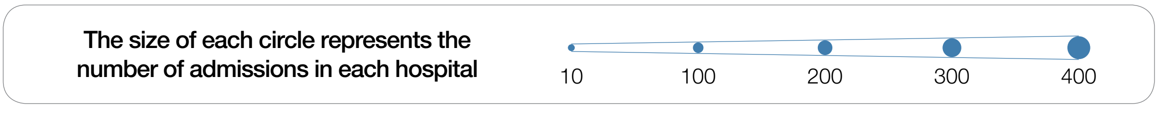
Source: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014).

Hip fracture average length of stay in hospital by peer group – 65 years and over

Figure 60: **Average length of stay for hip fracture patients aged 65 years and over, major and large public hospitals, by peer group, 2012–13**

Average length of stay (days)	Major metropolitan	Major regional	Large metropolitan	Large regional
Longest	16.9	15.9	15.5	12.7
Peer average	10.2	8.9	10.2	8.9
Shortest	6.5	5.7	5.5	5.3
No. admissions	10,240	3,118	807	579



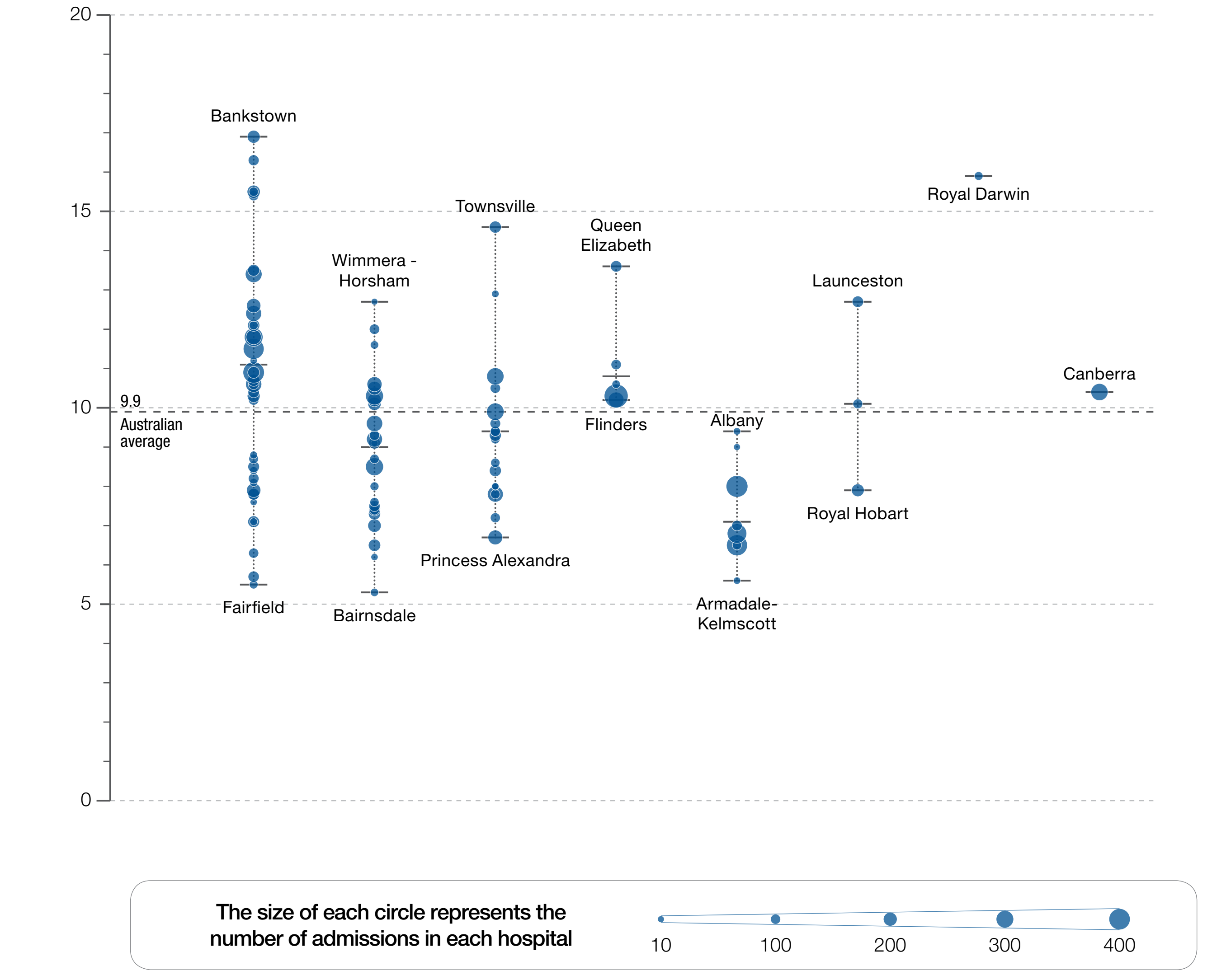


Notes:
The peer average is based on the total number of admissions in hospitals within that peer group, restricted to public hospitals with at least 10 admissions.

Source: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014).

Figure 61: Average length of stay for hip fracture patients aged 65 years and over, major and large public hospitals, by state and territory, 2012–13

Average length of stay (days)	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Longest	16.9	12.7	14.6	13.6	9.4	12.7	–	–
State/territory	11.1	9.0	9.4	10.8	7.1	10.1	15.9	10.4
Shortest	5.5	5.3	6.7	10.2	5.6	7.9	–	–
No. admissions	5,698	3,526	2,340	1,018	1,410	399	64	289



Notes:
The state/territory and national results are based on the total number of admissions in major and large public hospitals located within each geographic area, restricted to hospitals with at least 10 admissions.

Source: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014).

Hip fracture average length of stay in hospital by peer group – 65 years and over

Resources

- Australian and New Zealand Hip Fracture Registry Steering Group. *Australian and New Zealand Guideline for Hip Fracture Care: Improving Outcomes in Hip Fracture Management of Adults*. 2014. Available at: www.anzhfr.org/images/resources/Guidelines/ANZ%20Guideline%20for%20Hip%20Fracture%20Care.pdf.

- National Institute for Health and Care Excellence. *The management of hip fracture in adults*. 2011. Available at: www.nice.org.uk/guidance/CG124/chapter/1-Guidance

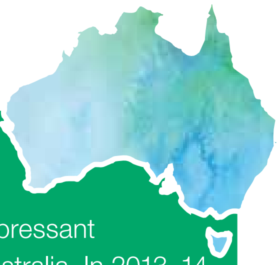
- Australian Commission on Safety and Quality in Health Care. *Hip Fracture Clinical Care Standard* (in development). Available at www.safetyandquality.gov.au/ccs.

- NSW Agency for Clinical innovation (ACI). *Minimum standards for the management of hip fracture in the older person*. 2014. Available at: www.aci.health.nsw.gov.au/__data/assets/pdf_file/0004/222727/Minimum-Standards-for-the-Management-of-Hip-Fractures.pdf.

1 Khan S, Kalra S, Khanna A, Thiruvengada M, Parker M. Timing of surgery for hip fractures: a systematic review of 52 published studies involving 291,413 patients. Injury. 2009;40:693–7.
2 British Geriatrics Society. The national hip fracture database national report 2012. London: BGS, 2012.
3 Ireland AW, Kelly PJ, Cumming RG. Total hospital stay for hip fracture: measuring the variations due to pre-fracture residence, rehabilitation, complications and comorbidities. BMC Health Services Research 2015;15:17.
4 Mak JCS, Cameron ID, March LM. Evidence-based guidelines for the management of hip fractures in older persons: an update. MJA 2010;vol 192,no. 1:37–41.
5 Neuburger J, Currie C, Wakeman R, Tsang C, Plant F, De Stavola B, et al. The impact of a national clinician-led audit initiative on care and mortality after hip fracture in England 2015; Medical Care 53(8)686–91.
6 Hawkes D, Baxter J, Bailey C, Holland G, Ruddlesdin J, Wall A, et al. Improving the care of patients with a hip fracture: a quality improvement report. BMJ Quality and Safety 2015;24:532–8.
7 Australian Orthopaedic Association National Joint Replacement Registry.Annual report for hip and knee arthroplasty. Adelaide: AOA, 2013
8 Australian Commission on Safety and Quality in Health Care. Hip fracture care clinical care standard. 2015. (Accessed 8 September 2015, at www.safetyandquality.gov.au/our-work/clinical-care-standards/hip-fracture-care-clinical-care-standard).
9 Australian Commission on Safety and Quality in Health Care. Joint working party of the Commission and the Independent Hospital Pricing Authority. ACSQHC 2015. (Accessed 8 September 2015, at: www.safetyandquality.gov.au/national-priorities/jwp-acsqhc-ihpa).
10 Australian Institute of Health and Welfare. The problem of osteoporotic hip fracture in Australia. Bulletin no. 76, Cat. no. AUS 121. Canberra: AIHW, 2010.

Chapter 4

Interventions for mental health and psychotropic medicines



At a glance

Almost half of the Australian population aged 16 to 85 will experience mental illness at some point in their life.

General practitioners prepared more than 950,000 mental health treatment plans in 2013–14. The number of services for the preparation of treatment plans in the area with the highest rate was 21 times that of the area with the lowest rate, and 3.5 times when the highest and lowest areas were excluded.

The greatest variation was shown in dispensing of prescriptions for psychotropic medicines for children and young people 17 years and under. More than 500,000 prescriptions for attention deficit hyperactivity disorder (ADHD) medicines were dispensed in Australia in 2013–14. The number of prescriptions in the area with the highest rate was 75 times more than in the area with the lowest rate. New South Wales had the highest average rate of dispensing out of all the states and territories, and had eight of the 12 local areas with the highest rates. Variation in rates of dispensing of antidepressant medicines and antipsychotic medicines to children and young people also varied greatly. Some local areas in New South Wales and Queensland had high dispensing rates across the three medicines for people 17 years and under.

Overall, large numbers of antidepressant medicines were dispensed in Australia. In 2013–14, nearly 15 million Pharmaceutical Benefits Scheme (PBS) prescriptions for antidepressants were dispensed to people aged 18 to 64. In addition, more than 400,000 prescriptions were dispensed to children and young adults, and more than 6.5 million prescriptions were dispensed to people aged 65 and over. Considerable variation is seen from area to area in the dispensing rates for prescriptions for antidepressants.

High volumes of anxiolytic and antipsychotic prescriptions were also dispensed to Australian adults, with large variation from area to area. Rates were particularly high for people aged 65 and over, and warrant scrutiny, particularly given the variation in anticholinesterase medicines dispensed for this age group which is highlighted in Chapter 6.

More than 900,000 prescriptions for antipsychotic medicines were dispensed for people aged 65 and over. The number of prescriptions was seven times higher in the area with the highest rate compared to the area with the lowest rate, and nearly 2.5 times when the highest and lowest areas were excluded. High and inappropriate prescribing of antipsychotic medicines has been documented in older people.

Interventions for mental health and psychotropic medicines

Recommendations

4a. The Commission refers the atlas findings on dispensing of mental health and psychotropic medications to the National Mental Health Commission for its recommendations on psychotropic drug prescribing including:

   i. use of psychotropic drugs in people 17 years and under

   ii. mechanisms for working with consumer groups to increase awareness of appropriate prescribing of antidepressant and anxiolytic medicines, as well as the benefits of non-pharmacological treatments.

4b. Clinicians adhere to current guidelines for treating behavioural and psychological symptoms in people with dementia, in particular those on the use of non-pharmacological strategies, and only prescribing medicines with demonstrated efficacy when necessary. Pharmacological treatment should target only those symptoms or behaviours that respond to medicines.

4c. The Australian Government Department of Health undertakes a national education campaign on the use of antipsychotic medicines for managing the behavioural and psychological symptoms of dementia. The campaign should ensure that clinicians and patients are aware that excessive or inappropriate use of antipsychotics in people aged 65 years and over has serious adverse effects.

4d. National boards and the Australian Health Practitioner Regulation Agency consider what actions could be taken to ensure relevant registered health practitioners have up-to-date knowledge of prescribing guidelines for antipsychotic drugs.

4e. The Australian Government Department of Health conducts an audit of antipsychotic medicines prescribing practices in the high outlier prescribing regions identified in the atlas findings.

Background

Almost half of Australian adults – nearly 7.3 million people aged 16 to 85 – will experience a mental illness at some point in their lifetime. In addition, almost 600,000 young people aged between four and 17 are affected by a clinically significant mental health problem each year.[1]

Mental illness significantly affects how a person thinks, behaves and interacts with other people.[2] It includes a wide range of conditions and disorders that vary in impact and severity. Mental illness results from complex interactions between the mind, body and environment.

Factors that can contribute to mental illness are:

- long-term and acute stress
- biological factors such as genetics, chemistry and hormones
- use of alcohol and other drugs and substances
- cognitive patterns such as constant negative thoughts and low self-esteem
- social factors such as isolation, financial problems, family breakdown or violence
- community stressors, such as natural disasters.[3]

These factors can be minimised by a strong and supportive community environment. Good mental health involves a sense of wellbeing, confidence and self-esteem. It enables us to fully enjoy and appreciate other people, our day-to-day life and environment, and cope with the normal stressors of life. Good mental health is not merely the absence of mental illness.

The effect of mental illness on individuals and families can be severe and its influence on society is far reaching.[4] The economic cost of mental ill health to Australia is enormous; all up, direct and indirect costs, lost productivity and related job turnover represent an estimated $40 billion a year.[1]

In recent years, the dispensing of antidepressants, antipsychotics and attention deficit hyperactivity disorder medicines has increased in Australia.[5,6] General practitioners, psychiatrists and paediatricians can prescribe these medicines.

Mental health interventions include pharmacological and non-pharmacological types such as cognitive and behavioural therapies, as well as psychosocial support. Pharmacological and non-pharmacological interventions both have a role to play in managing mental illness.

Chapter overview

This chapter includes:

- general practitioner mental health treatment plans
- antidepressant medicines dispensing 17 years and under
- antidepressant medicines dispensing 18–64 years
- antidepressant medicines dispensing 65 years and over
- anxiolytic medicines dispensing 18–64 years
- anxiolytic medicines dispensing 65 years and over
- antipsychotic medicines dispensing 17 years and under
- antipsychotic medicines dispensing 18–64 years
- antipsychotic medicines dispensing 65 years and over
- attention deficit hyperactivity disorder medicines dispensing 17 years and under.

International comparisons

The variations apparent in Australian psychotropic medicine dispensing are similar to those reported in the United States and New Zealand; for example, the use of antipsychotic and anxiolytic medicines by adults in New Zealand increased with age.[7] In the United States, the Dartmouth Atlas reported substantial geographical variation in the dispensing of psychotropic medicines for children and people aged under 18.[8]

Of note is the sheer volume of antidepressant medicines dispensed in Australia. Nearly 15 million prescriptions for antidepressant medicines were dispensed for people aged 18 to 64. Australia ranks second only to Iceland using the international standard of comparison: defined daily dose (DDD) per 1,000 inhabitants per day (DDD/1,000/day).[9] For more detail, refer to figure 62.

Interventions for mental health and psychotropic medicines

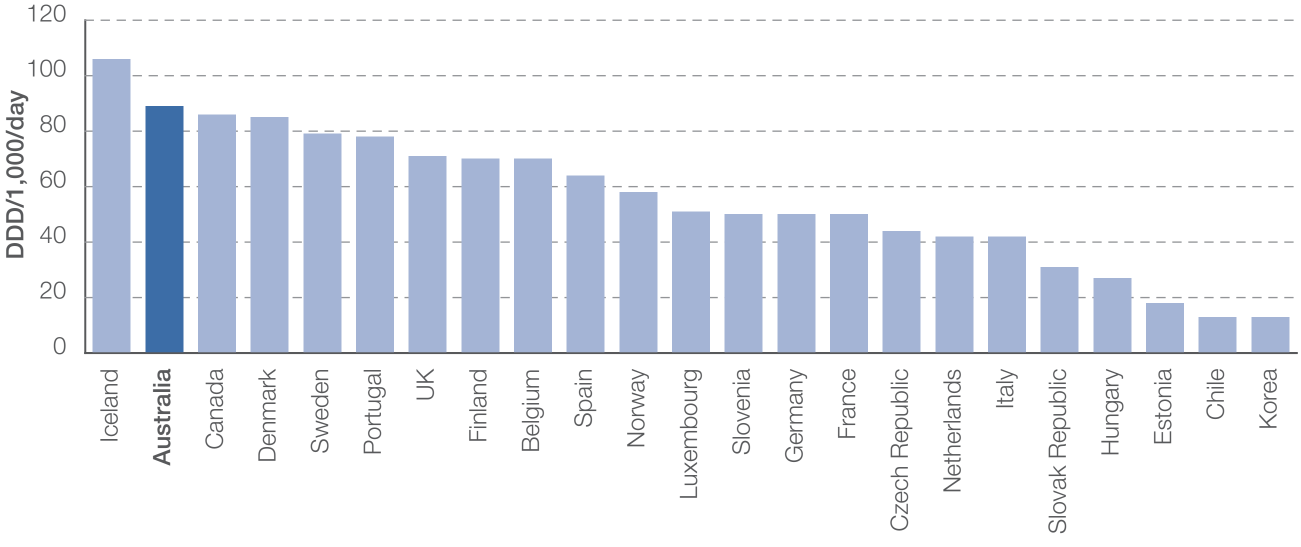
Australian initiatives

The information in this chapter complements work underway to address mental illness at a national level, which is described in documents including:

- the National Mental Health Strategy,[10] a commitment by Australian governments to improve the lives of people with mental illness, and to develop mental health programs and services that better address their mental health needs
- the Mental Health Services Report,[11] produced by the Australian Institute of Health and Welfare – it provides the most recent information about mental health-related services in Australia
- the National Report Card on Mental Health and Suicide Prevention,[12] produced by the National Mental Health Commission, which provides recommendations to ensure that all Australians achieve the best possible mental health and wellbeing
- the National Review of Mental Health Programmes and Services,[1] which assessed how efficient and effective mental health programs and services were in enabling individuals (and their families) experiencing mental health problems to lead a fulfilling life and engage productively in the community
- Choosing Wisely Australia,[13] an initiative established in 2015 and led by Australia's medical colleges and consumer groups to help practitioners, consumers and healthcare stakeholders start important conversations about tests, treatments and procedures if evidence shows they provide no benefit or may lead to harm
- the Commission's forthcoming Delirium Clinical Care Standard,[14] which will address inappropriate use of antipsychotic medicines for patients with delirium.

Significant work to address mental illness is also being undertaken at state and territory level.

Figure 62: Comparing defined daily dose/1,000/day for antidepressant use in Australia and other OECD countries



Source: Organisation for Economic Co-operation and Development. Health at a Glance 2013: OECD Indicators. Paris: OECD Publishing, 2013.

About the data

All data is based on patients' residential postcodes rather than where the medicine was dispensed or the service received. The data represents the number of services delivered per 100,000 population, and includes repeat services provided for individuals.

The data regarding medicines to treat mental illness comes from the PBS and shows the number of PBS prescriptions dispensed for each class of medicine.

The mental health treatment plan data comes from the Medicare Benefits Schedule (MBS) and shows the number of MBS plans general practitioners prepared under the category of general practitioner mental health treatment plans.

A number of limitations are implicit in the atlas data, including:

- the information reported includes data outliers, so caution should be exercised when interpreting the analysis
- data within a small area may reflect chance variations and can be influenced by a dense cluster of high-risk individuals, or many repeat events for a few individuals
- the data has not been analysed to determine how rates of dispensing relate to health outcomes
- dispensing from some remote area Aboriginal Health Services which are not captured in the PBS, resulting in artificially low rates of dispensing in many remote communities.

1 National Mental Health Commission. The national review of mental health programmes and services. Sydney: NMHC, 2014.
2 Australian Government Department of Health and Ageing. What is mental illness? Canberra: Department of Health, 2007.
3 World Health Organization. Mental health in emergencies: Factsheet 383. 2013. (Accessed 11 September 2015 at: www.who.int/mediacentre/factsheets/fs383/en).
4 Australian Institute for Health and Welfare. Australia's health 2014. Australia's health series no. 14. Cat. no. AUS 178. Canberra: AIHW, 2014.
5 Karanges EA, Stephenson CP, McGregor IS. 2014. Longitudinal trends in the dispensing of psychotropic medications in Australia from 2009–2012: focus on children, adolescents and prescriber specialty. ANZJP 2014 Oct;48(10):917–31.
6 Drug Utilisation Sub-Committee. Use of antipsychotics in the middle aged. Canberra: Pharmaceutical Benefits Advisory Committee, Pharmaceutical Benefits Scheme, 2013.
7 Health Quality & Safety Commission New Zealand. Polypharmacy in older people. 2015. (Accessed 11 September 2015 at: www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/atlas-of-healthcare-variation/polypharmacy-in-older-people).
8 Goodman DC, Morden NE, Ralston SL, Chang CHC, Parker DM, Weinstein SJW. The Dartmouth Atlas of Children's Health Care in Northern New England. Lebanon, NH: The Dartmouth Institute for Health Policy & Clinical Practice, 2013.
9 Organisation for Economic Co-operation and Development. Health at a Glance 2013: OECD Indicators. Paris: OECD Publishing, 2013.
10 Australian Government Department of Health. National mental health strategy. 2014. (Accessed 11 September 2015 at: www.health.gov.au/internet/main/publishing.nsf/content/mental-strat).
11 Australian Institute of Health and Welfare. Mental health. 2015. (Accessed 11 September 2015 at: www.aihw.gov.au/mental-health).
12 National Mental Health Commission. A contributing life: the 2013 national report card on mental health and suicide prevention. Sydney: NMHC, 2013.
13 National Pharmaceutical Benefits Scheme. Choosing wisely Australia. 2015. (Accessed 11 September 2015 at: www.choosingwisely.org.au).
14 Australian Commission on Safety and Quality in Healthcare. Delirium clinical care standard. 2015. (Accessed 18 September 2015 at: www.safetyandquality.gov.au/our-work/clinical-care-standards/delirium-clinical-care-standard).

4.1 General practitioner mental health treatment plans

Context

This data item examines the number of mental health treatment plans prepared by general practitioners. These data are sourced from the MBS and show the number of plans prepared per 100,000 population.

General practitioners are often the first contact for people needing mental health support. Reforms in 2006 aimed to increase access to mental health care by introducing Medicare reimbursement for general practitioner mental health services. However, debate is ongoing about the relative importance of mental health treatment plans compared with other interventions such as referral to specialist services.[1]

Mental health treatment plans provide a structured framework that general practitioners can use to carry out early intervention, assessment and management of patients with mental disorders. Importantly, they also provide referral pathways to other health professionals.[2]

Preparing a mental health treatment plan involves assessing the patient and then developing content. An important component of the plan is follow-up of the treatment, especially for people with depression and anxiety. If completed as indicated, the plans represent evidence of clinician concern with, and willingness to address, mental health. That is, they are a sign of good mental health practice. The plans are the gateway to access psychological therapy interventions, which evidence suggests are underused in some communities.[3] An evaluation of MBS-funded mental health treatment plans found that treatment rates for Australians with mental illness increased as a result. However, it also found that some groups such as young people aged less than 15 years, men, people living in rural and remote regions and people living in areas of high socioeconomic disadvantage are not accessing the services they need.[1]

The data includes MBS items relating to general practitioner preparation of mental health treatment plans. They do not include MBS items for mental health plan reviews or other general practitioner attendance for mental health, or services provided through the program Access to Allied Psychological Services.

General practitioner mental health treatment plans

Magnitude of variation

In 2013–14, there were 965,946 MBS-funded services for the preparation of mental health treatment plans by general practitioners, representing 4,260 services per 100,000 people (the Australian rate).

The number of MBS-funded services for the preparation of mental health treatment plans by general practitioners across 325* local areas (SA3s) ranged from 354 to 7,427 per 100,000 people. The number of services was **21.0 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of services varied across states and territories, from 1,705 per 100,000 people in the Northern Territory, to 4,769 in Victoria.

After excluding the highest and lowest results, the rate of services for the preparation of general practitioner mental health treatment plans across the 302 remaining local areas was **3.5 times higher** in one local area compared to another.

The lowest rates of general practitioner prepared mental health treatment plans were in remote SA3s in the Northern Territory, Queensland and Western Australia. Rates were higher in areas along the east coast of Australia, and around capital cities, especially in outer suburbs.

The highest rates of general practitioner prepared mental health treatment plans were in major cities and inner regional areas. Rates decreased with increased distance from urban centres. In major cities and inner and outer regional areas, rates were lower in areas of high and low socioeconomic status.

Interpretation

Potential reasons for the variation include differences in:

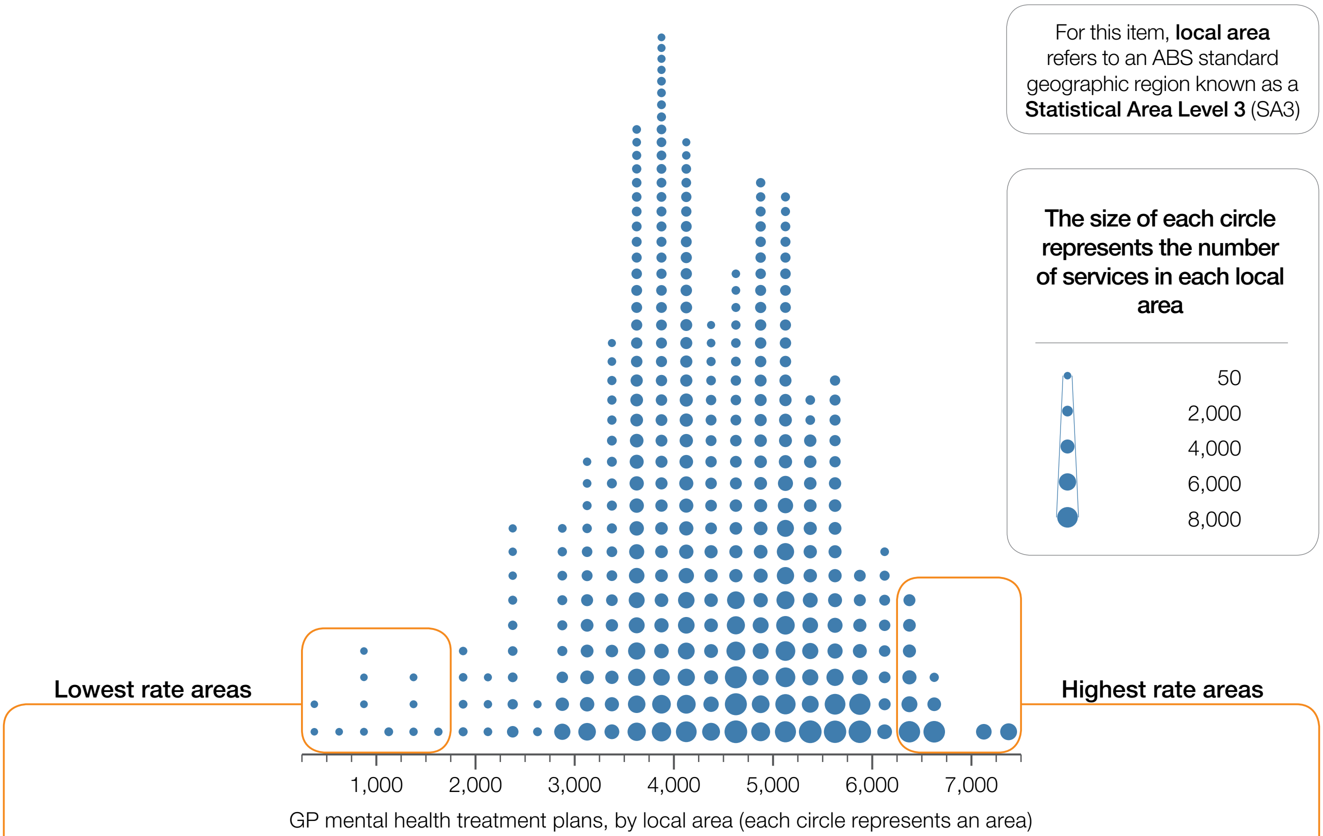
- patterns of relative access to general practitioners, specialist psychiatrists, psychologists, mental health nurses and allied health professionals
- decision-making criteria between clinicians and patients about the need for mental health treatment plans.

To explore this variation, further analysis could focus on:

- longitudinal analysis of the number of new general practitioner mental health treatment plan preparations each year (including the proportion of first-time users)
- patients who had mental health treatment plans prepared who also received follow-up services from a general practitioner
- patients who had mental health treatment plans prepared who also accessed allied psychological services through the plan (as provided by appropriately qualified psychologists, social workers and occupational therapists)[3]
- comparing the Bettering the Evaluation and Care of Health (BEACH) data for the number of people general practitioners see with mental health problems to determine whether general practitioners in remote areas treat fewer people with mental health problems, or if these general practitioners are just not developing mental health plans for their patients.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of services in these areas.

Figure 63: Number of MBS-funded services for the preparation of mental health treatment plans by general practitioners per 100,000 people, age standardised, by local area, 2013–14



Local area	State	Rate	Services
Daly - Tiwi - West Arnhem	NT	354	58
East Arnhem	NT	362	61
Katherine	NT	566	121
Gascoyne	WA	753	68
Far North	Qld	816	263
Barkly	NT	902	62
Outback - South	Qld	970	182
Pilbara	WA	1,156	828
Litchfield	NT	1,274	271
Kimberley	WA	1,399	578
Esperance	WA	1,421	218
Outback - North	Qld	1,648	581

Local area	State	Rate	Services
Coffs Harbour	NSW	7,427	5,748
Richmond Valley - Coastal	NSW	7,030	4,966
Nambour - Pomona	Qld	6,641	3,795
Frankston	Vic	6,602	8,620
Gold Coast Hinterland	Qld	6,522	1,101
Baw Baw	Vic	6,479	2,751
Maroochy	Qld	6,479	3,458
Tweed Valley	NSW	6,433	5,172
Mornington Peninsula	Vic	6,343	8,492
Coolangatta	Qld	6,309	3,196
Port Macquarie	NSW	6,280	4,083

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of services and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

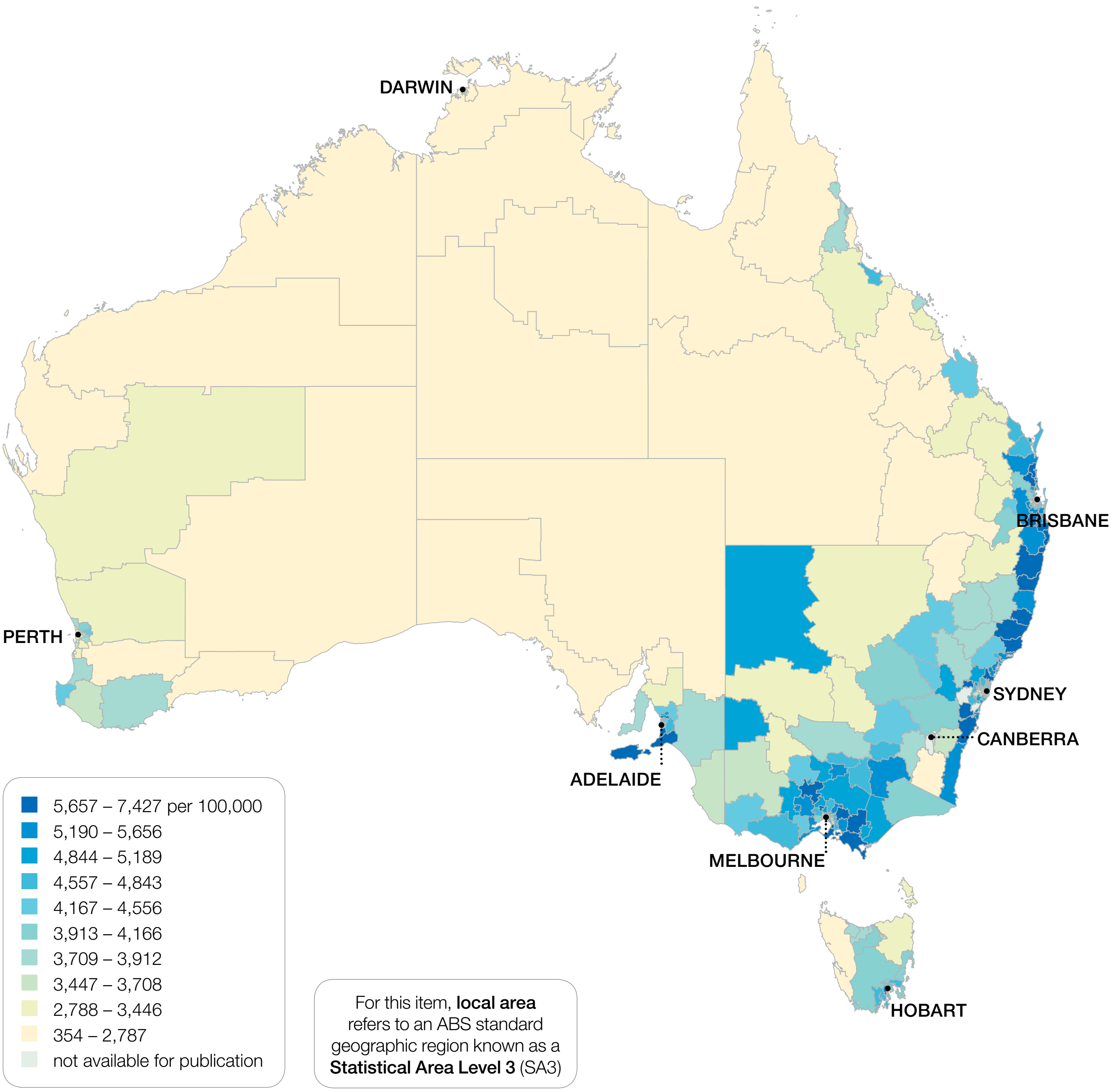
MBS statistics exclude services provided free of charge to public patients in hospitals, to Department of Veterans' Affairs beneficiaries, some patients under compensation arrangements and through other publicly funded programs.
SA3 analysis excludes approximately 1,240 services from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

General practitioner mental health treatment plans

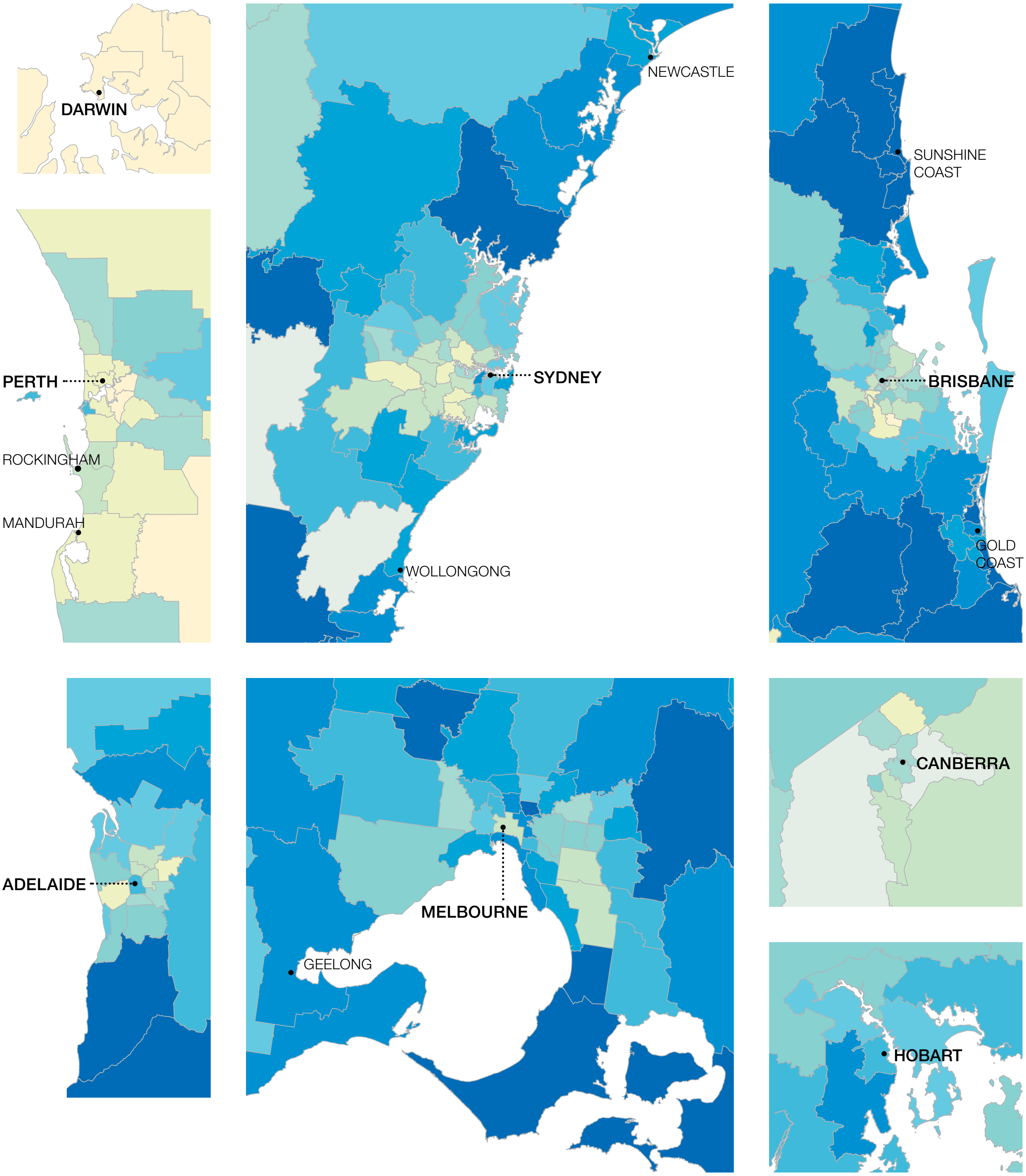
Figure 64: Number of MBS-funded services for the preparation of mental health treatment plans by general practitioners per 100,000 people, age standardised, by local area, 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of MBS-funded services for the preparation of mental health treatment plans by general practitioners across 325 local areas (SA3s) ranged from 354 to 7,427 per 100,000 people. The number of services was **21.0 times higher** in the area with the highest rate compared to the area with the lowest rate.

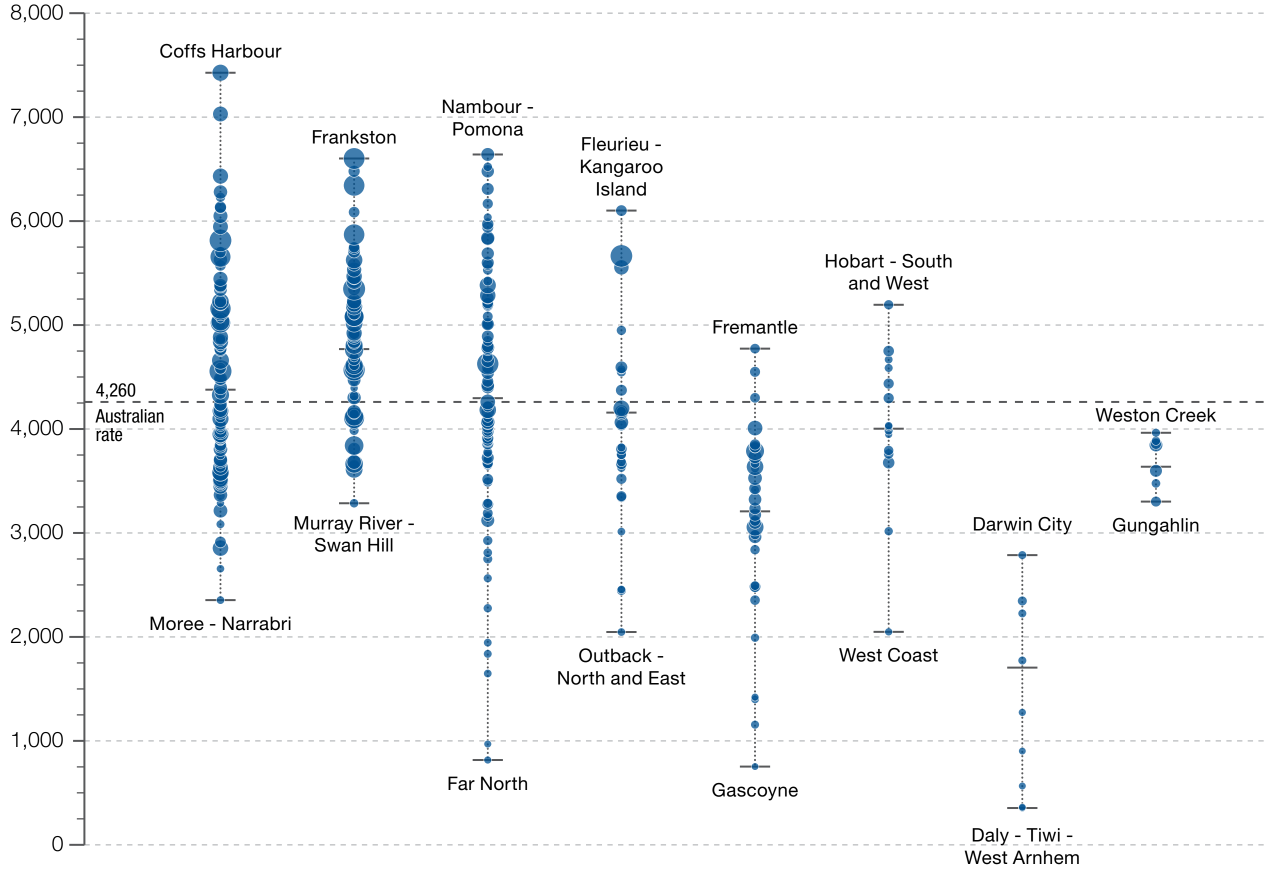


Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

General practitioner mental health treatment plans

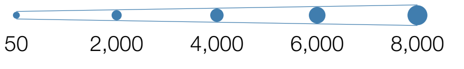
Figure 65: Number of MBS-funded services for the preparation of mental health treatment plans by general practitioners per 100,000 people, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	7,427	6,602	6,641	6,101	4,773	5,195	2,787	3,964
State/territory	4,378	4,769	4,297	4,158	3,208	4,003	1,705	3,637
Lowest rate	2,354	3,286	816	2,047	753	2,049	354	3,302
No. services	315,682	269,058	196,570	66,406	80,751	19,098	4,266	14,090



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of services in each local area



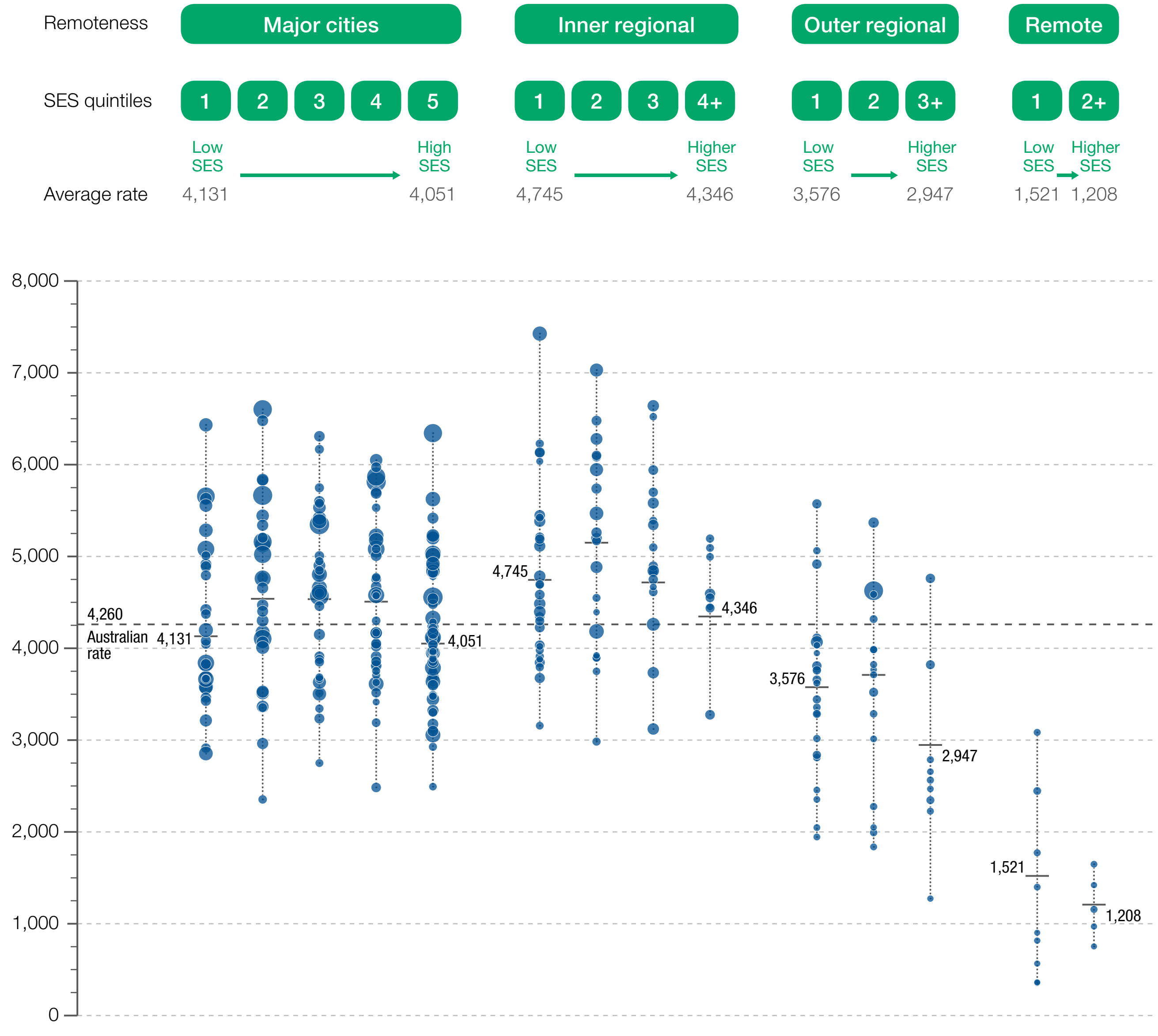
Notes:

Rates are standardised based on the age structure of the Australian population in 2001.

State/territory and national rates are based on the total number of services and people in the geographic area.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 66: Number of MBS-funded services for the preparation of mental health treatment plans by general practitioners per 100,000 people, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of services in each local area

50 2,000 4,000 6,000 8,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of services and people in Australia.
Average rates are based on the total number of services and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Department of Human services Medicare Benefits statistics 2013–14 (data supplied 12/08/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

General practitioner mental health treatment plans

Resources

- Australian Institute of Health and Welfare. *Mental health services – in brief 2014*. Cat. no. HSE 154. 2014. Available at: www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129549620.
- Meadows GN, Enticott JC, Inder B, Russell GM, Gurr R. *Better access to mental health care and the failure of the Medicare principle of universality*. The Medical Journal of Australia. 2015;202(4):190–94.
- Royal Australian College of General Practice. *The General Practice Mental Health Standards Collaboration*. Available at: http://www.racgp.org.au/education/gpmhsc/.

1 Pirkis J, Harris M, Hall W, Ftanou M. Evaluation of the better access to psychiatrists, psychologists and general practitioners through the MBS initiative: summative evaluation. Melbourne: The University of Melbourne Centre for Health Policy, Programs and Economics, 2011.
2 Department of Health. Better access to psychiatrists, psychologists and general practitioners through the MBS (better access) initiative. 2014. (Accessed 31 August 2015 at: www.health.gov.au/internet/main/publishing.nsf/Content/mental-ba).
3 Dolja-Gore X, Loxton DJ, D'Este CA, Byles JE, Mental health service use: Is there a difference between rural and non-rural women in service uptake?, *Aust. J. Rural Health*, 22, 92–100, 2014

4.2 Antidepressant medicines dispensing 17 years and under

Context

This data item examines dispensing rates of antidepressant medicines for people 17 years and under. These data are sourced from the PBS and relate to the number of prescriptions dispensed per 100,000 people.

Antidepressant medicines are primarily prescribed for anxiety, rather than depression, in children.

Anxiety- and depression-related disorders are increasingly being recognised in young people.[1] Children with an anxiety disorder may experience persistent and excessive worry; feel restless or on edge; be easily fatigued or irritable; have difficulty concentrating; or experience muscle tension, sleep disturbance[2] or recurrent headaches and stomach aches.[3] The anxiety, worry or physical symptoms cause clinically significant distress or impairment in social or other important day-to-day functioning.[2]

Depression tends to be diagnosed more often in adolescents than in younger children. As well as a depressed mood or loss of interest or pleasure, children may experience two or more weeks of emotional, behavioural and cognitive symptoms such as irritability or social withdrawal; tiredness; change in appetite or weight; vague or unexplained physical problems; sleeping problems; and difficulty concentrating, making decisions or remembering information.[2] Depressive disorders are thought to affect up to four per cent of Australian children.[4]

Left untreated, anxiety and depressive disorders can be especially serious for young people; they can have long-term consequences for adolescents' mental health, school engagement and development. Psychological therapy is the optimal choice for less severe depression[5] and anxiety, but for more severe anxiety- and depression-related disorders, antidepressant or anxiolytic medicines may be considered in conjunction with psychological therapies.

Within the reported dispensing data, it is not possible to determine whether these medicines were prescribed for depression or anxiety, or for other mental health conditions such as obsessive-compulsive disorder.

Antidepressant medicines dispensing 17 years and under

Magnitude of variation

In 2013–14, there were 404,276 PBS prescriptions dispensed for antidepressant medicines, representing 7,989 prescriptions per 100,000 people aged 17 years and under (the Australian rate).

The number of PBS prescriptions dispensed for antidepressant medicines across 324* local areas (SA3s) ranged from 386 to 16,844 per 100,000 people aged 17 years and under. The number of prescriptions was **43.6 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 3,589 per 100,000 people aged 17 years and under in the Northern Territory, to 10,613 in the Australian Capital Territory.

After excluding the highest and lowest results, the antidepressant medicine prescription rate across the 300 remaining local areas was **4.1 times higher** in one local area compared to another.

Dispensing rates were highest in inner regional areas and lowest in remote communities.

The prescription rate was influenced by socioeconomic status and geographical remoteness. In major cities, areas of higher socioeconomic status had higher prescription rates. The reverse was seen in inner regional areas, where prescription rates were highest in areas of low socioeconomic status, and declined as the socioeconomic status increased. Socioeconomic trends were less clear in the other geographical areas.

Interpretation

Potential reasons for the variation include differences in:

- the proportion of children who are at risk of depression and anxiety
- cost and supply barriers to accessing optimal treatment pathways, including psychosocial interventions[6]
- prescribing practices, training, knowledge and attitudes of clinicians
- decision-making criteria of patients and clinicians about the need for antidepressant medicines
- the affordability and accessibility of mental health services suitable for young people, including psychosocial interventions in regional locations
- location of youth correction centres in areas of higher dispensing.

It is also important to note that the dispensing of antidepressant medicines in remote areas by some Aboriginal Health Services is not captured in the PBS.

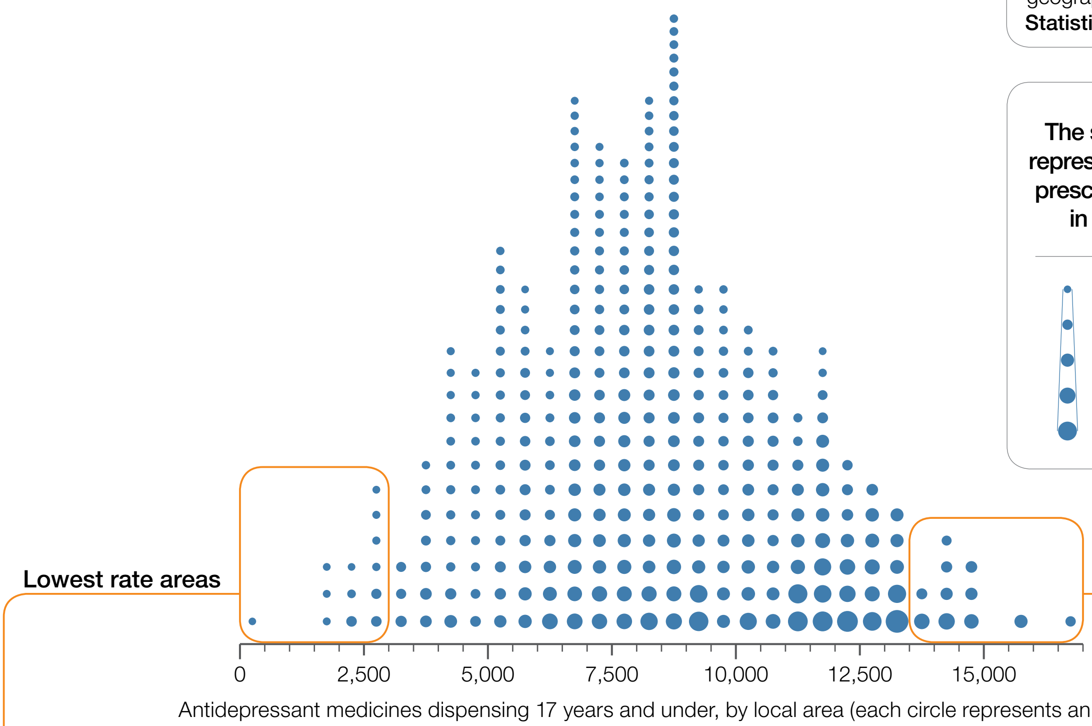
To explore this variation, further analysis could focus on:

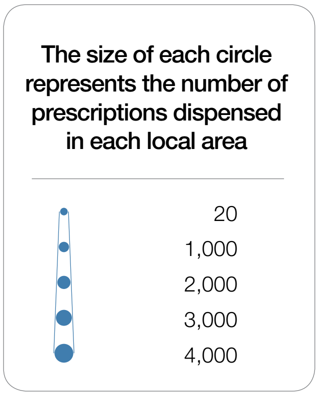
- the variation in different socioeconomic groups and geographical locations for antidepressant and anxiolytic medicine dispensing rates for people under the age of 18
- the variation in dispensing rates between primary and specialist care providers
- determining how limited access to mental health services in regional locations influences the dispensing rate
- exploring differences between pre- and post-puberty age groups to determine whether variations in dispensing rates are seen throughout childhood and adolescence
- excluding tricyclic antidepressants from this analysis, as tricyclic antidepressants, notably amitriptyline, are commonly used in young children for bed-wetting.

*There are 333 SA3s. For this item, data were suppressed for 9 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 67: Number of PBS prescriptions dispensed for antidepressant medicines per 100,000 people aged 17 years and under, age standardised, by local area, 2013–14

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)





Local area	State	Rate	Prescriptions
Daly - Tiwi - West Arnhem	NT	386	22
Kimberley	WA	1,767	158
Katherine	NT	1,805	100
Far North	Qld	1,823	146
Fairfield	NSW	2,360	1,092
Auburn	NSW	2,452	411
Gascoyne	WA	2,492	48
Outback - North	Qld	2,578	200
Melbourne City	Vic	2,679	240
East Arnhem	NT	2,737	115
Merrylands - Guildford	NSW	2,819	960
Alice Springs	NT	2,845	291
Dandenong	Vic	2,899	1,081

Local area	State	Rate	Prescriptions
Great Lakes	NSW	16,844	1,006
Taree - Gloucester	NSW	15,501	2,001
Southern Highlands	NSW	14,823	1,676
Maitland	NSW	14,546	2,467
Wellington	Vic	14,525	1,462
Hobart - North West	Tas	14,496	1,671
Bribie - Beachmere	Qld	14,244	878
Wagga Wagga	NSW	14,218	3,142
Gippsland - East	Vic	14,159	1,312
Strathpine	Qld	13,880	1,215
Tamworth - Gunnedah	NSW	13,829	2,831

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

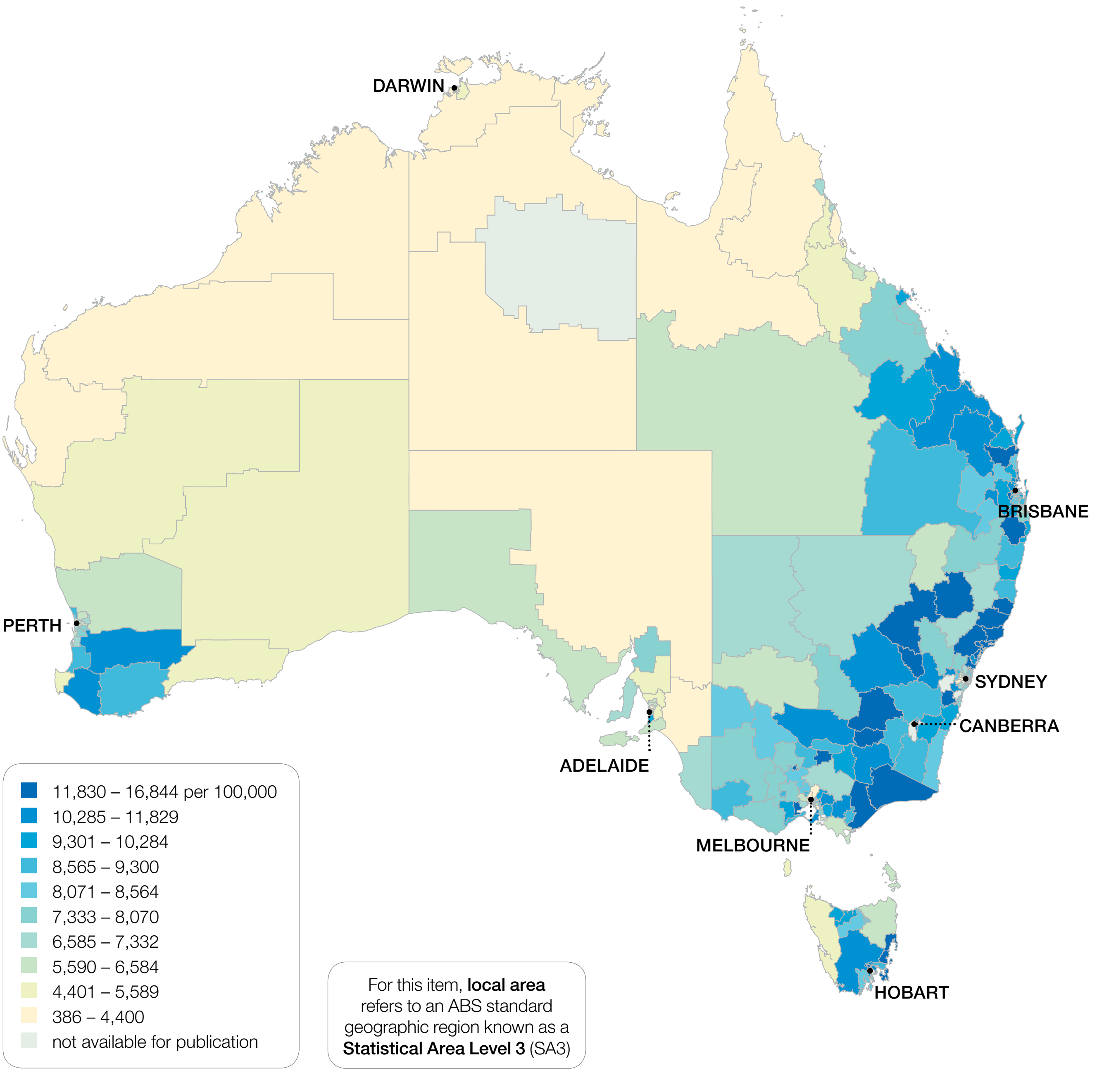
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions.
SA3 analysis excludes approximately 180 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

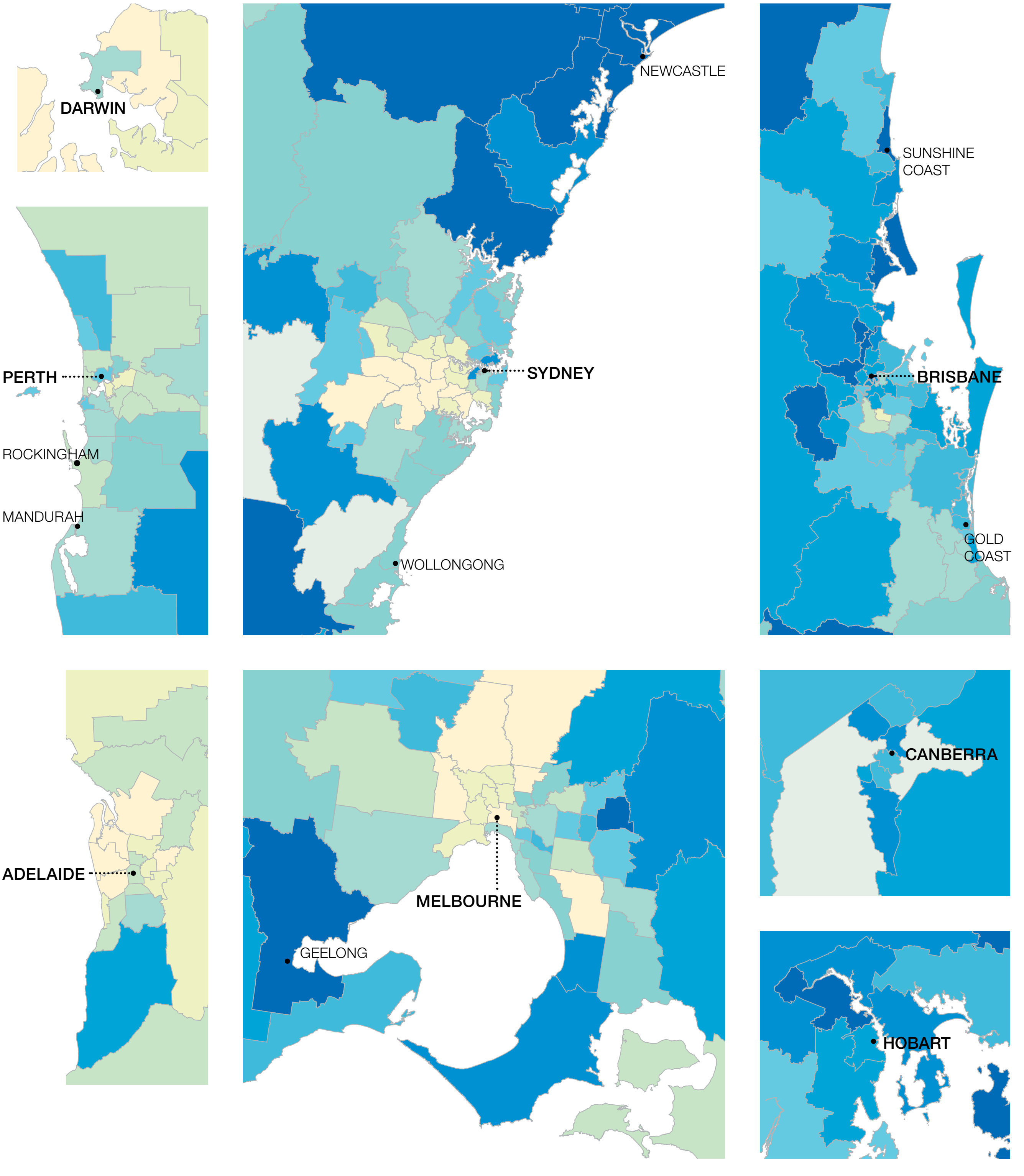
Antidepressant medicines dispensing 17 years and under

Figure 68: Number of PBS prescriptions dispensed for antidepressant medicines per 100,000 people aged 17 years and under, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for antidepressant medicines across 324 local areas (SA3s) ranged from 386 to 16,844 per 100,000 people aged 17 years and under. The number of prescriptions was **43.6 times higher** in the area with the highest rate compared to the area with the lowest rate.

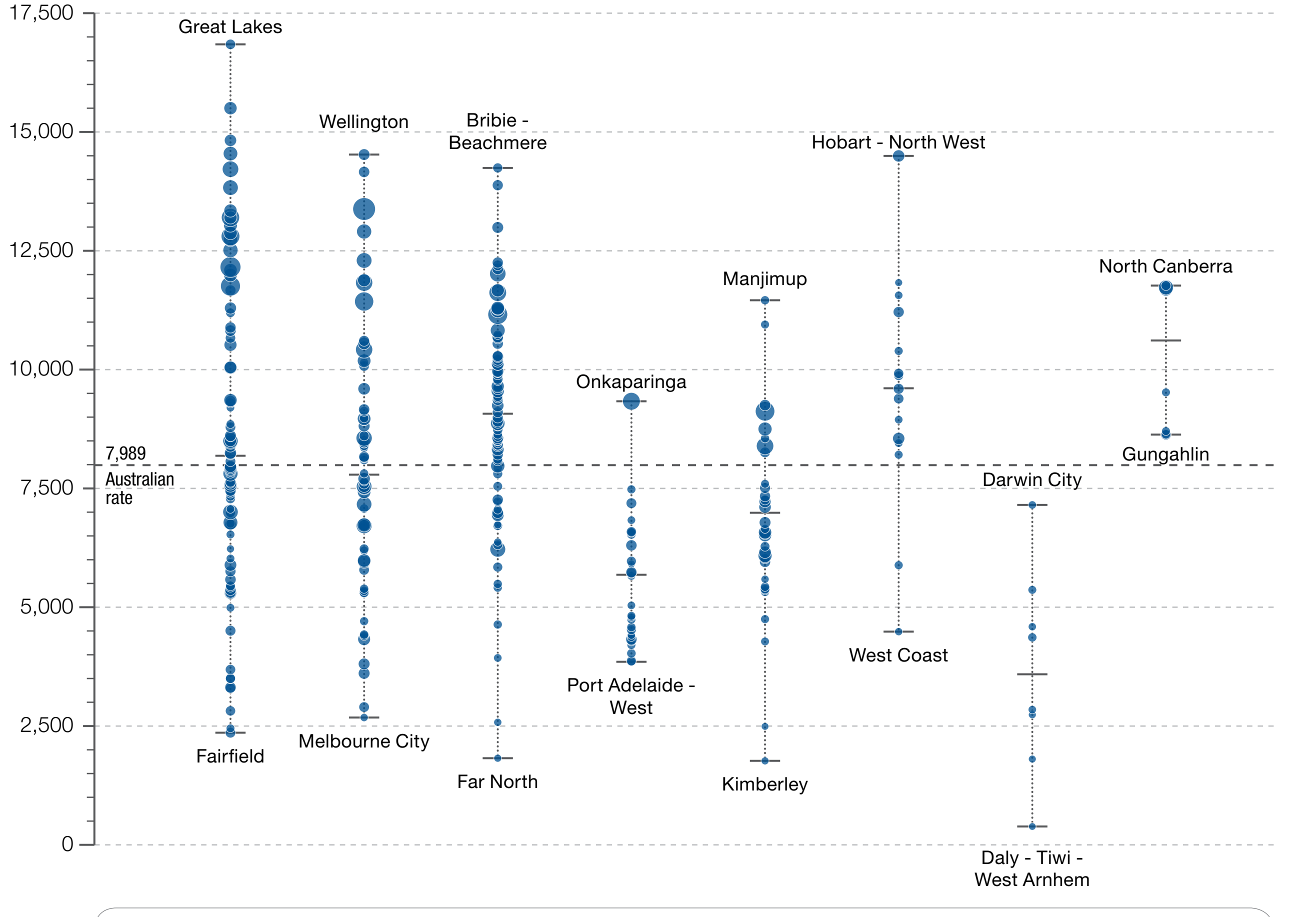


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antidepressant medicines dispensing 17 years and under

Figure 69: **Number of PBS prescriptions dispensed for antidepressant medicines per 100,000 people aged 17 years and under, age standardised, by local area, state and territory, 2013–14**

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	16,844	14,525	14,244	9,334	11,459	14,496	7,152	11,768
State/territory	8,187	7,789	9,072	5,682	6,987	9,608	3,589	10,613
Lowest rate	2,360	2,679	1,823	3,852	1,767	4,486	386	8,632
No. prescriptions	131,754	94,391	97,501	20,338	38,714	11,212	2,094	8,230



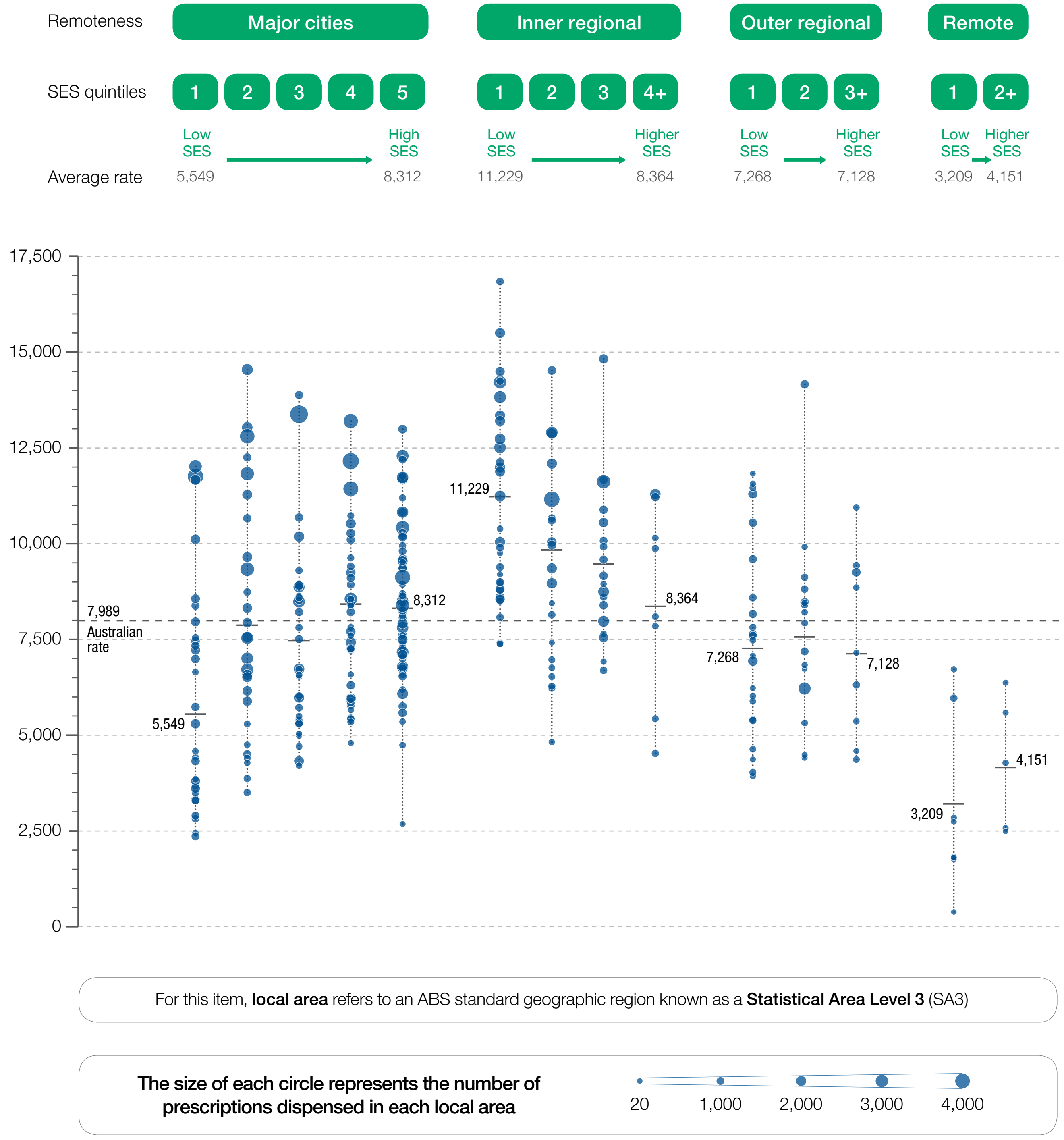
For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area 20 1,000 2,000 3,000 4,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 70: Number of PBS prescriptions dispensed for antidepressant medicines per 100,000 people aged 17 years and under, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antidepressant medicines dispensing 17 years and under

Resources

- Beyondblue. *Clinical practice guidelines: Depression in adolescents and young adults*. 2010. Available at: www.nhmrc.gov.au/_files_nhmrc/publications/attachments/ext0007_cp_guideline_depression_adolescents_young_beyondblue.pdf.

- American Academy of Child and Adolescent Psychiatry. *Practice Parameter for the Assessment and Treatment of Children and Adolescents with Anxiety Disorders*. 2007. Available at: www.jaacap.com/article/S0890-8567(09)61838-4/pdf.

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1 Lawrence D, Johnson S, Hafekost J, Boterhoven de Haan K, Sawyer M, Ainley J et al. The mental health of children and adolescents. Report on the second Australian child and adolescent survey of mental health and wellbeing. Canberra: Department of Health, 2015.
2 American Psychiatric Association. Diagnostic and statistical manual of mental disorders: DSM-5. Washington, D.C: APA; 2013.
3 Raising Children Network. Pre-teen and teenage depression. 2014. (Accessed 31 August 2015 at: http://raisingchildren.net.au/articles/depression_teenagers.html/context/1068).
4 Sawyer MG, Arney FM, Baghurst PA, Clark JJ, Graetz BW, Kosky RJ et al. The mental health of young people in Australia. Canberra: Mental Health and Special Programs Branch, Commonwealth Department of Health and Aged Care, 2000.
5 Beyondblue. Clinical practice guidelines: depression in adolescents and young adults. Melbourne: beyondblue: the national depression initiative, 2010.
6 Spence R, Roberts A, Ariti C, Bardsley M. QualityWatch. Focus on: antidepressant prescribing. Trends in the prescribing of antidepressants in primary care. Health Foundation and Nuffield Trust 2014.

4.3 Antidepressant medicines dispensing 18–64 years

Context

This data item examines the dispensing rates of antidepressant medicines for people aged 18 to 64. These data are sourced from the PBS and relate to the number of prescriptions dispensed per 100,000 people.

Antidepressants are a class of medicine used to treat depression. Every year, about one in 25 Australian adults meets the criteria for being diagnosed with depression.[1] Clinical depression is a condition that lasts more than two weeks and can be very disabling, affecting a person's emotions, thinking, behaviour and physical wellbeing.[2] There is no evidence to suggest that depression increases with age; in fact, severe depression is less common in adults 65 and over who are living in the community than in those aged 64 and under.[1]

Depression is commonly dealt with in the primary care setting. During 2010–11, it ranked second (after hypertension) among chronic problems most frequently seen by general practitioners.[3]

Non-pharmacological interventions are the optimal treatment for milder forms of depression;[2] moderate to severe depression is best treated with a combination of social and psychological interventions and antidepressant medicines. Some antidepressant medicines can also be used to treat neuropathic pain and some anxiety disorders.

With effective treatment about half the people with moderate depression will show great improvement within six to eight weeks. For those whose depression goes untreated, the duration of their condition varies widely. Some will get better after several months, some will recover partially, and others will continue to have longer-term problems. People who have been prescribed medicine to treat depression usually need to continue taking this medicine for between six and 24 months.[4]

Antidepressant medicines dispensing 18–64 years

Magnitude of variation

In 2013–14, there were 14,933,534 PBS prescriptions dispensed for antidepressant medicines, representing 101,239 prescriptions per 100,000 people aged 18 to 64 years (the Australian rate).

The number of PBS prescriptions dispensed for antidepressant medicines across 325* local areas (SA3s) ranged from 14,981 to 175,380 per 100,000 people aged 18 to 64 years. The number of prescriptions was **11.7 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 55,785 per 100,000 people aged 18 to 64 years in the Northern Territory, to 139,004 in Tasmania.

After excluding the highest and lowest results, the antidepressant medicine prescription rate across the 305 remaining local areas was **2.8 times higher** in one local area compared to another.

Of note is the sheer volume of antidepressant medicines dispensed, with nearly 15 million PBS prescriptions dispensed.

Dispensing rates tended to be higher in inner and outer regional areas than in major cities and were lowest in remote communities.

There was a clear relationship between socioeconomic status and the dispensing rate in regional areas: dispensing rates were highest in areas of low socioeconomic status, decreasing in areas that had a higher socioeconomic status. This relationship was not evident in metropolitan areas.

Interpretation

Potential reasons for the variation include differences in:

- the prevalence of risk factors for depression in different areas
- access to optimal alternate treatment pathways, including psychosocial interventions
- access to medical and mental health services in regional and remote locations, and within disadvantaged communities[5]
- clinicians' assumptions that individuals want pharmacological assistance[6]
- prescribing practices, training, knowledge and attitudes of clinicians
- decision-making criteria of patients and clinicians about the need for antidepressant medicines.

It is also important to note that the dispensing of antidepressant medicines in remote areas by some Aboriginal Health Services is not captured in the PBS.

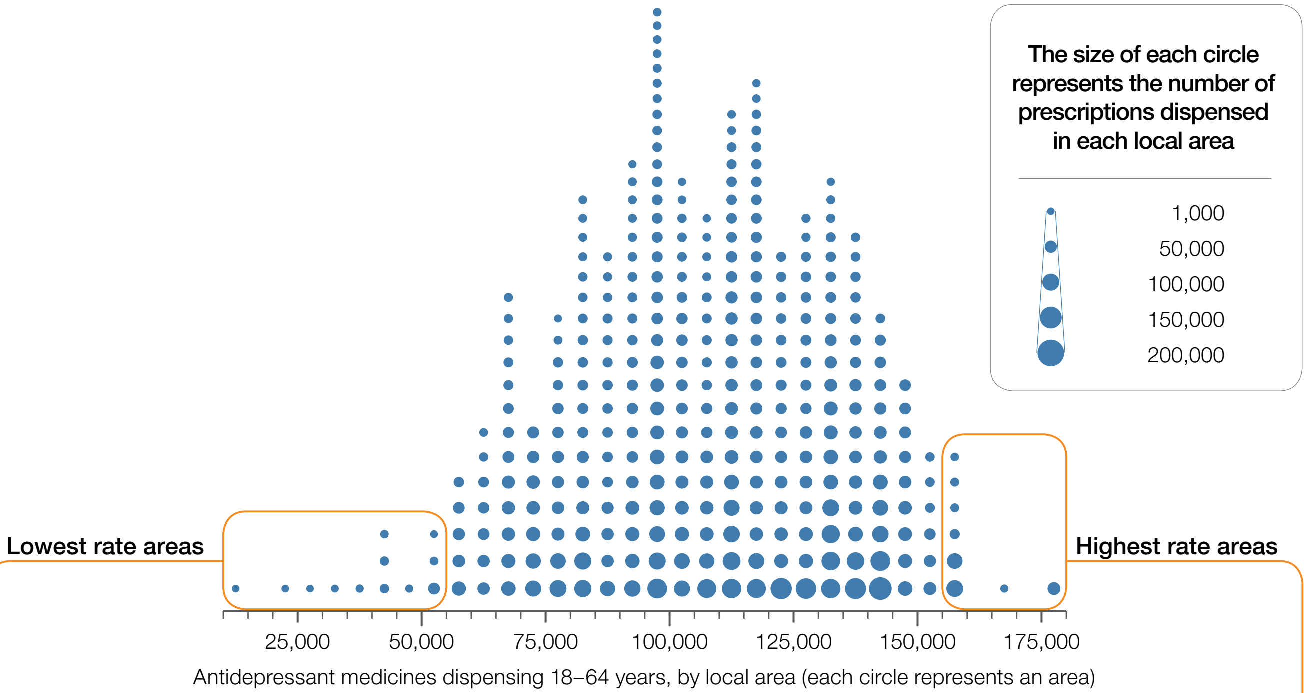
To explore this variation, further analysis could focus on:

- the individual- and system-level factors that lead to unwarranted variations in antidepressant dispensing rates among those aged 18 to 64
- whether access to mental health services affects the variation in dispensing rates.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 71: Number of PBS prescriptions dispensed for antidepressant medicines per 100,000 people aged 18 to 64 years, age standardised, by local area, 2013–14

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)



Local area	State	Rate	Prescriptions
Daly - Tiwi - West Arnhem	NT	14,981	1,647
East Arnhem	NT	23,914	2,362
Barkly	NT	26,834	1,059
Katherine	NT	33,668	4,157
Far North	Qld	39,563	7,949
Auburn	NSW	40,976	21,197
Pilbara	WA	41,001	20,002
Kimberley	WA	43,261	10,973
Litchfield	NT	47,552	7,119
Alice Springs	NT	51,783	14,082
Gascoyne	WA	54,196	3,706
Canterbury	NSW	54,776	45,836

Local area	State	Rate	Prescriptions
Hobart - North West	Tas	175,380	56,213
South East Coast	Tas	169,273	7,222
Sorell - Dodges Ferry	Tas	158,962	15,885
Brighton	Tas	157,923	15,941
Central Highlands	Tas	157,772	12,279
Ipswich Inner	Qld	157,658	98,008
Bribie - Beachmere	Qld	157,270	28,288
Bendigo	Vic	156,566	85,488

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

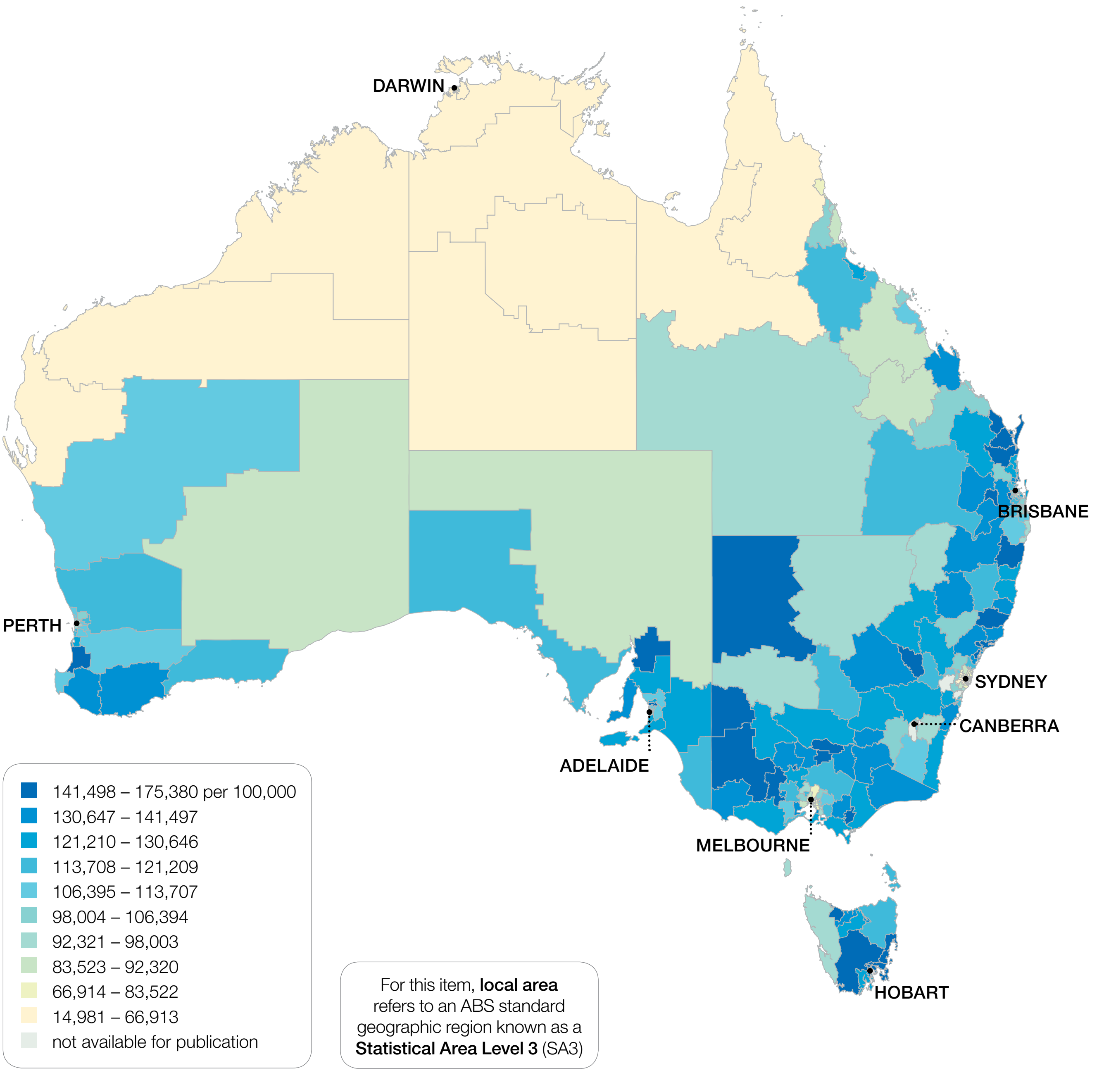
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 46,180 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

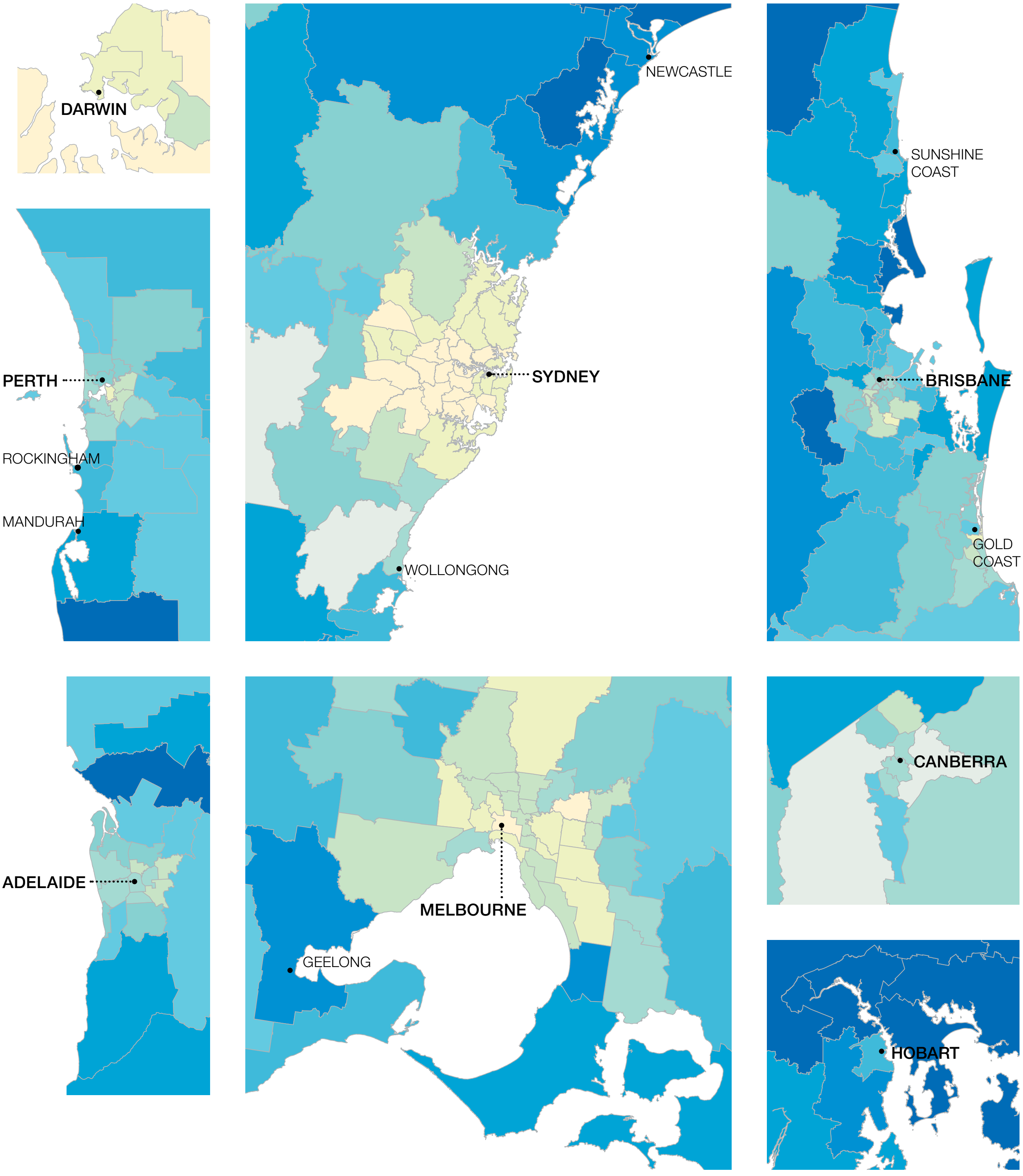
Antidepressant medicines dispensing 18–64 years

Figure 72: **Number of PBS prescriptions dispensed for antidepressant medicines per 100,000 people aged 18 to 64 years, age standardised, by local area, 2013–14**



Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for antidepressant medicines across 325 local areas (SA3s) ranged from 14,981 to 175,380 per 100,000 people aged 18 to 64 years. The number of prescriptions was **11.7 times higher** in the area with the highest rate compared to the area with the lowest rate.

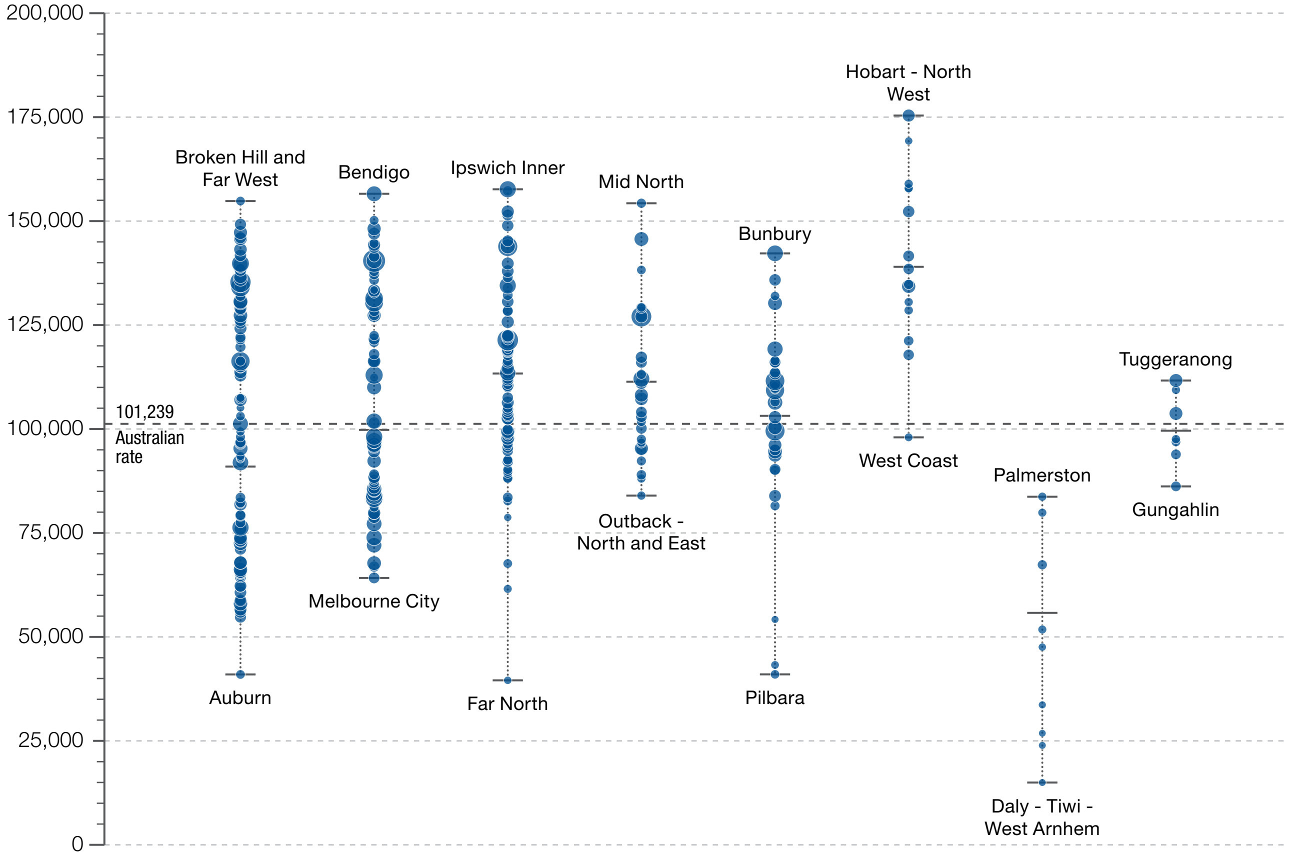


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antidepressant medicines dispensing 18–64 years

Figure 73: Number of PBS prescriptions dispensed for antidepressant medicines per 100,000 people aged 18 to 64 years, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	154,816	156,566	157,658	154,297	142,245	175,380	83,718	111,663
State/territory	90,959	99,774	113,350	111,372	103,170	139,004	55,785	99,589
Lowest rate	40,976	64,188	39,563	83,987	41,001	98,003	14,981	86,207
No. prescriptions	4,278,221	3,659,499	3,348,494	1,186,141	1,677,278	447,360	87,146	247,030



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

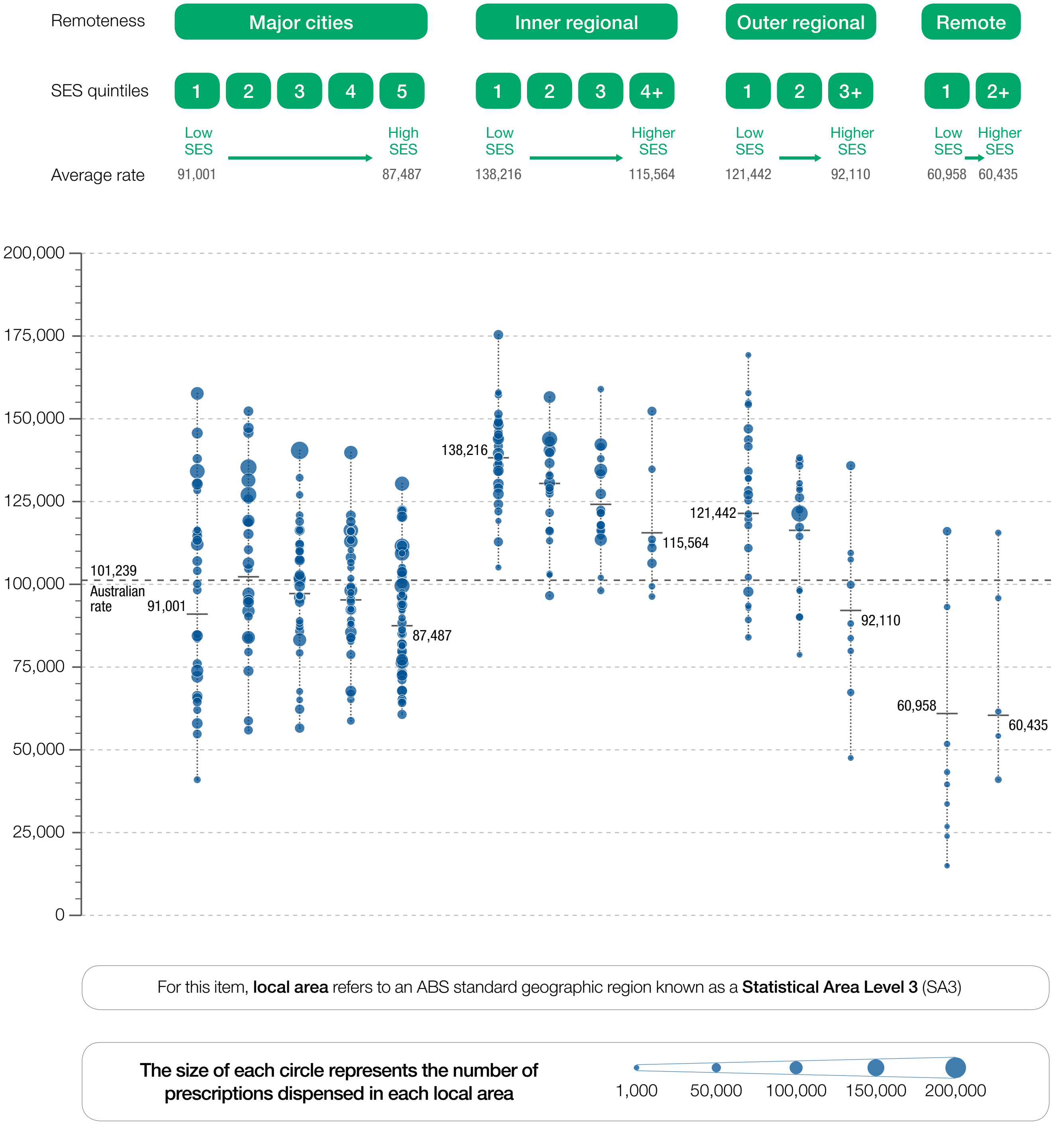
The size of each circle represents the number of prescriptions dispensed in each local area

1,000 50,000 100,000 150,000 200,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 74: Number of PBS prescriptions dispensed for antidepressant medicines per 100,000 people aged 18 to 64 years, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antidepressant medicines dispensing 18–64 years

Resources

- Royal Australian & New Zealand College of Psychiatrists. Clinical Practice Guidelines Team for Depression. *Australian and New Zealand clinical practice guidelines for the treatment of depression*. Australian and New Zealand Journal of Psychiatry. 2004;38:389–407. Available at: www.ranzcp.org/Files/Resources/Publications/CPG/Clinician/CPG_Clinician_Full_Depression-pdf.aspx.

- Australian Government Department of Health. *What are the treatments for depression?* 2005. Available at: www.health.gov.au/internet/publications/publishing.nsf/Content/mental-pubs-c-coping-toc~mental-pubs-c-coping-wha.

- Beyondblue. *Clinical Practice Guidelines: Depression in adolescents and young adults*. 2011. Available at: www.nhmrc.gov.au/_files_nhmrc/publications/attachments/ext0007_cp_guideline_depression_adolescents_young_beyondblue.pdf.

1 Australian Bureau of Statistics. National survey of mental health and wellbeing: summary of results 2007. Cat. no. 4326.0. Canberra: ABS, 2007.
2 Royal Australian & New Zealand College of Psychiatrists Clinical Practice Guidelines Team for Depression. Australian and New Zealand clinical practice guidelines for the treatment of depression. ANZJP 2004;38:389–407.
3 Britt H, Miller G, Charles J, Henderson J, Bayram C, Pan Y et al. General practice activity in Australia 2010–11: Bettering the Evaluation And Care of Health. Sydney: Sydney University Press, 2011.
4 Ellis PM, Hickie IB, Smith DAR. Royal Australian and New Zealand College of Psychiatrists Clinical Practice Guidelines: summary of guidelines for the treatment of depression. Australasian Psychiatry March 2003;11(1).
5 Meadows GN, Enticott JC, Inder B, Russell GM, Gurr R. Better access to mental health care and the failure of the Medicare principle of universality. MJA 2015;202(4):190–4.
6 Lin P, Campbell DG, Chaney EF, Liu CF, Heagerty P, Felker BL, et al. The influence of patient preference on depression treatment in primary care. Annals of Behavioral Medicine 2005;30(2):164–73.

4.4 Antidepressant medicines dispensing 65 years and over

Context

This data item examines dispensing rates of antidepressant medicines for people aged 65 and over. These data are sourced from the PBS and relate to the number of prescriptions dispensed per 100,000 people.

Antidepressants are a class of medicine used to treat depression. They are also used to treat a number of other conditions prevalent in adults aged 65 and over, including some anxiety disorders, chronic pain and some types of urinary incontinence. This makes it difficult to make direct comparisons between the 65 and over age group and younger adults.

Every year, about one in 25 Australian adults meets the criteria for being diagnosed with depression.[1] Clinical depression lasts for at least two weeks and can be very disabling, affecting a person's emotions, thinking, behaviour and physical wellbeing.[2] There is no evidence to suggest that depression increases with age; in fact, severe depression is less common in adults 65 and over who are living in the community than in those aged 64 and under.[3] Older women are more likely than men to experience depressive illnesses.[4]

Depression is commonly dealt with in the primary care setting. During 2010–11, it ranked second (after hypertension) among chronic problems most frequently seen by general practitioners.[5]

Similarly to adults younger than 65, milder forms of depression are ideally treated with social and psychological interventions.[2] Moderate to severe depression is best treated with a combination of social and psychological interventions and antidepressant medicines.

With effective treatment, about half of the people with moderate depression will show improvement within six to eight weeks. For those whose depression goes untreated, the duration of their condition varies widely. Some will get better after several months, some will recover partially, and others will continue to have longer-term problems. People who have been prescribed medicine to treat depression usually need to continue taking this medicine for between six and 24 months.[6]

Antidepressant medicines dispensing 65 years and over

Magnitude of variation

In 2013–14, there were 6,592,577 PBS prescriptions dispensed for antidepressant medicines, representing 196,574 prescriptions per 100,000 people aged 65 years and over (the Australian rate).

The number of PBS prescriptions dispensed for antidepressant medicines across 325* local areas (SA3s) ranged from 22,213 to 306,383 per 100,000 people aged 65 years and over. The number of prescriptions was **13.8 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 115,760 per 100,000 people aged 65 years and over in the Northern Territory, to 221,409 in Queensland.

After excluding the highest and lowest results, the antidepressant medicine prescription rate across the 301 remaining local areas was **1.9 times higher** in one local area compared to another.

Based on the available data, it is not possible to determine the extent to which antidepressants were prescribed to treat pain and conditions other than depression.[7]

Dispensing rates tended to be slightly higher in inner regional areas than in major cities, and variations were also noted between major cities. Evidence showed that dispensing rates were higher in areas of low socioeconomic status and variations based on socioeconomic factors were less apparent than in younger adults. Dispensing rates for older adults were almost double those for adults aged less than 64 years.

Interpretation

Potential reasons for the variation include differences in:

- disadvantaged communities with a higher risk of depression and lack of access to optimal alternate non-medication treatment pathways[8]
- access to optimal alternate treatment pathways, including psychosocial services in regional and remote locations and within disadvantaged communities, a barrier further compounded by age
- preferences and knowledge about the appropriate treatment for depression, including the role of social and psychological interventions; older people are less likely than their younger counterparts to access these available services[9,10]
- access to services for physical illness and declining function, which are major contributors to depression in older people
- prescribing practices, training, knowledge and attitudes of clinicians
- the density of aged-care facilities[11]
- variations in prevalence of other conditions for which some antidepressants are used, for example, neuropathic pain and urinary incontinence.

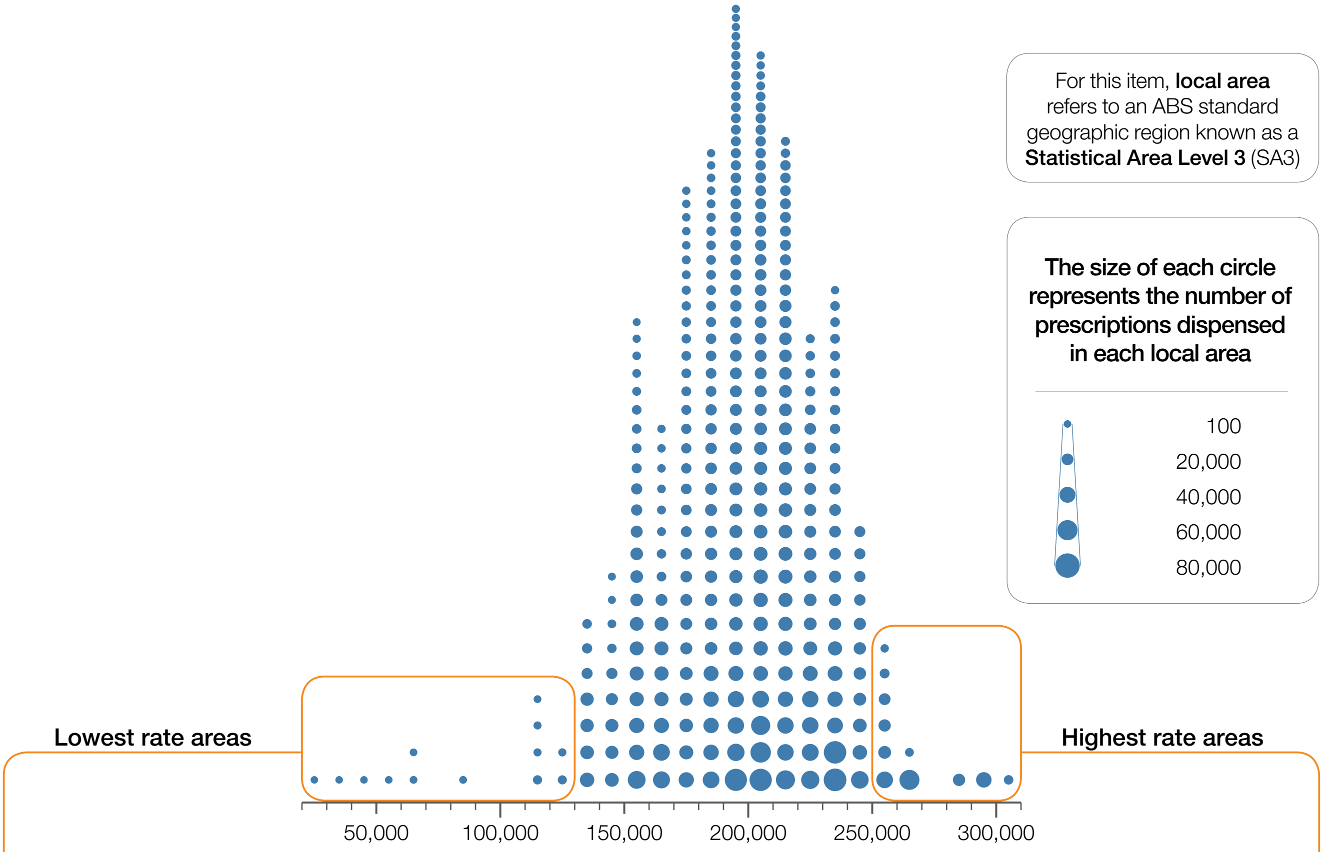
It is also important to note that the dispensing of antidepressant medicines in remote areas by some Aboriginal Health Services is not captured in the PBS.

To explore this variation, further analysis could focus on:

- individual- and system-level factors that lead to variation in antidepressant dispensing rates within more specific age groups (for example, 65 years and over, 75 years and over, and 85 years and over, compared with those aged 64 years and under)
- the relationship between dispensing rates and the proportion of older adults living in residential and community settings.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 75: Number of PBS prescriptions dispensed for antidepressant medicines per 100,000 people aged 65 years and over, age standardised, by local area, 2013–14



Antidepressant medicines dispensing 65 years and over, by local area (each circle represents an area)

Lowest rate areas

Local area	State	Rate	Prescriptions
East Arnhem	NT	22,213	113
Daly - Tiwi - West Arnhem	NT	33,259	297
Barkly	NT	49,179	208
Katherine	NT	51,217	640
Pilbara	WA	62,614	871
Kimberley	WA	63,723	1,367
Litchfield	NT	87,243	1,389
Gascoyne	WA	111,419	1,467
Auburn	NSW	111,641	8,111
Far North	Qld	111,720	2,724
Alice Springs	NT	119,390	2,797
Manly	NSW	125,163	7,609
Outback - North	Qld	126,853	3,255

Highest rate areas

Local area	State	Rate	Prescriptions
Jimboomba	Qld	306,383	9,475
Ipswich Inner	Qld	292,564	37,717
Hills District	Qld	286,912	22,469
Toowoomba	Qld	263,081	59,228
Sorell - Dodges Ferry	Tas	260,910	6,286
Central Highlands	Tas	259,934	4,420
Rockhampton	Qld	258,988	43,380
Broken Hill and Far West	NSW	257,681	11,037
Shepparton	Vic	257,330	25,080
Hobart - North West	Tas	251,890	22,595
Charters Towers - Ayr - Ingham	Qld	250,200	20,229

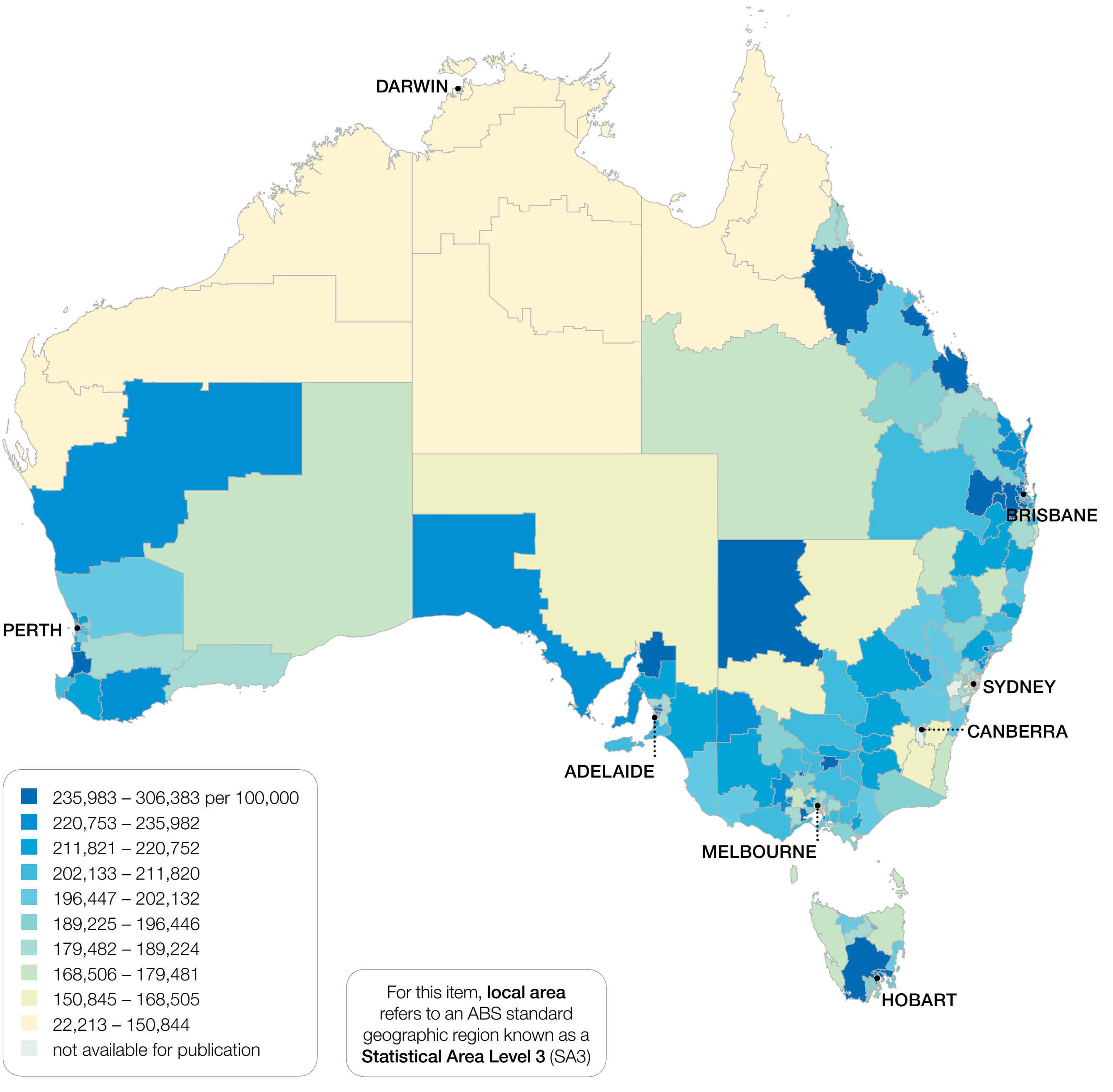
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 28,780 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

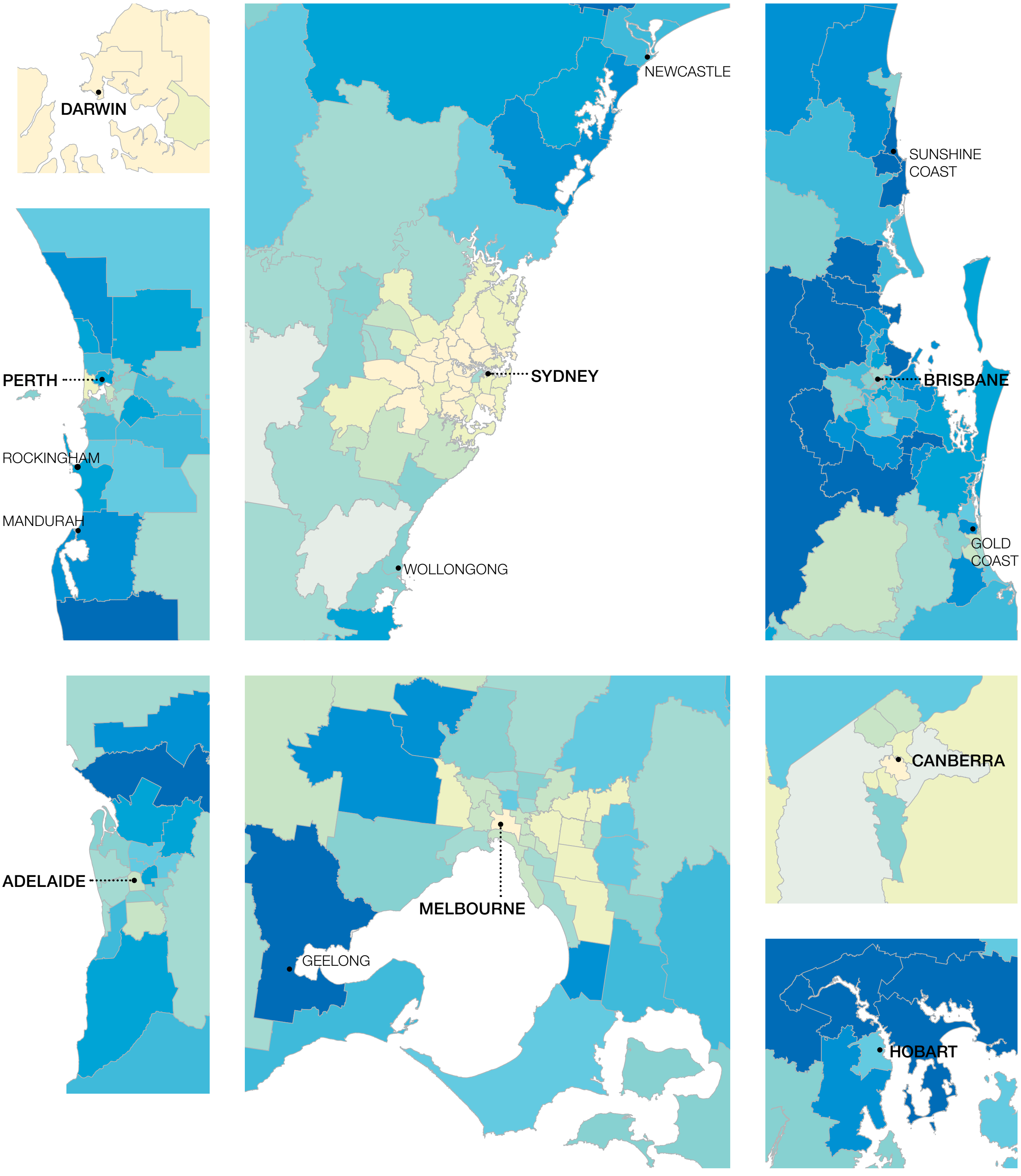
Antidepressant medicines dispensing 65 years and over

Figure 76: Number of PBS prescriptions dispensed for antidepressant medicines per 100,000 people aged 65 years and over, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for antidepressant medicines across 325 local areas (SA3s) ranged from 22,213 to 306,383 per 100,000 people aged 65 years and over. The number of prescriptions was **13.8 times higher** in the area with the highest rate compared to the area with the lowest rate.

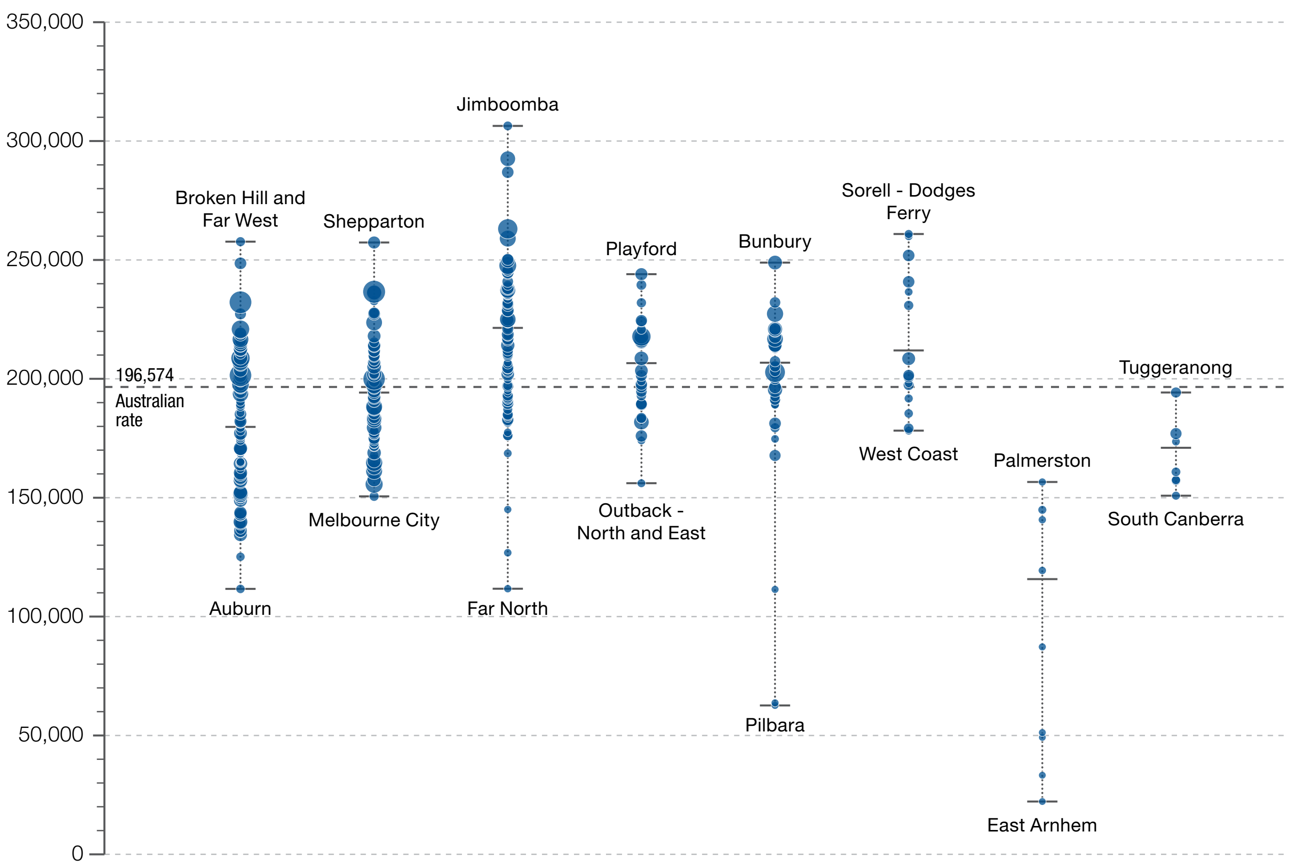


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antidepressant medicines dispensing 65 years and over

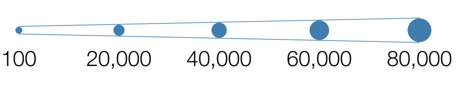
Figure 77: Number of PBS prescriptions dispensed for antidepressant medicines per 100,000 people aged 65 years and over, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	257,681	257,330	306,383	244,017	248,886	260,910	156,596	194,253
State/territory	179,771	194,225	221,409	206,606	206,794	211,950	115,760	170,982
Lowest rate	111,641	150,572	111,720	156,085	62,614	178,198	22,213	150,844
No. prescriptions	2,034,181	1,643,057	1,401,657	585,259	649,258	188,559	16,114	73,706



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

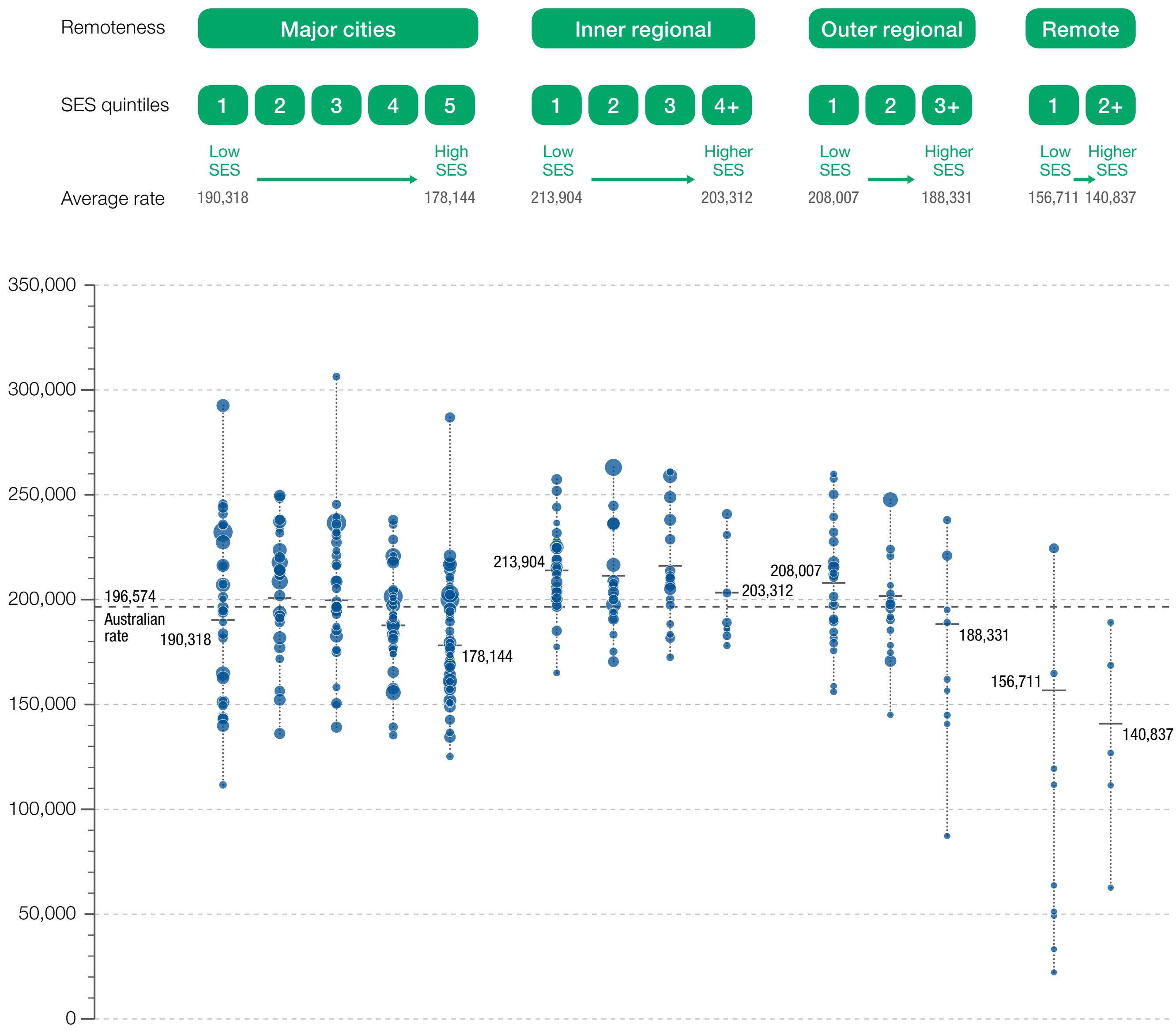
The size of each circle represents the number of prescriptions dispensed in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 78: Number of PBS prescriptions dispensed for antidepressant medicines per 100,000 people aged 65 years and over, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

100 20,000 40,000 60,000 80,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antidepressant medicines dispensing 65 years and over

Resources

- Atkins J, Naismith SL, Luscombe GM, Hickie IB. *Elderly care recipients' perceptions of treatment helpfulness for depression and the relationship with help-seeking*. Clinical Interventions in Aging. 2015; 10:287.
- Royal Australian and New Zealand College of Psychiatrists. Clinical Practice Guidelines Team for Depression. *Australian and New Zealand clinical practice guidelines for the treatment of depression*. Australian and New Zealand Journal of Psychiatry 2004;38:389–407. Available at: www.ranzcp.org/Files/Resources/Publications/CPG/Clinician/CPG_Clinician_Full_Depression-pdf.aspx.
- Royal Australian and New Zealand College of Psychiatrists. *Position Statement 81: Use of antidepressants to treat depression in dementia*. 2015. Available at: www.ranzcp.org/Files/Resources/College_Statements/Position_Statements/PS-81-FPOA-Antidepressants-to-treat-depression-in.aspx.
- McKay R, Casey J, Stevenson J, McGowan H. *Psychiatry services for older people: a report on current issues and evidence to inform the development of services and the revision of RANZCP Position Statement 22*. Royal Australian and New Zealand College of Psychiatrists. 2015. Available at: www.ranzcp.org/Files/Resources/College_Statements/Position_Statements/RPT-FPOA-Psychiatry-services-for-older-people-revi.aspx
- NPS Medicinewise. *Clinical e-Audit*. Available at: www.nps.org.au/health-professionals/cpd/clinical-e-audits.

1 Australian Bureau of Statistics. National Survey of Mental Health and Wellbeing: summary of results 2007. Cat. no. 4326.0. Canberra: ABS, 2007.
2 Royal Australian & New Zealand College of Psychiatrists Clinical Practice Guidelines Team for Depression. Australian and New Zealand clinical practice guidelines for the treatment of depression. ANZJP 2004;38:389–407.
3 Australian Bureau of Statistics. National survey of mental health and wellbeing: summary of results, 2007. Cat. no. 4326.0. Canberra: ABS, 2008.
4 Djernes JK. Prevalence and predictors of depression in populations of elderly: a review. Acta psychiatrica Scandinavica 2006;113(5):372–87.
5 Britt H, Miller G, Charles J, Henderson J, Bayram C, Pan Y et al. General practice activity in Australia: 2010–11. Bettering the Evaluation And Care of Health. Sydney: Sydney University Press, 2011.
6 Ellis PM, Hickie IB, Smith DAR. Royal Australian & New Zealand College of Psychiatrists Clinical Practice Guidelines: Summary of guidelines for the treatment of depression. Australasian Psychiatry March 2003;11(1).
7 Tiller JWG. Depression and anxiety. MJA 2012;1(4):28–31.
8 Spence R, Roberts A, Ariti C, Bardsley M. QualityWatch. Focus on: antidepressant prescribing. Trends in the prescribing of antidepressants in primary care. London: Health Foundation and Nuffield Trust, 2014.
9 Mental Health Services in Australia: Characteristics of Access to Allied Psychological Services (ATAPS) consumers. Australian Institute of Health and Welfare. 2013. (Accessed 31 August 2015 at: mhsa.aihw.gov.au/home/
10 McKay RG, Draper BM. Is it too late to prevent a decline in mental health care for older Australians? MJA 2012;197(2):87–8.
11 Australian Institute of Health and Welfare. Depression in residential aged care 2008–2012. Aged care statistics series no. 39. Cat. no. AGE 73. Canberra: AIHW. 2013.

4.5 Anxiolytic medicines dispensing 18–64 years

Context

This data item examines dispensing rates of anxiolytic medicines to people aged 18 to 64. These data are sourced from the PBS and relate to the number of prescriptions dispensed per 100,000 people.

Anxiety disorders are now the most common mental health problem in Australia, affecting 14 per cent of people. Although anyone can develop an anxiety disorder, women are more at risk than men. In Australia, almost 20 per cent of women have an anxiety disorder, compared to about 10 per cent of men.[1]

Anxiolytics are a class of prescription medicines most appropriately used to treat the symptoms of anxiety, insomnia and substance withdrawal over short periods. While effective in the short term, they are not recommended for long-term use as they can be addictive and have a number of side effects.

Anxiolytics are not the sole medicines used in the treatment for anxiety; antidepressants may also be used in some situations. In the longer term, a combination of antidepressant medicines and psychological interventions is more suitable and more effective at maximising positive treatment outcomes.[2]

Anxiolytic medicines dispensing 18–64 years

Magnitude of variation

In 2013–14, there were 2,508,346 PBS prescriptions dispensed for anxiolytic medicines, representing 17,201 prescriptions per 100,000 people aged 18 to 64 years (the Australian rate).

The number of PBS prescriptions dispensed for anxiolytic medicines across 325* local areas (SA3s) ranged from 1,079 to 41,473 per 100,000 people aged 18 to 64 years. The number of prescriptions was **38.4 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 6,930 per 100,000 people aged 18 to 64 years in the Northern Territory, to 25,802 in Tasmania.

After excluding the highest and lowest results, the anxiolytic medicine prescription rate across the 302 remaining local areas was **4.8 times higher** in one local area compared to another.

Dispensing rates tended to be slightly higher in inner and outer regional areas than in major cities and were lowest in remote communities.

Dispensing rates were highest in areas with low socioeconomic status, and lower in areas with higher socioeconomic status.

Interpretation

Potential reasons for the variation include differences in:

- the risk of anxiety and depression, which is higher in disadvantaged communities[3]
- access to optimal alternate non-pharmacological treatment pathways[3]
- prescribing practices, including short courses of treatment and planning to discontinue medication, which can prevent long-term dependence
- private prescriptions, which are not included in this data.

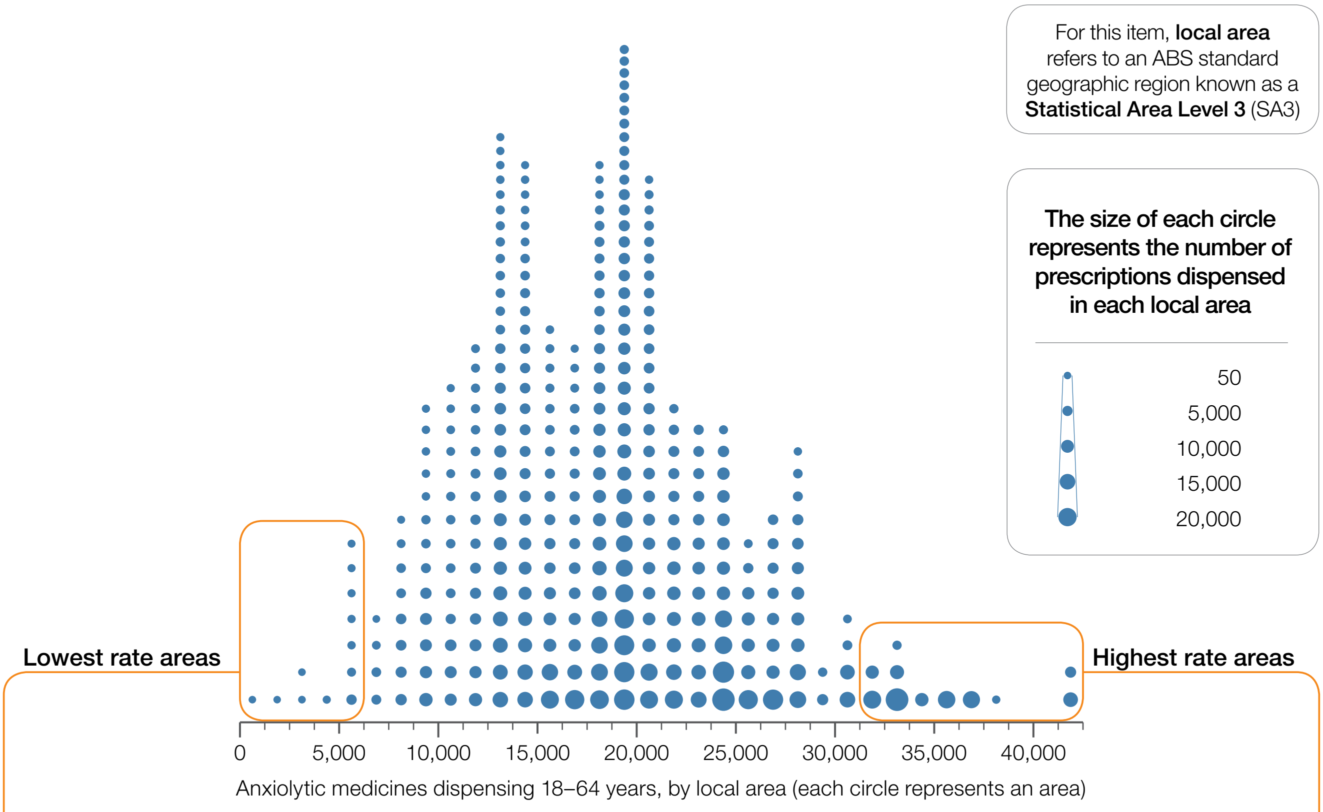
It is also important to note that the dispensing of anxiolytic medicines in remote areas by some Aboriginal Health Services is not captured in the PBS.

To explore this variation, further analysis could focus on:

- the individual- and system-level factors that lead to variation in the dispensing rates for anxiolytic and antidepressant medicines among those aged 18 to 64
- the influence of access to mental health services and variations in dispensing rates.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 79: Number of PBS prescriptions dispensed for anxiolytic medicines per 100,000 people aged 18 to 64 years, age standardised, by local area, 2013–14



Local area	State	Rate	Prescriptions
Daly - Tiwi - West Arnhem	NT	1,079	121
Barkly	NT	1,696	69
Katherine	NT	2,791	343
East Arnhem	NT	3,021	297
Kimberley	WA	4,972	1,268
Alice Springs	NT	5,335	1,461
Pilbara	WA	5,728	2,852
Pennant Hills - Epping	NSW	5,807	1,694
Baulkham Hills	NSW	5,900	5,339
Far North	Qld	5,973	1,203
Outback - North	Qld	5,977	1,327
Litchfield	NT	6,160	901

Local area	State	Rate	Prescriptions
Hobart - North West	Tas	41,473	13,301
Bribie - Beachmere	Qld	41,276	6,767
South East Coast	Tas	38,107	1,551
Playford	SA	36,292	17,974
Tweed Valley	NSW	35,310	18,488
Hobart - North East	Tas	34,643	10,884
Frankston	Vic	33,138	28,205
Redcliffe	Qld	33,026	12,171
Sorell - Dodges Ferry	Tas	32,541	3,289
Ballarat	Vic	32,107	19,337
Grampians	Vic	32,092	10,632

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

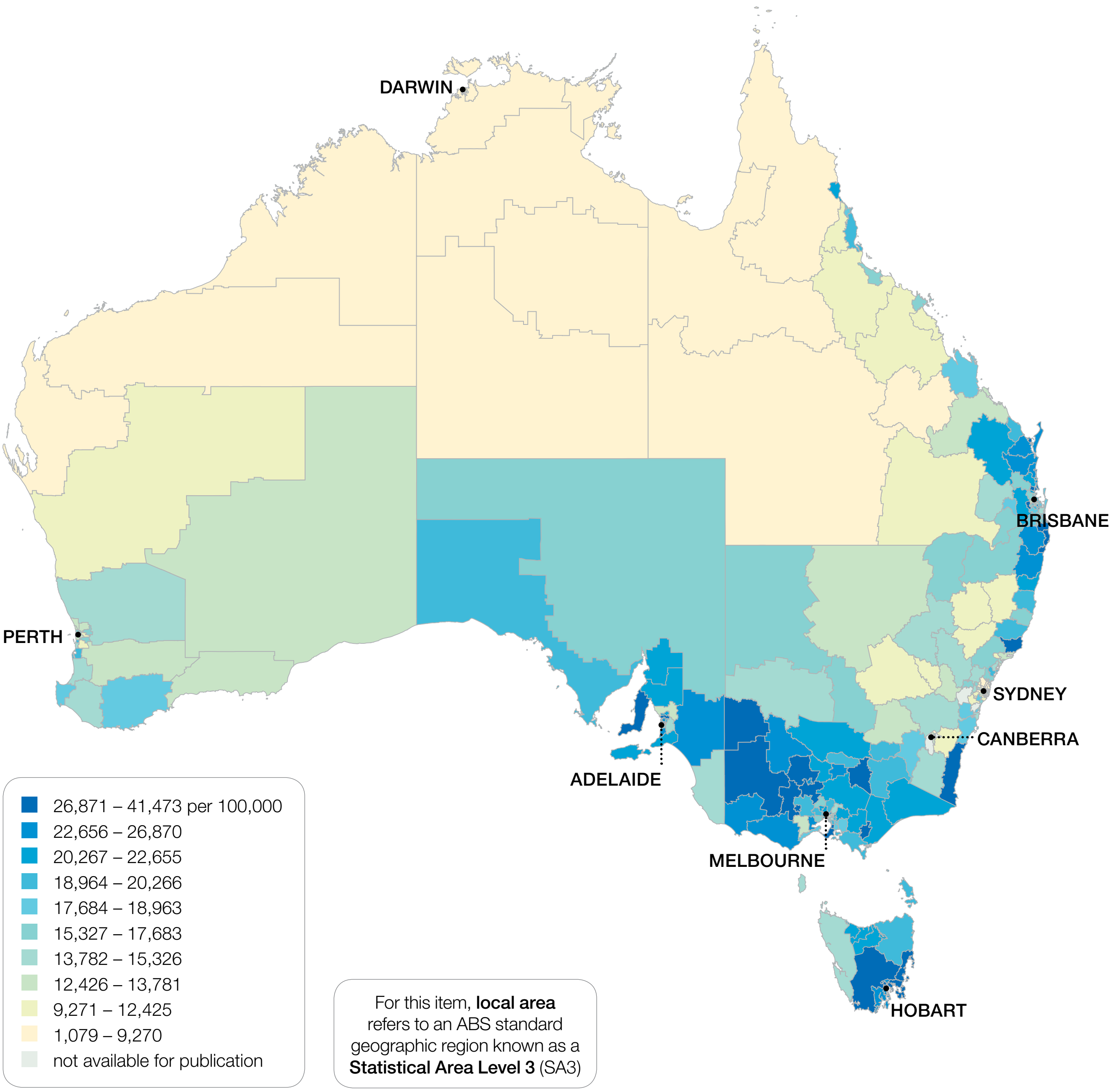
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 14,520 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Anxiolytic medicines dispensing 18–64 years

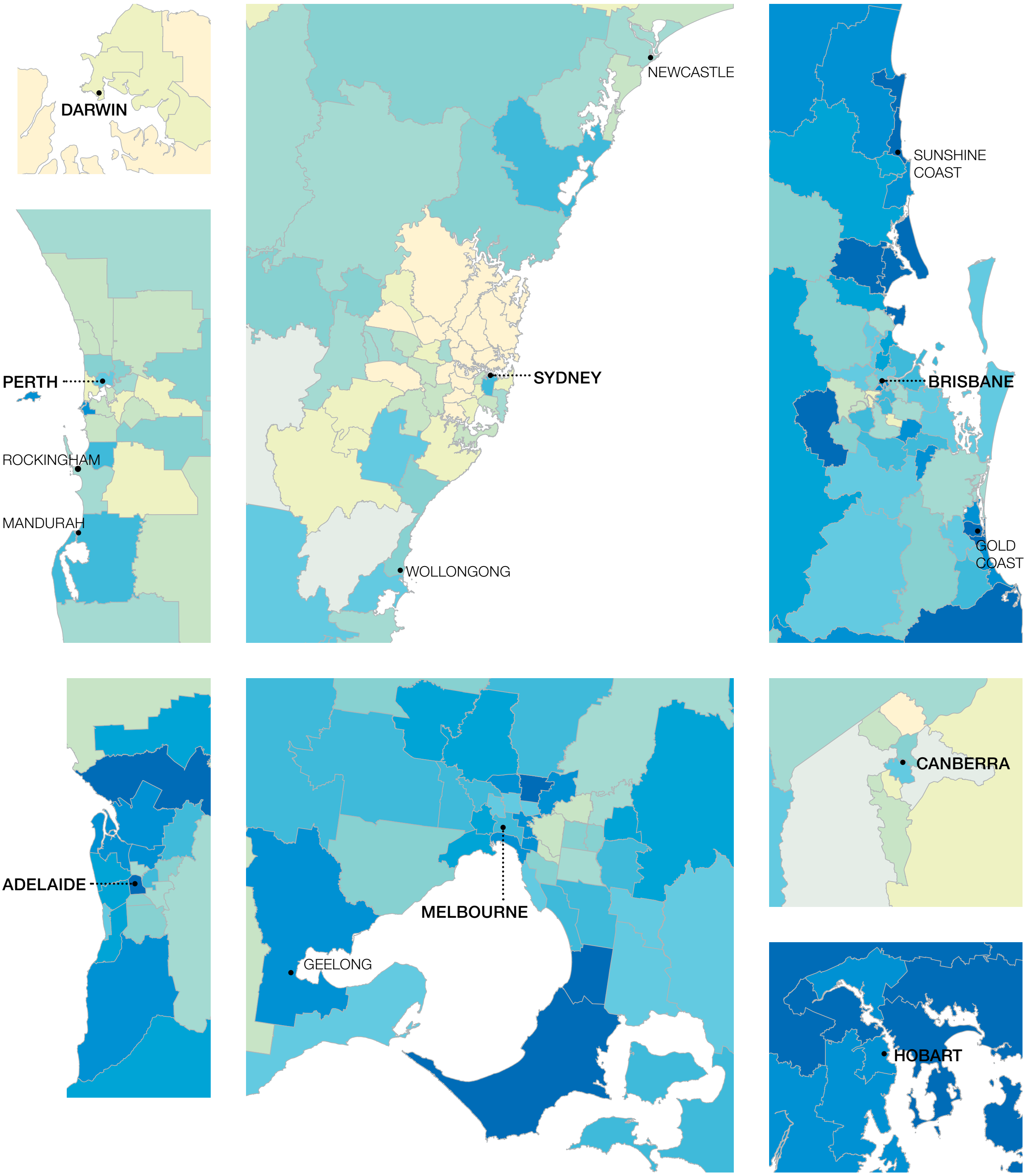
Figure 80: **Number of PBS prescriptions dispensed for anxiolytic medicines per 100,000 people aged 18 to 64 years, age standardised, by local area, 2013–14**



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for anxiolytic medicines across 325 local areas (SA3s) ranged from 1,079 to 41,473 per 100,000 people aged 18 to 64 years. The number of prescriptions was **38.4 times higher** in the area with the highest rate compared to the area with the lowest rate.

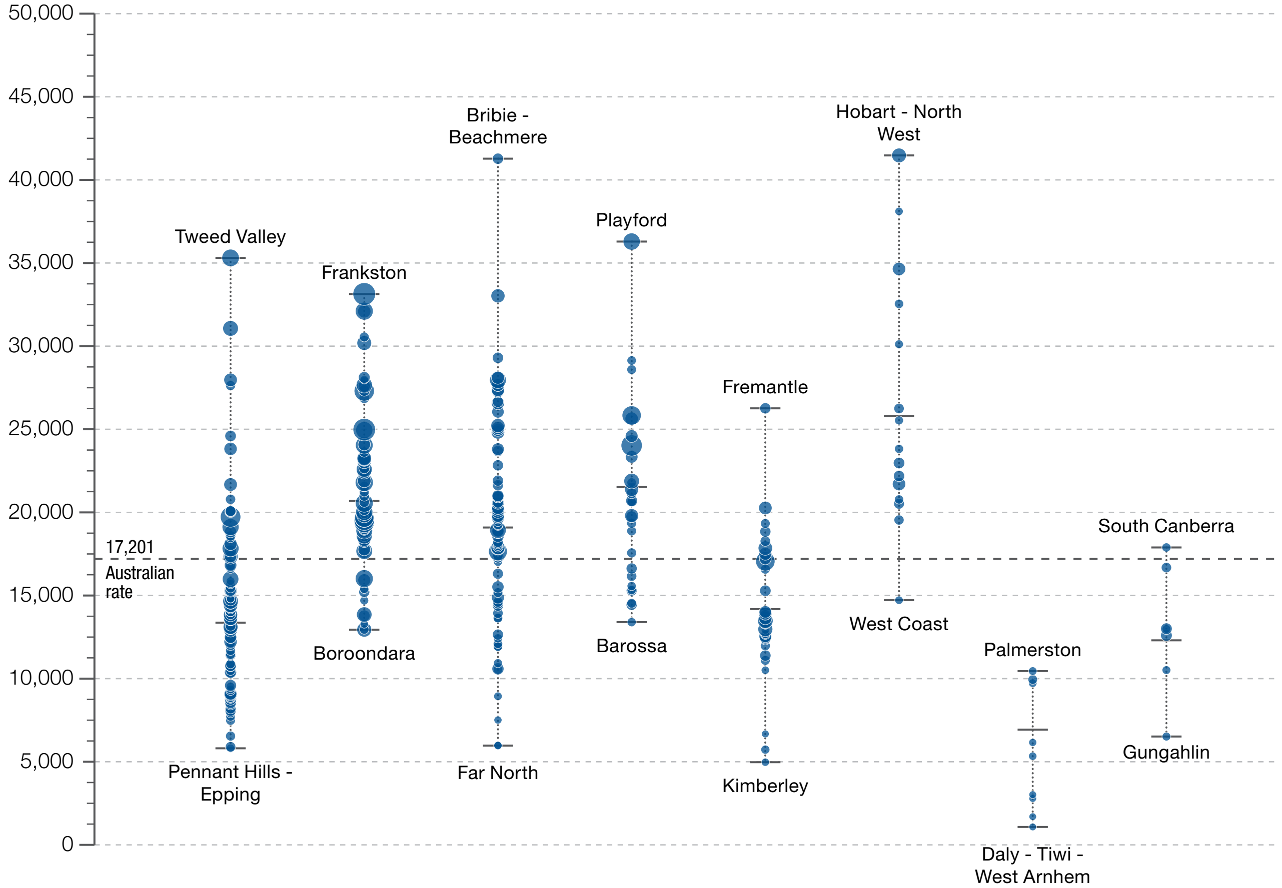


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Anxiolytic medicines dispensing 18–64 years

Figure 81: Number of PBS prescriptions dispensed for anxiolytic medicines per 100,000 people aged 18 to 64 years, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	35,310	33,138	41,276	36,292	26,261	41,473	10,454	17,890
State/territory	13,367	20,689	19,091	21,527	14,183	25,802	6,930	12,305
Lowest rate	5,807	12,946	5,973	13,398	4,972	14,716	1,079	6,516
No. prescriptions	624,047	749,760	558,128	224,701	227,901	82,548	10,766	30,053



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

50 | 5,000 | 10,000 | 15,000 | 20,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 82: Number of PBS prescriptions dispensed for anxiolytic medicines per 100,000 people aged 18 to 64 years, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Anxiolytic medicines dispensing 18–64 years

Resources

- HealthDirect Australia. *Anxiety*. 2013. Available at: www.healthdirect.gov.au/anxiety.
- Kyrios M. *Anxiety Disorders: Assessment and management in general practice*. Australian Family Physician. June 2011;40(6). Available at: www.racgp.org.au/download/documents/AFP/2011/June/201106kyrios.pdf.
- Pharmaceutical Benefits Scheme. *Australian Statistics on Medicines*. 2015. Available at: www.pbs.gov.au/info/browse/statistics.

1 Australian Bureau of Statistics. National Survey of Mental Health and Wellbeing: summary of results. Cat. no. 4326.0. Canberra: ABS, 2007.
2 National Institute of Health and Care Excellence. Generalised anxiety disorder and panic disorder (with or without agoraphobia) in adults: management in primary, secondary and community care. Clinical guideline 113. Manchester: NICE, 2011.
3 Meadows GN, Enticott JC, Inder B, Russell GM, Gurr R. Better access to mental health care and the failure of the Medicare principle of universality. MJA 2015;202(4):190–4.

4.6 Anxiolytic medicines dispensing 65 years and over

Context

This data item examines the dispensing rates of anxiolytic medicines for people 65 years and over. These data are sourced from the PBS and relate to the number of prescriptions dispensed per 100,000 people.

Rates of anxiety disorders are lower among older people.[1] Anxiety disorders are now the most common mental health problem in Australia, affecting 14 per cent of people. Although anyone can develop an anxiety disorder, women are more at risk than men. In Australia, almost 20 per cent of women have an anxiety disorder compared to about 10 per cent of men.[1]

Anxiety in older people can be associated with increased disability, mortality and the use of health services.[2] Although it is not as well researched as anxiety among other groups, the condition may be harder to recognise in older people because the symptoms of anxiety overlap with the symptoms of depression and dementia.[3]

Anxiolytics are a class of prescription medicine most appropriately used to treat the symptoms of anxiety, insomnia and substance withdrawal over short periods. While effective in the short term, they are not recommended for long-term use as they can be addictive and have a number of side effects.

Anxiolytics are not the sole medicines used to treat anxiety; antidepressants may also be used in some situations. In the longer term, a combination of antidepressant medicines and psychological interventions is more suitable and more effective at maximising positive treatment outcomes.[4]

Anxiolytic medicines dispensing 65 years and over

Magnitude of variation

In 2013–14, there were 1,265,996 PBS prescriptions dispensed for anxiolytic medicines, representing 37,695 prescriptions per 100,000 people aged 65 years and over (the Australian rate).

The number of PBS prescriptions dispensed for anxiolytic medicines across 323* local areas (SA3s) ranged from 6,193 to 80,445 per 100,000 people aged 65 years and over. The number of prescriptions was **13.0 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 14,506 per 100,000 people aged 65 years and over in the Northern Territory, to 54,247 in Tasmania.

After excluding the highest and lowest results, the anxiolytic medicines prescription rate across the 302 remaining local areas was **4.0 times higher** in one local area compared to another.

Dispensing rates tended to be higher in inner and outer regional areas than in major cities and were lowest in remote communities. A clear association was seen between socioeconomic status and the anxiolytic dispensing rate; dispensing rates were highest in areas with low socioeconomic status, and lower in areas with higher socioeconomic status.

The anxiolytic medicine dispensing rate for older adults was almost double the rate for the 18-64 age group, and socio-demographic variations were similar for younger and older adults.

Interpretation

Potential reasons for the variation include differences in:

- the density of aged-care facilities[4] and disadvantaged communities[5]
- older people's referrals for psychological therapies[2]
- access to psychological treatment pathways[5] – a barrier that is compounded among older people[6]
- individual clinicians' prescribing practices
- community awareness regarding prevention, self-management and non-medication treatments for anxiety
- private prescriptions, which are not included in this data.

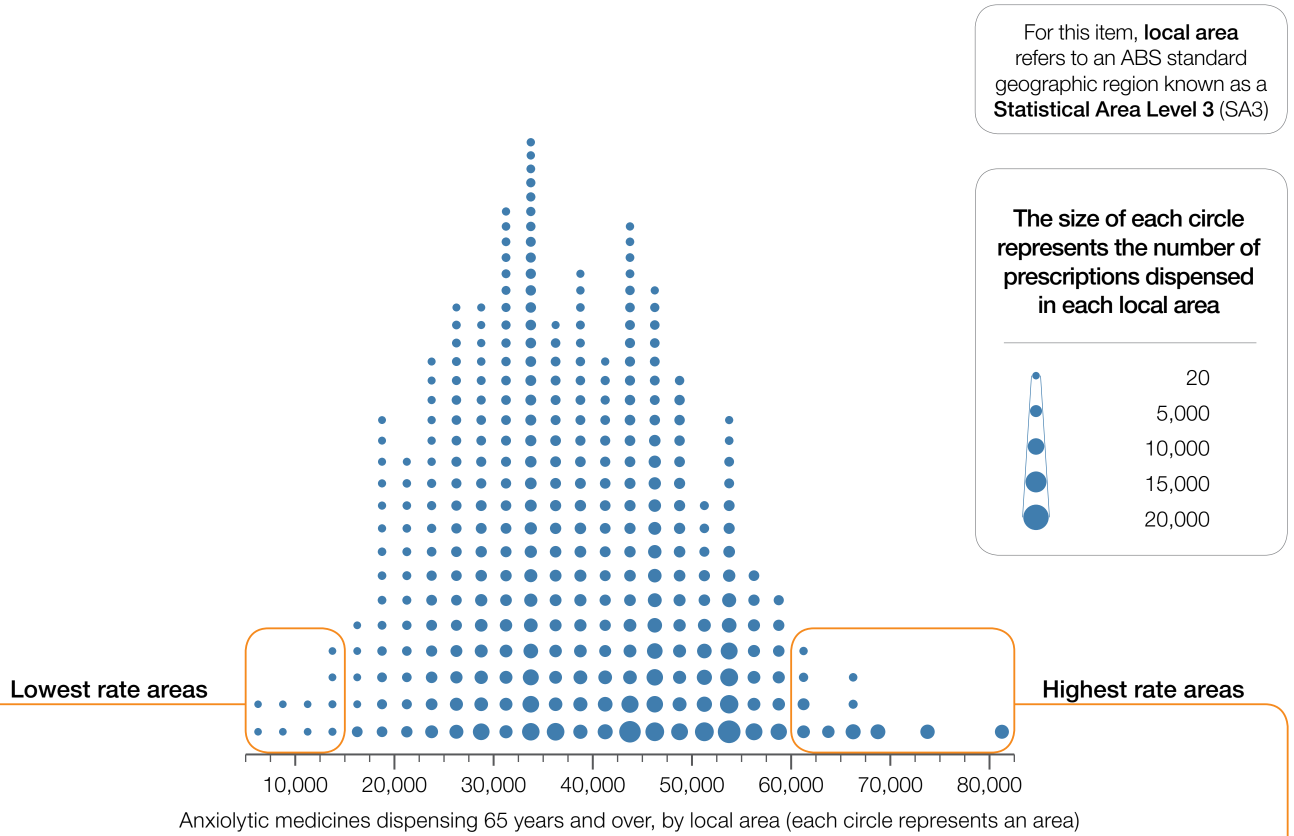
It is also important to note that the dispensing of anxiolytic medicines in remote areas by some Aboriginal Health Services is not captured in the PBS.

To explore this variation, further analysis could focus on:

- the individual- and system-level factors that lead to variation in dispensing rates for people aged 65 and over compared with the rates for people aged 18 to 64, including gaps in the availability of mental health services.

*There are 333 SA3s. For this item, data were suppressed for 10 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 83: Number of PBS prescriptions dispensed for anxiolytic medicines per 100,000 people aged 65 years and over, age standardised, by local area, 2013–14



Local area	State	Rate	Prescriptions
Barkly	NT	6,193	24
Litchfield	NT	6,644	104
Kimberley	WA	7,788	181
Pilbara	WA	9,402	111
Katherine	NT	10,534	130
Darwin City	NT	11,426	225
Upper Hunter	NSW	13,356	563
Gascoyne	WA	14,075	163
Alice Springs	NT	14,768	350
Weston Creek	ACT	14,879	639

Local area	State	Rate	Prescriptions
Hobart - North West	Tas	80,445	7,258
Playford	SA	74,380	7,647
Redcliffe	Qld	69,420	8,202
Brighton	Tas	67,470	1,149
Jimboomba	Qld	66,785	1,766
Ipswich Inner	Qld	65,723	8,440
Southport	Qld	62,901	5,516
Burnie - Ulverstone	Tas	62,365	5,888
Springwood - Kingston	Qld	62,262	4,938
Brisbane Inner - East	Qld	61,003	2,048
Central Highlands	Tas	60,670	975

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

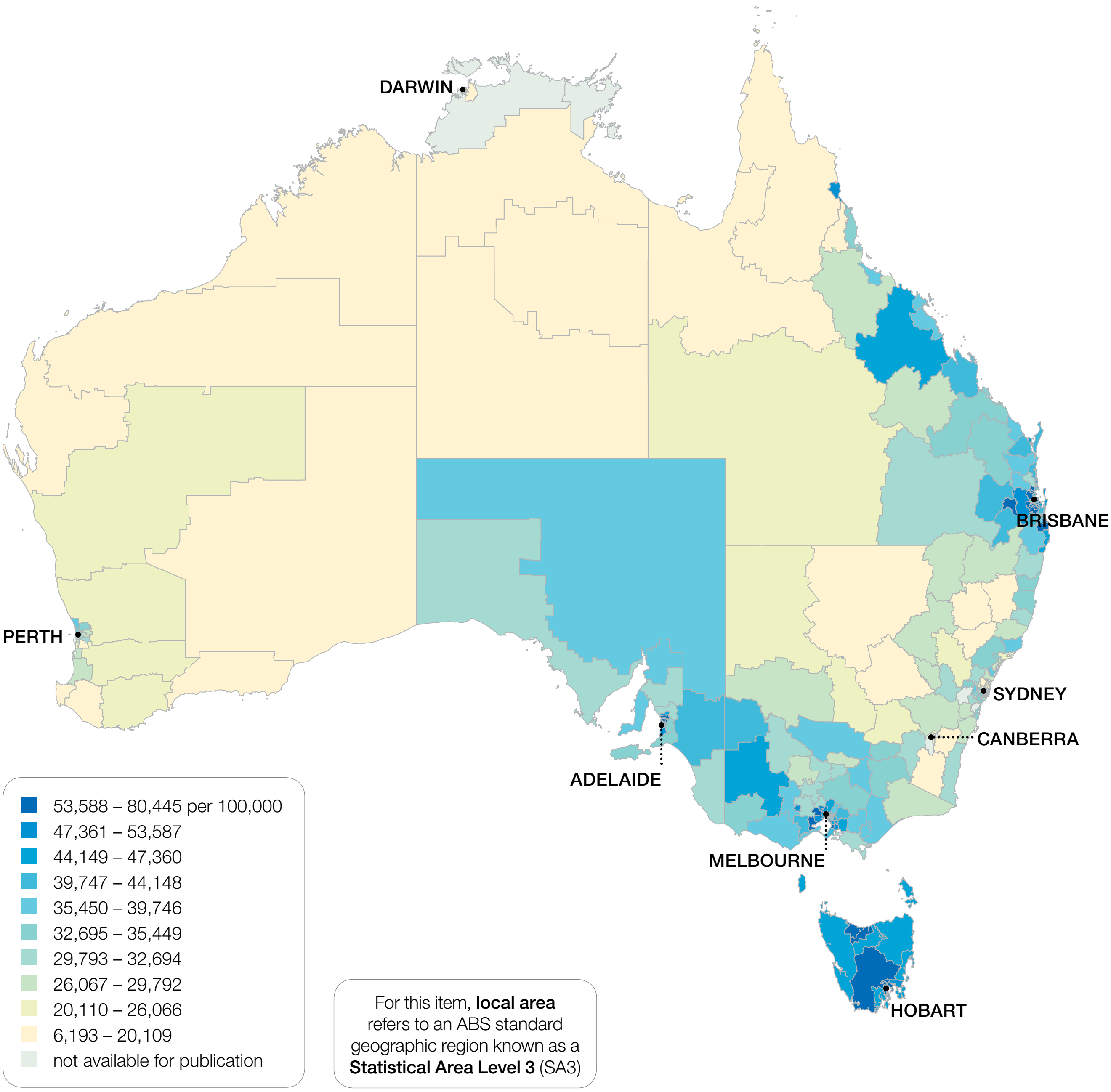
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 9,220 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Anxiolytic medicines dispensing 65 years and over

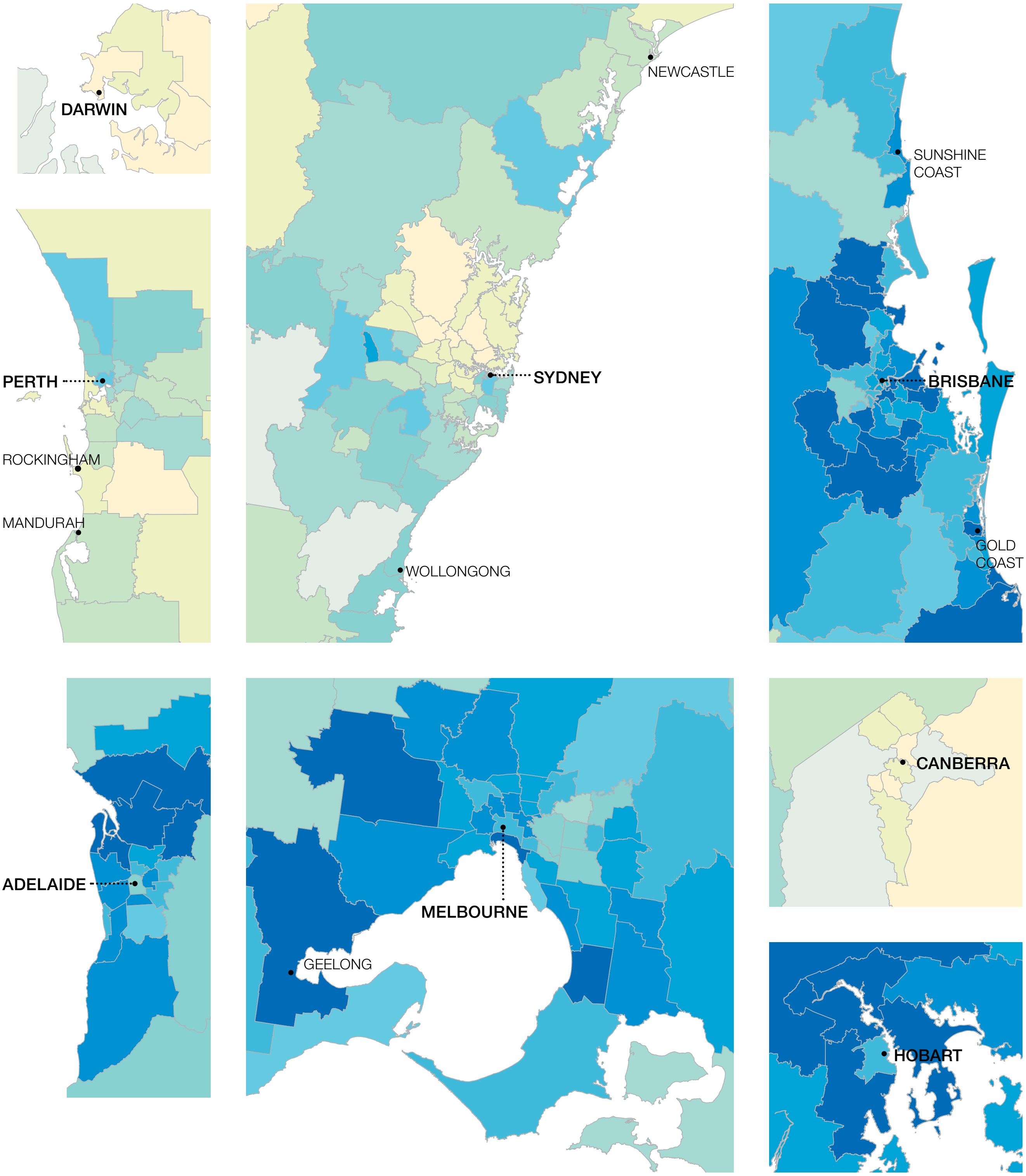
Figure 84: Number of PBS prescriptions dispensed for anxiolytic medicines per 100,000 people aged 65 years and over, age standardised, by local area, 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for anxiolytic medicines across 323 local areas (SA3s) ranged from 6,193 to 80,445 per 100,000 people aged 65 years and over. The number of prescriptions was **13.0 times higher** in the area with the highest rate compared to the area with the lowest rate.

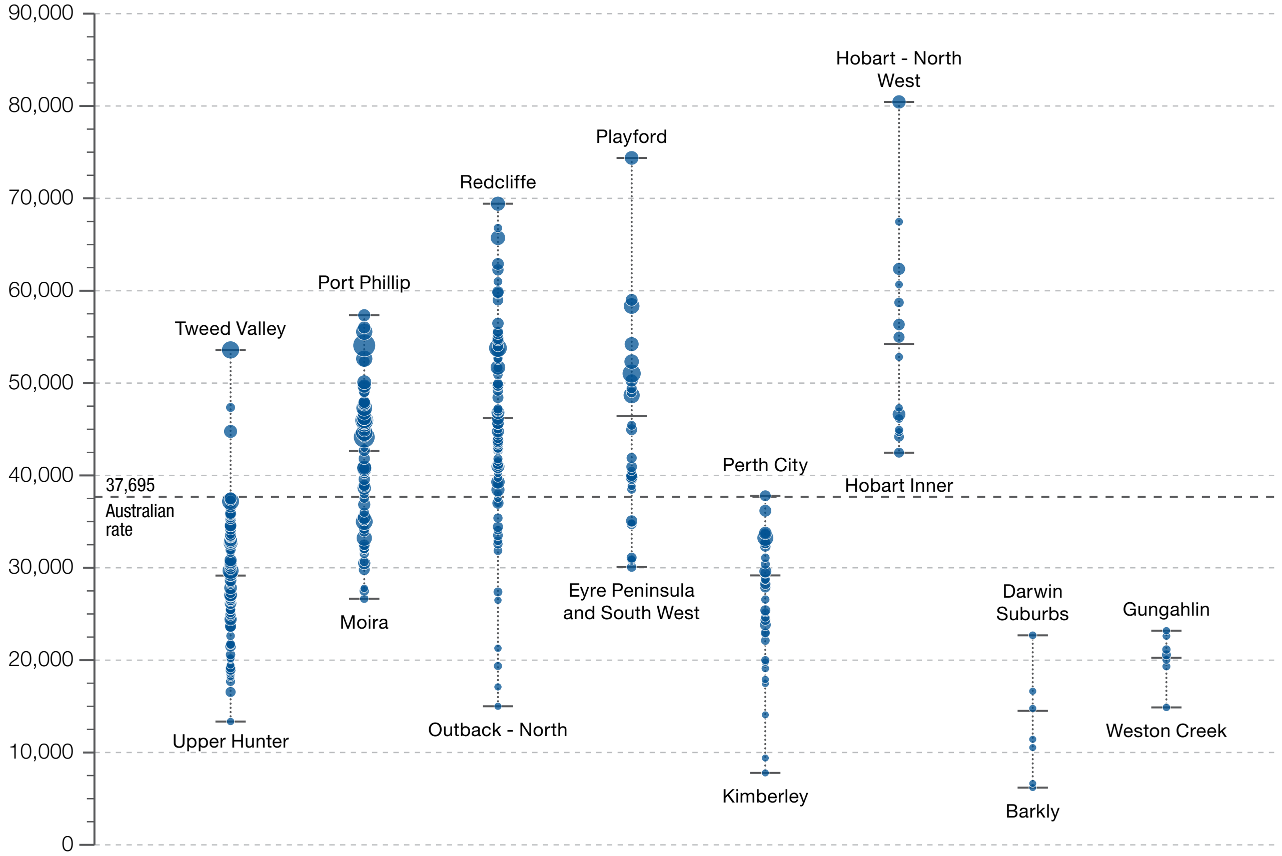


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Anxiolytic medicines dispensing 65 years and over

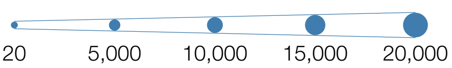
Figure 85: Number of PBS prescriptions dispensed for anxiolytic medicines per 100,000 people aged 65 years and over, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	53,591	57,347	69,420	74,380	37,799	80,445	22,692	23,185
State/territory	29,159	42,664	46,197	46,426	29,175	54,247	14,506	20,249
Lowest rate	13,356	26,648	15,004	30,074	7,788	42,466	6,193	14,879
No. prescriptions	329,006	363,214	289,607	133,941	91,434	48,002	1,997	8,685



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

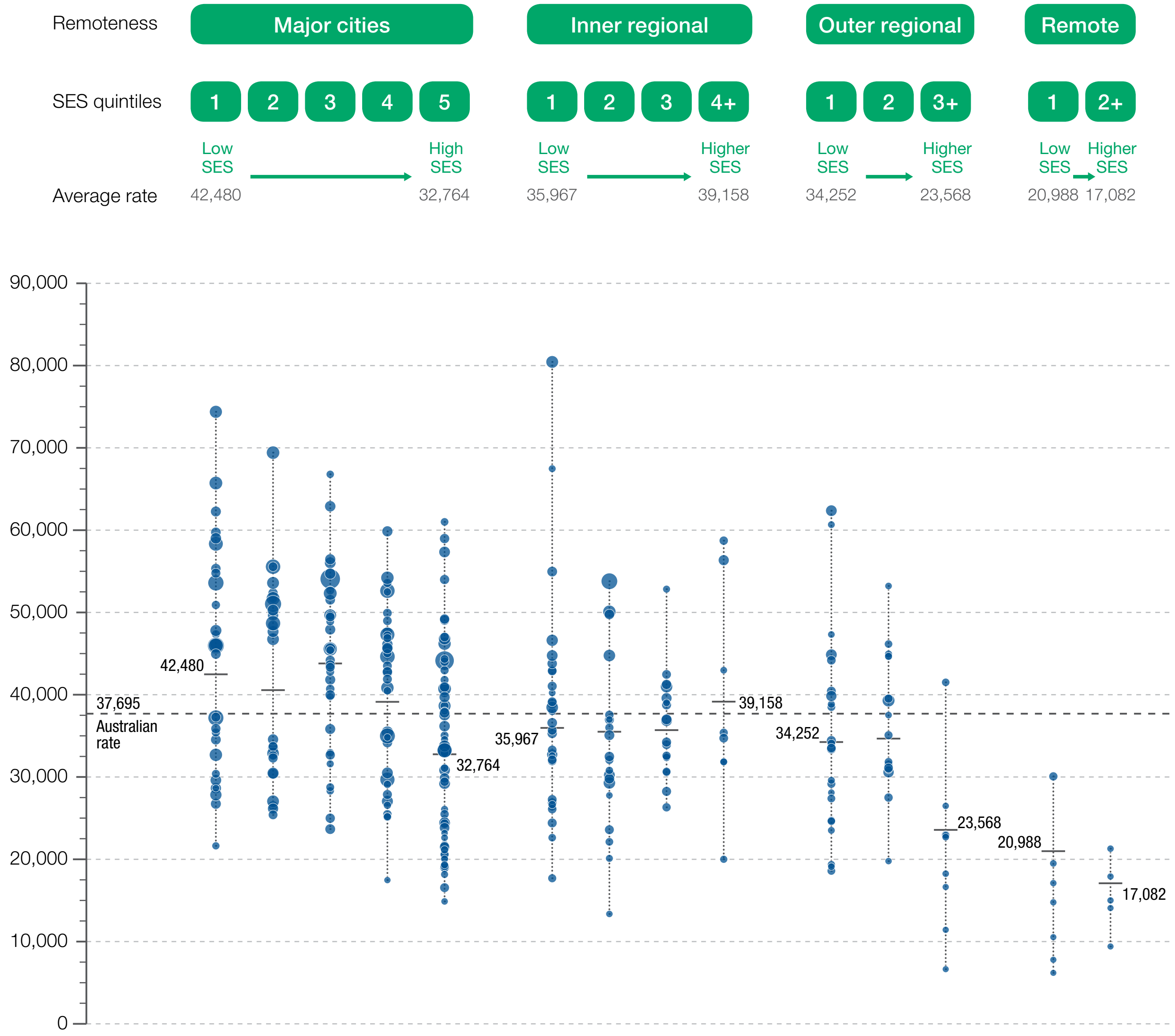
The size of each circle represents the number of prescriptions dispensed in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 86: Number of PBS prescriptions dispensed for anxiolytic medicines per 100,000 people aged 65 years and over, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

20 5,000 10,000 15,000 20,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Anxiolytic medicines dispensing 65 years and over

Resources

- HealthDirect Australia. *Anxiety*. 2013. Available at: www.healthdirect.gov.au/anxiety.
- Kyrios M. *Anxiety Disorders: Assessment and management in general practice*. Australian Family Physician. June 2011; 40(6). Available at: www.racgp.org.au/download/documents/AFP/2011/June/201106kyrios.pdf.
- McKay R, Casey J, Stevenson J, McGowan H. *Psychiatry services for older people: a report on current issues and evidence to inform the development of services and the revision of RANZCP Position Statement 22*. Royal Australian and New Zealand College of Psychiatrists. 2015. Available at: www.ranzcp.org/Files/Resources/College_Statements/Position_Statements/RPT-FPOA-Psychiatry-services-for-older-people-revi.aspx
- Pharmaceutical Benefits Scheme. *Australian Statistics on Medicines*. 2015. Available at: www.pbs.gov.au/info/browse/statistics.

1 Australian Bureau of Statistics. National Survey of Mental Health and Wellbeing: summary of results. Cat. no. 4326.0. Canberra: ABS, 2007.
2 Gonçalves DC, Byrne GJ. Interventions for generalized anxiety disorder in older adults: systematic review and meta-analysis. Journal of Anxiety Disorders 2012;26(1):1–11.
3 Seignourel PJ, Kunik ME, Snow L, Wilson N, Stanley M. Anxiety in dementia: a critical review. Clinical Psychology Review 2008;28(7):1071–82.
4 Australian Institute of Health and Welfare. Depression in residential aged care 2008–2012. Aged care statistics series no. 39: Cat. no. AGE 73. Canberra: AIHW, 2013.
5 Meadows GN, Enticott JC, Inder B, Russell GM, Gurr R. Better access to mental health care and the failure of the Medicare principle of universality. MJA 2015;202(4):190–4.
6 McKay RG, Draper BM. Is it too late to prevent a decline in mental health care for older Australians? MJA 2012;197(2):87–8.

4.7 Antipsychotic medicines dispensing 17 years and under

Context

This data item examines dispensing rates of antipsychotic medicines for people aged 17 years and under. These data are sourced from the PBS and relate to the number of prescriptions dispensed per 100,000 people.

In Australia, antipsychotic medicines are primarily used to treat psychotic disorders, including schizophrenia, and the psychotic symptoms of mood disorders. They are used to reduce or sometimes eliminate the distressing and disabling symptoms of psychosis, such as paranoia, confused thinking, delusions and hallucinations. This is the common use of antipsychotic medicines for adolescents.

In children and some adolescents, antipsychotic medicines are also used to treat a range of behavioural disturbances related to developmental and behavioural conditions, including autism spectrum disorder, attention deficit hyperactivity disorder and conduct disorder.

Antipsychotic medicine is one component of treating mental health conditions but is rarely considered sufficient on its own.[1] Effective treatment for psychosis and behavioural disorders usually includes ongoing clinical support in the community; psychological therapies including family therapy; education about symptoms and how to deal with them; accommodation, employment and educational support.

Antipsychotic medicines dispensing 17 years and under

Magnitude of variation

In 2013–14, there were 104,697 PBS prescriptions dispensed for antipsychotic medicines, representing 2,070 prescriptions per 100,000 people aged 17 years and under (the Australian rate).

The number of PBS prescriptions dispensed for antipsychotic medicines across 317* local areas (SA3s) ranged from 306 to 6,895 per 100,000 people aged 17 years and under. The number of prescriptions was **22.5 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 716 per 100,000 people aged 17 years and under in the Northern Territory, to 2,544 in Queensland.

After excluding the highest and lowest results, the antipsychotic medicine prescription rate across the 298 remaining local areas was **7.1 times higher** in one local area compared to another.

Dispensing rates were similar in major cities and in regional areas, and lowest in remote communities. Dispensing rates for those 17 years and under had little association with socioeconomic groupings.

Interpretation

Potential reasons for the variation include differences in:

- prescribing practices across different states and territories and potentially between primary health providers and specialists
- access to psychosocial interventions[2]
- the incidence and prevalence of psychosis related to illicit drug use
- practitioner, consumer and family willingness to accept medication assistance
- health system factors, including availability of mental health services and access to psychiatric and psychological services
- location of youth correction centres in areas of higher dispensing
- private prescriptions, which are not included in this data.

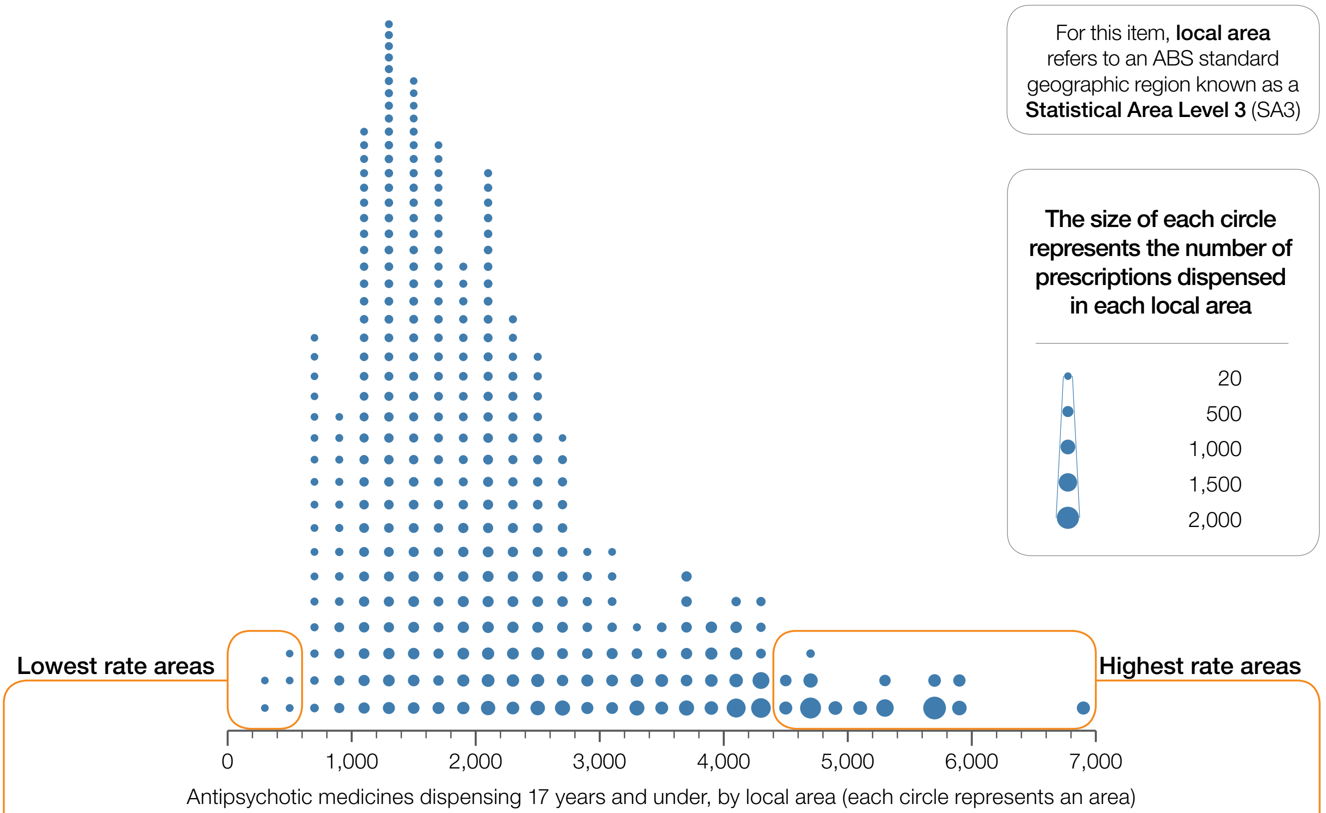
It is also important to note that the dispensing of antipsychotic medicines in remote areas by some Aboriginal Health Services is not captured in the PBS.

To explore this variation, further analysis could focus on:

- prescription rates based on practitioner type. This could help determine the extent of variations between primary and specialist care providers, taking into account the severity of the disease or disorder.

*There are 333 SA3s. For this item, data were suppressed for 16 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 87: Number of PBS prescriptions dispensed for antipsychotic medicines per 100,000 people aged 17 years and under, age standardised, by local area, 2013–14



Local area	State	Rate	Prescriptions
Augusta - Margaret River - Busselton	WA	306	34
Pilbara	WA	382	42
Litchfield	NT	483	25
Darwin Suburbs	NT	489	66
Woden	ACT	573	41

Local area	State	Rate	Prescriptions
Southern Highlands	NSW	6,895	781
Kempsey - Nambucca	NSW	5,982	669
Port Macquarie	NSW	5,822	974
Taree - Gloucester	NSW	5,698	714
Wyong	NSW	5,609	2,077
Wollondilly	NSW	5,363	549
Ipswich Inner	Qld	5,282	1,368
Caboolture	Qld	5,111	876
Dubbo	NSW	4,869	857
Gladstone - Biloela	Qld	4,776	937
Campbelltown	NSW	4,690	1,840
Beaudesert	Qld	4,644	155
Burnett	Qld	4,568	566
Maitland	NSW	4,476	768

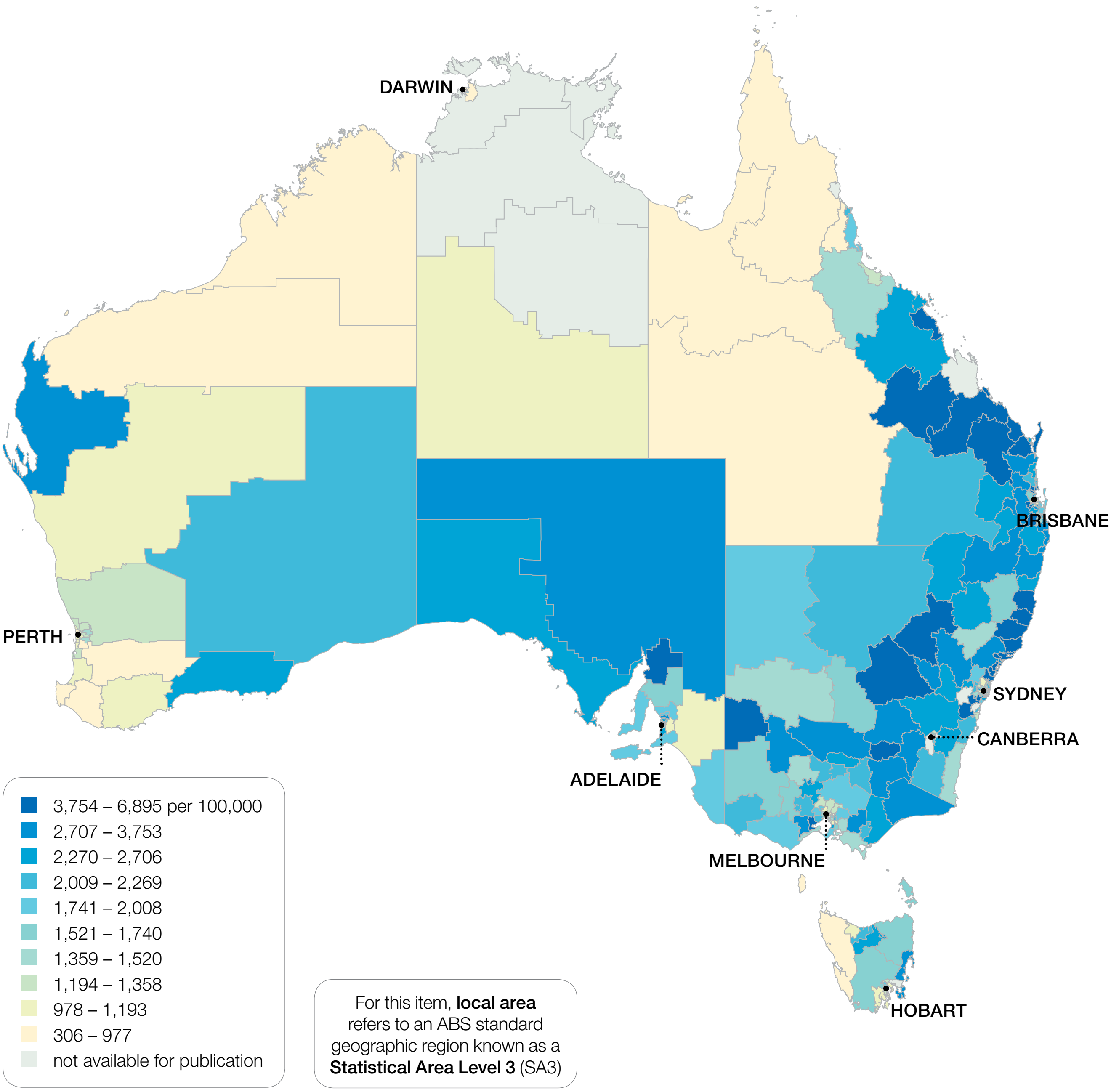
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions.
SA3 analysis excludes approximately 160 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

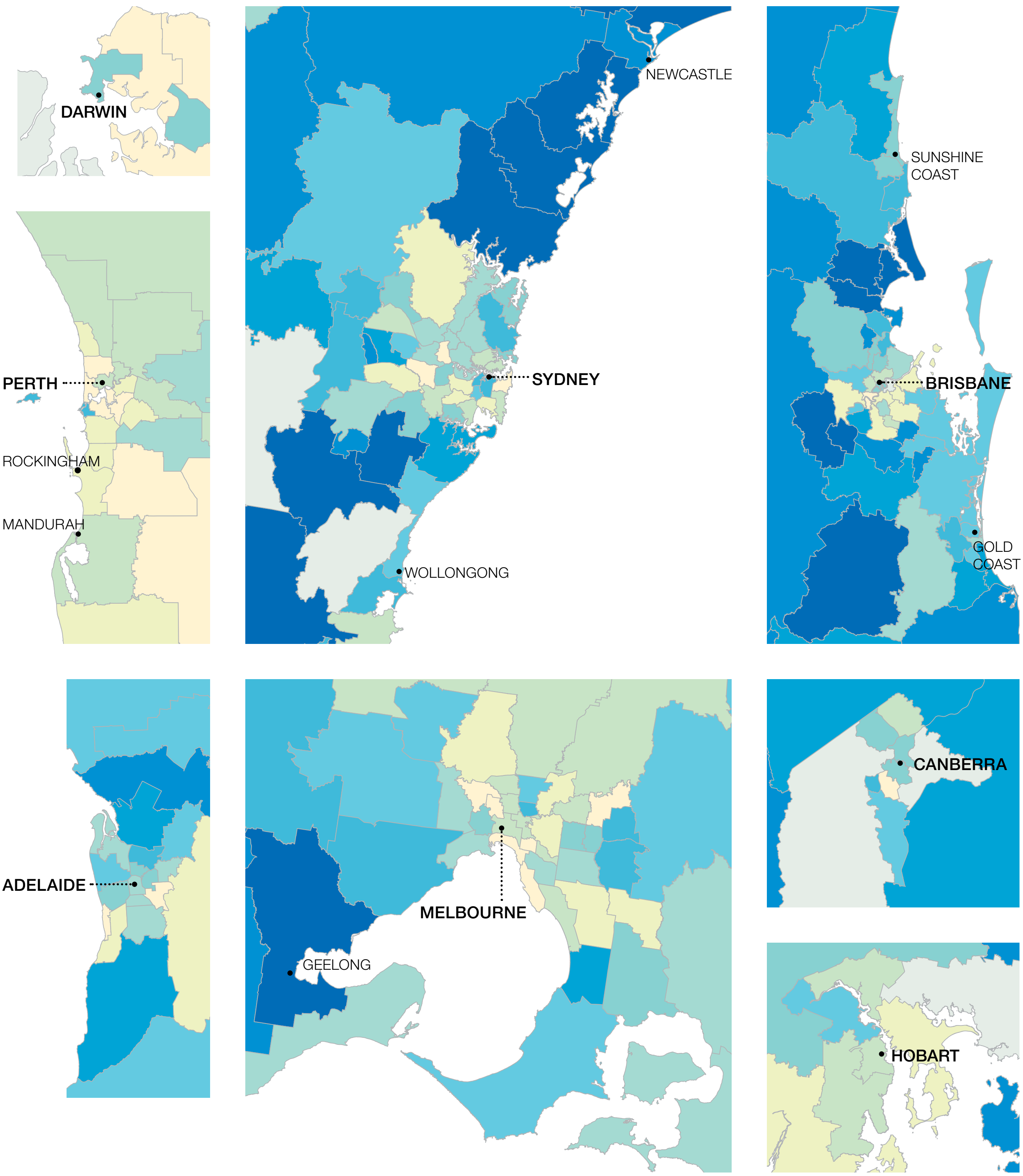
Antipsychotic medicines dispensing 17 years and under

Figure 88: Number of PBS prescriptions dispensed for antipsychotic medicines per 100,000 people aged 17 years and under, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for antipsychotic medicines across 317 local areas (SA3s) ranged from 306 to 6,895 per 100,000 people aged 17 years and under. The number of prescriptions was **22.5 times higher** in the area with the highest rate compared to the area with the lowest rate.

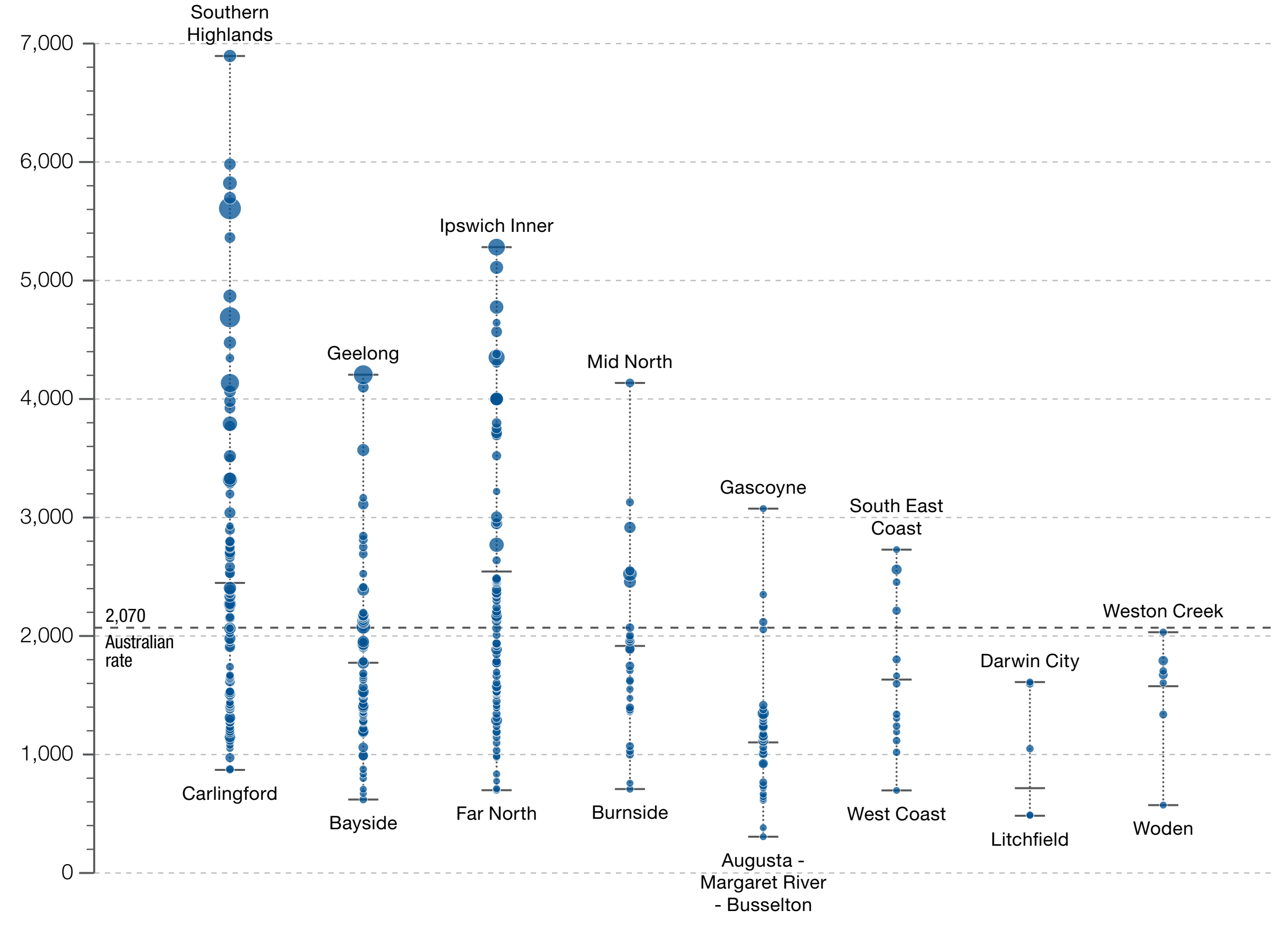


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antipsychotic medicines dispensing 17 years and under

Figure 89: Number of PBS prescriptions dispensed for antipsychotic medicines per 100,000 people aged 17 years and under, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	6,895	4,205	5,282	4,136	3,075	2,729	1,611	2,032
State/territory	2,448	1,774	2,544	1,916	1,102	1,632	716	1,576
Lowest rate	870	620	699	708	306	697	483	573
No. prescriptions	39,447	21,492	27,366	6,742	6,110	1,877	426	1,221



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

20 500 1,000 1,500 2,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 90: Number of PBS prescriptions dispensed for antipsychotic medicines per 100,000 people aged 17 years and under, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

20 500 1,000 1,500 2,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antipsychotic medicines dispensing 17 years and under

Resources

- Seida JC, Schouten JR, Mousavi SS, Hamm M, Beaith A, Vandermeer B, et al. *First- and Second-Generation Antipsychotics for Children and Young Adults*. Comparative Effectiveness Review No. 39. Agency for Healthcare Research and Quality. 2012. Available at: www.effectivehealthcare.ahrq.gov/ehc/products/147/835/CER39_Antipsychotics-Children-Young-Adults_20120221.pdf.

- Spence R, Roberts A, Ariti C, Bardsley M. QualityWatch. *Focus on: antidepressant prescribing*. Health Foundation and Nuffield Trust. 2014. Available at: www.nuffieldtrust.org.uk/sites/files/nuffield/publication/140528_qualitywatch_focus_on_antidepressant_prescribing.pdf

- Royal College of Psychiatrists. *Consensus statement on high-dose antipsychotic medication: Council Report CR190*. 2014. Available at: www.rcpsych.ac.uk/files/pdfversion/CR190.pdf

- Australian Government Department of Health. *The mental health of children and adolescents: report on the second Australian child and adolescent survey of mental health and wellbeing*. 2015. Available at: www.health.gov.au/internet/main/publishing.nsf/Content/mental-pubs-m-child2.

- Pharmaceutical Benefits Scheme. *Australian Statistics on Medicines*. 2015. Available at: www.pbs.gov.au/info/browse/statistics.

1 Royal Australian and New Zealand College of Psychiatrists Clinical Practice Guidelines for the Treatment of Schizophrenia and Related Disorders. ANZJP 2005;39:1–30.

2 Spence R, Roberts A, Ariti C, Bardsley M. QualityWatch. Focus on: antidepressant prescribing. Trends in the prescribing of antidepressants in primary care. London: Health Foundation and Nuffield Trust, 2014.

4.8 Antipsychotic medicines dispensing 18–64 years

Context

This data item examines dispensing rates of antipsychotic medicines for people aged 18 to 64. These data are sourced from the PBS and relate to the number of prescriptions dispensed per 100,000 people.

In Australia, antipsychotic medicines are primarily used to treat psychotic disorders, including schizophrenia, and the psychotic symptoms of mood disorders. They are used to reduce or sometimes eliminate the distressing and disabling symptoms of psychosis, such as paranoia, confused thinking, delusions and hallucinations.

Antipsychotic medicine is one component of treating mental illness, but is rarely considered sufficient on its own.[1] Effective treatment for schizophrenia and related disorders usually includes ongoing clinical support in the community; psychological therapies; education about symptoms and how to deal with them; psychosocial rehabilitation; accommodation, employment and educational support.

Concerns have been raised about prescribing antipsychotic medicines outside the intended purpose; for example, to treat sleep disorders.

Antipsychotic medicines dispensing 18–64 years

Magnitude of variation

In 2013–14, there were 2,582,447 PBS prescriptions dispensed for antipsychotic medicines, representing 17,844 prescriptions per 100,000 people aged 18 to 64 years (the Australian rate).

The number of PBS prescriptions dispensed for antipsychotic medicines across 325* local areas (SA3s) ranged from 2,076 to 39,544 per 100,000 people aged 18 to 64 years. The number of prescriptions was **19.0 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 9,250 per 100,000 people aged 18 to 64 years in the Northern Territory, to 20,863 in South Australia.

After excluding the highest and lowest results, the antipsychotic medicine prescription rate across the 302 remaining local areas was **3.2 times higher** in one local area compared to another.

Dispensing rates were similar in major cities and regional areas and were lowest in remote communities.

A relationship was noted between dispensing rates and socioeconomic status: rates were highest in areas of low socioeconomic status, and lower in areas of high socioeconomic status.

Interpretation

Potential reasons for the variation include differences in:

- prescription practices, which may vary between states and territories, primary health providers and specialists
- the prevalence of mental health conditions such as schizophrenia, which may be higher in disadvantaged communities[2]
- access to psychiatric and psychological services
- location of correctional facilities in areas of higher dispensing
- private prescriptions, which are not included in this data.

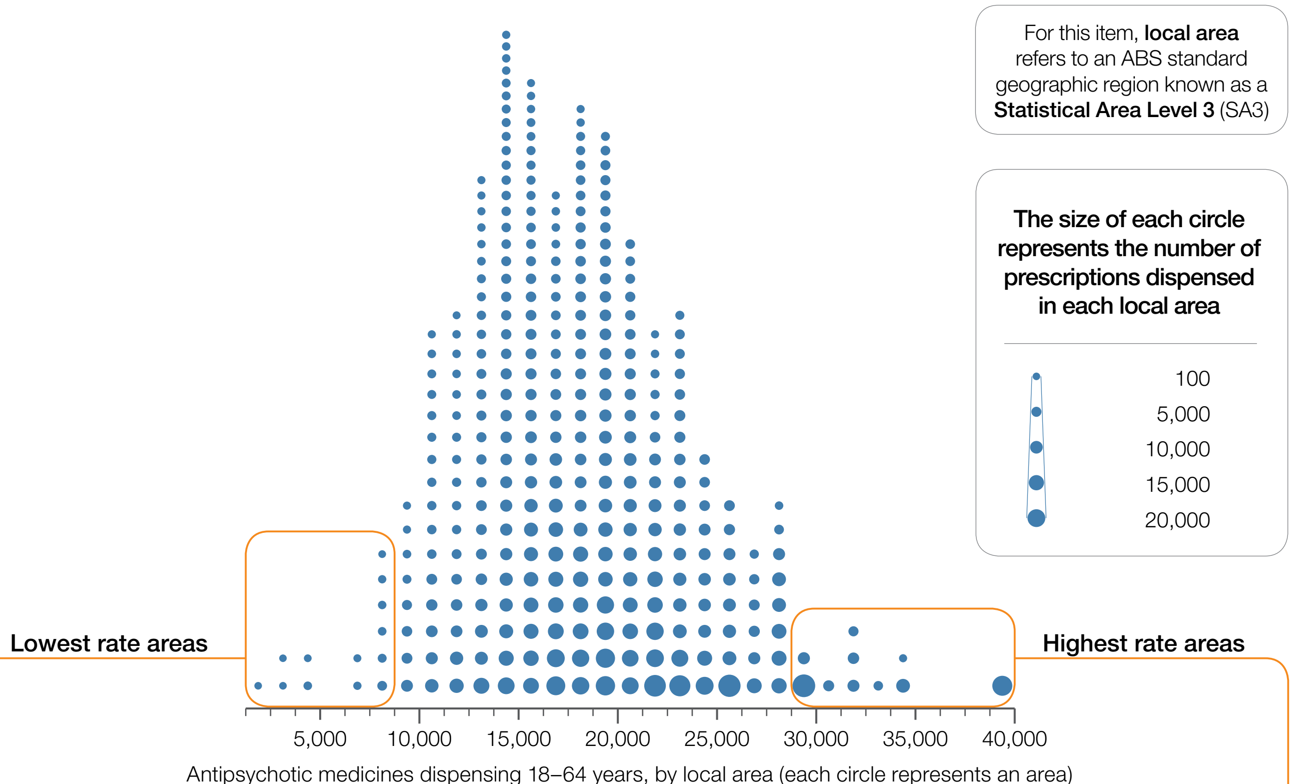
It is also important to note that the dispensing of antipsychotic medicines in remote areas by some Aboriginal Health Services is not captured in the PBS database.

To explore this variation, further analysis could focus on:

- the individual- and system-level factors that lead to unwarranted variations in the prescribing and dispensing of antipsychotic medicines to those aged 18 to 64
- the rate of variation once quetiapine has been removed from the data, as concerns have been raised about its use as a sedative.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 91: Number of PBS prescriptions dispensed for antipsychotic medicines per 100,000 people aged 18 to 64 years, age standardised, by local area, 2013–14



Local area	State	Rate	Prescriptions
East Arnhem	NT	2,076	211
Daly - Tiwi - West Arnhem	NT	2,594	298
Barkly	NT	2,885	120
Katherine	NT	4,271	539
Pilbara	WA	4,408	2,160
Litchfield	NT	7,021	951
Central Highlands	Qld	7,331	1,537
Gungahlin	ACT	7,832	2,838
Far North	Qld	8,003	1,614
Kimberley	WA	8,109	2,162
Blacktown - North	NSW	8,261	4,423
Gascoyne	WA	8,364	510
Outback - North	Qld	8,500	1,920

Local area	State	Rate	Prescriptions
Ipswich Inner	Qld	39,544	24,298
South East Coast	Tas	34,558	1,228
Redcliffe	Qld	34,450	12,227
Adelaide City	SA	32,774	3,995
Maryborough	Qld	32,466	7,746
Taree - Gloucester	NSW	32,352	8,771
Great Lakes	NSW	32,301	5,085
Gippsland - East	Vic	30,255	6,864
Hobart - North West	Tas	29,178	9,020
Newcastle	NSW	28,893	29,563

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

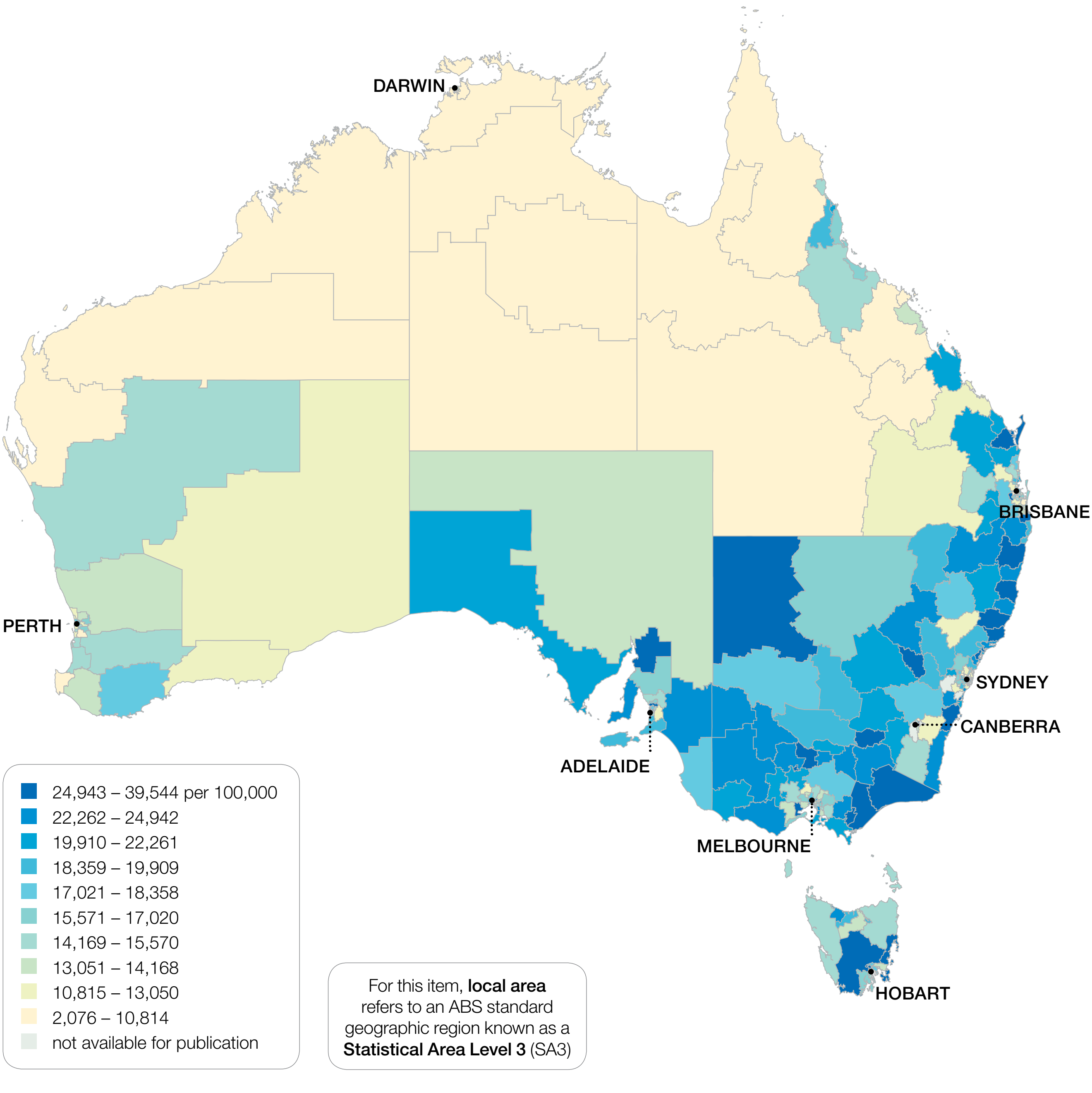
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 93,450 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

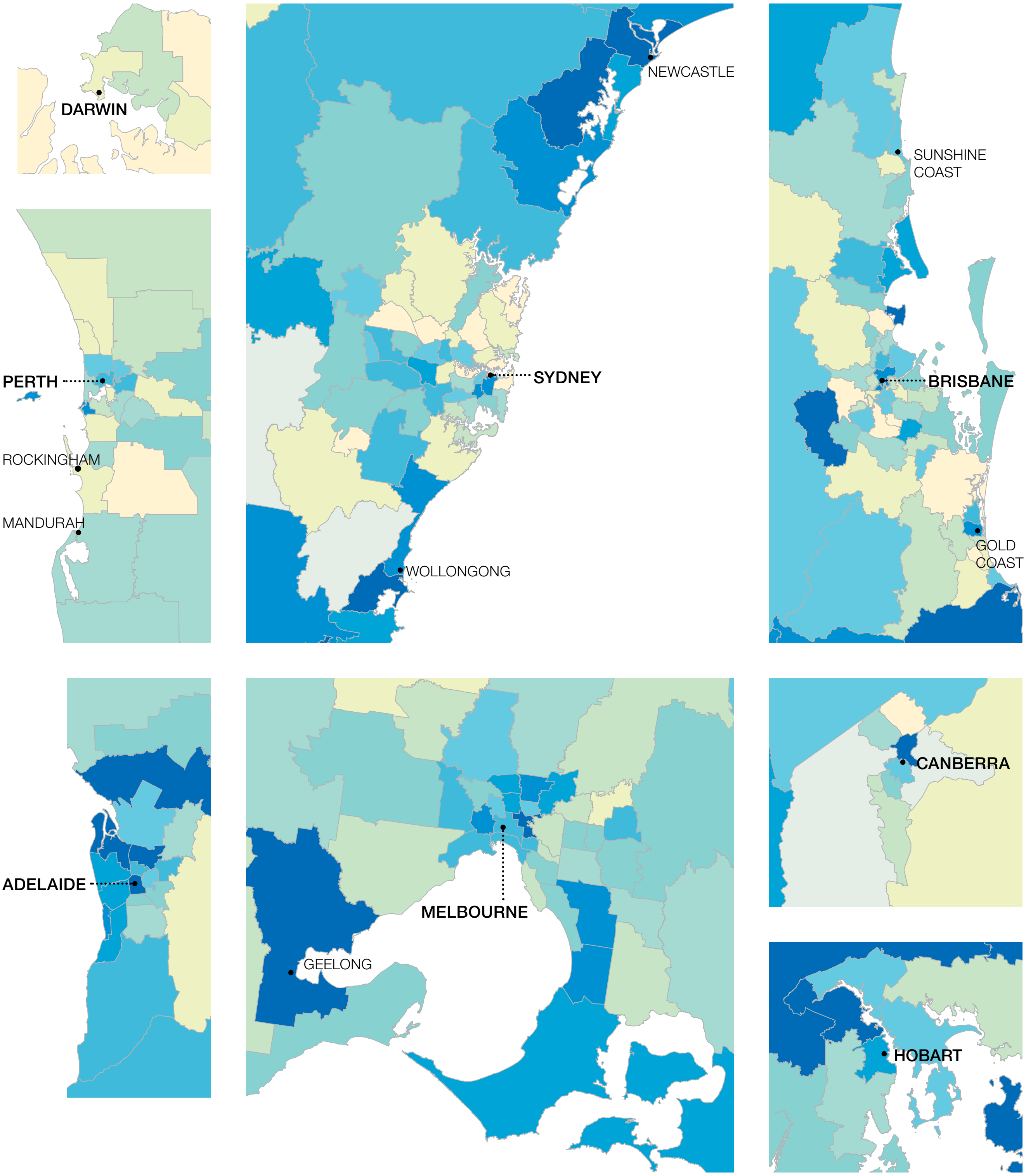
Antipsychotic medicines dispensing 18–64 years

Figure 92: Number of PBS prescriptions dispensed for antipsychotic medicines per 100,000 people aged 18 to 64 years, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for antipsychotic medicines across 325 local areas (SA3s) ranged from 2,076 to 39,544 per 100,000 people aged 18 to 64 years. The number of prescriptions was **19.0 times higher** in the area with the highest rate compared to the area with the lowest rate.

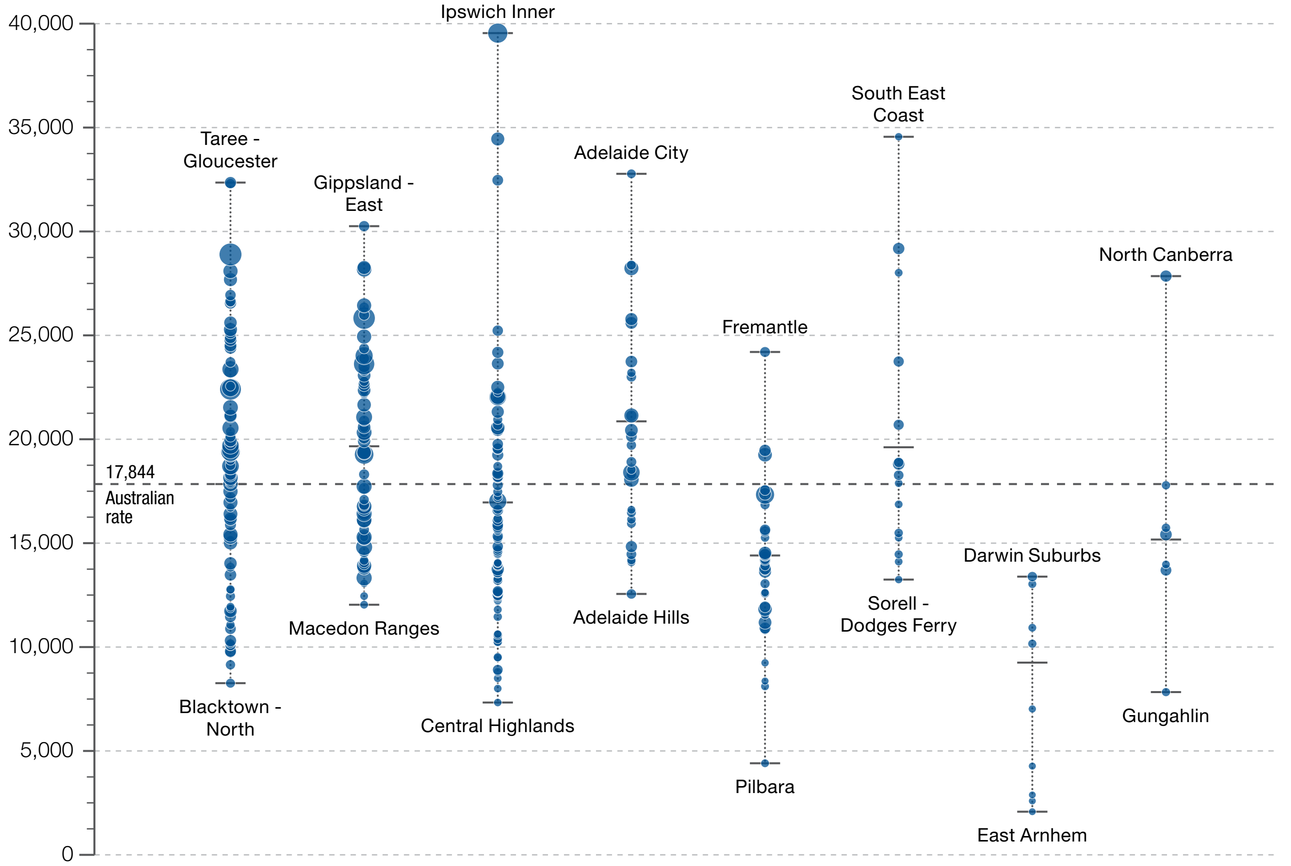


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antipsychotic medicines dispensing 18–64 years

Figure 93: Number of PBS prescriptions dispensed for antipsychotic medicines per 100,000 people aged 18 to 64 years, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	32,352	30,255	39,544	32,774	24,200	34,558	13,390	27,851
State/territory	17,842	19,663	16,961	20,863	14,409	19,616	9,250	15,176
Lowest rate	8,261	12,038	7,331	12,555	4,408	13,246	2,076	7,832
No. prescriptions	821,243	710,944	490,256	215,415	231,947	60,042	14,666	37,422



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

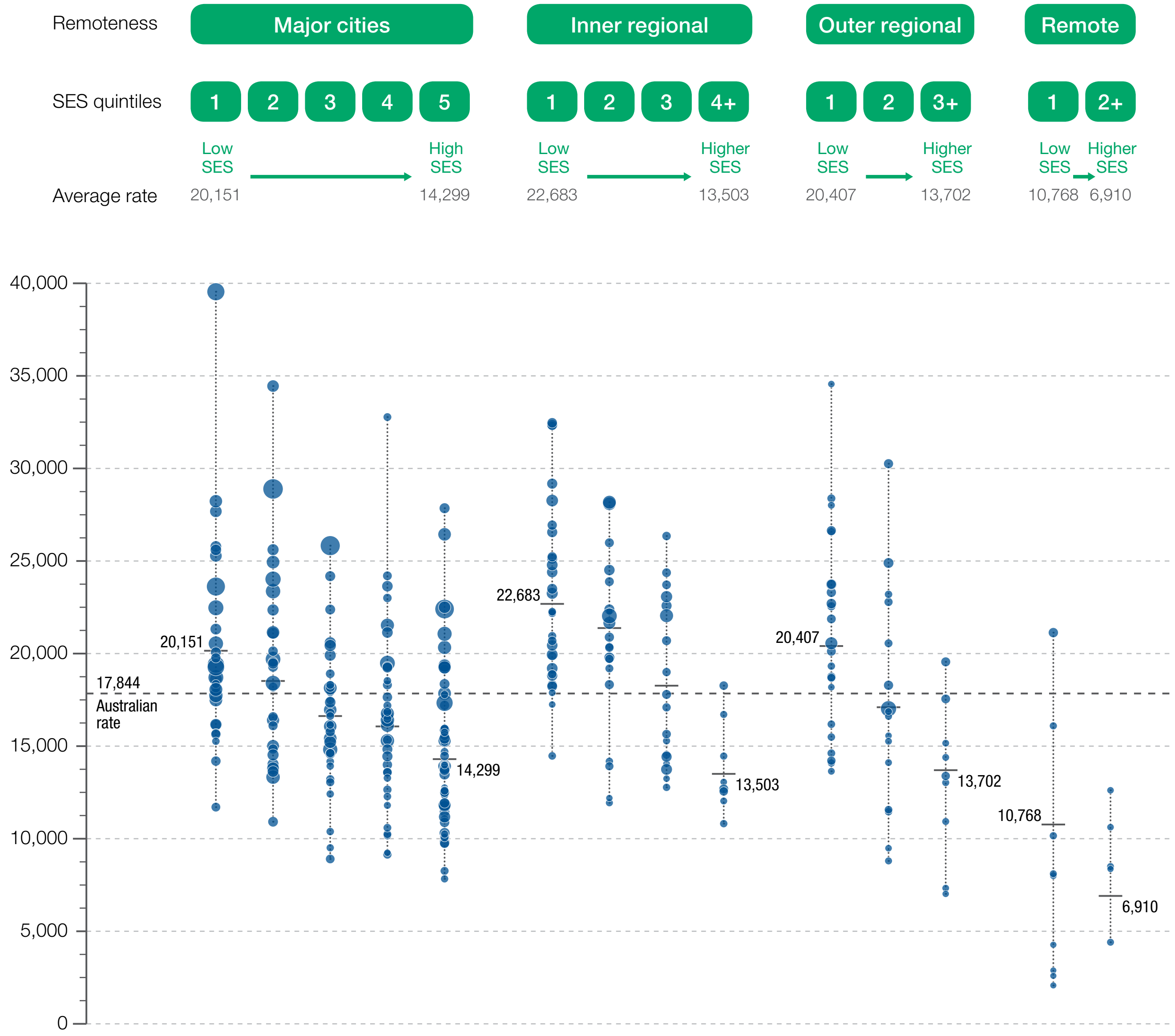
The size of each circle represents the number of prescriptions dispensed in each local area

100 5,000 10,000 15,000 20,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 94: Number of PBS prescriptions dispensed for antipsychotic medicines per 100,000 people aged 18 to 64 years, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

100 | 5,000 | 10,000 | 15,000 | 20,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antipsychotic medicines dispensing 18–64 years

Resources

- Royal Australian & New Zealand College of Psychiatrists. *Schizophrenia – Guide for the public*. 2009. Available at: www.ranzcp.org/Mental-health-advice/guides-for-the-public/schizophrenia.aspx.

- Royal Australian and New Zealand College of Psychiatrists. *Clinical Practice Guidelines for the Treatment of Schizophrenia and Related Disorders*. Australian and New Zealand Journal of Psychiatry. Consultation draft 2015. Available at: www.ranzcp.org/Files/Resources/Publications/CPG/Clinician/CPG_Clinician_Full_Schizophrenia-pdf.aspx.

- NPS Medicinewise. *Medicines for psychotic conditions*. Available at: www.nps.org.au/medicines/brain-and-nervous-system/medicines-for-psychotic-conditions.

- Royal College of Psychiatrists. *Consensus statement on high-dose antipsychotic medication: Council Report CR190*. 2014. Available at: www.rcpsych.ac.uk/files/pdfversion/CR190.pdf

- Drug Utilisation Subcommittee (DUSC) of the Pharmaceutical Benefits Advisory Committee (PBAC). *Antipsychotics in the middle aged. February 2013 and June 2013*. Available at: www.pbs.gov.au/info/industry/listing/participants/public-release-docs/antipsychotics-middle-aged-2013.

- Pharmaceutical Benefits Scheme. *Australian Statistics on Medicines*. 2015. Available at: www.pbs.gov.au/info/browse/statistics.

1 Royal Australian and New Zealand College of Psychiatrists. Clinical Practice Guidelines for the Treatment of Schizophrenia and Related Disorders. ANZJP 2005;39:1–30.

2 Tandon R, Keshavan MS, Nasrallah HA. Schizophrenia, "just the facts" what we know in 2008. Part 2. Epidemiology and etiology. Schizophrenia research 2008;102(1–3):1–18.

4.9 Antipsychotic medicines dispensing 65 years and over

Context

This data item examines dispensing rates of antipsychotic medicines for people aged 65 and over. These data are sourced from the PBS and show the number of prescriptions dispensed per 100,000 people.

In Australia, antipsychotic medicines are primarily used to treat psychotic disorders, including schizophrenia, and the psychotic symptoms of mood disorders. They are used to reduce, or sometimes eliminate, the distressing and disabling symptoms of psychosis, such as delusions and hallucinations.

Antipsychotic medicine is one component of treating mental health conditions, but is rarely considered sufficient on its own. Effective treatment for schizophrenia and related disorders usually includes ongoing clinical support in the community; psychological therapies; education about symptoms and how to deal with them; psychosocial rehabilitation; accommodation, employment and educational support.

In particular, high and inappropriate prescribing of antipsychotics has been documented in older people.[1] Concerns have been raised about prescribing antipsychotic medicines outside guideline recommendations, such as for behavioural disturbances related to dementia or delirium, before secondary causes have been excluded and non-pharmacological measures have been tried.[2,3,4]

Antipsychotic medicines dispensing 65 years and over

Magnitude of variation

In 2013–14, there were 919,026 PBS prescriptions dispensed for antipsychotic medicines, representing 27,043 prescriptions per 100,000 people aged 65 years and over (the Australian rate).

The number of PBS prescriptions dispensed for antipsychotic medicines across 324* local areas (SA3s) ranged from 8,043 to 57,130 per 100,000 people aged 65 years and over. The number of prescriptions was **7.1 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 17,522 per 100,000 people aged 65 years and over in the Northern Territory, to 31,763 in Victoria.

After excluding the highest and lowest results, the antipsychotic medicine prescription rate across the 299 remaining local areas was **2.4 times higher** in one local area compared to another.

Dispensing rates were higher in major cities than in regional and remote areas and were lowest in remote communities.

There was some correlation between socioeconomic status and the dispensing rate: the dispensing rate was lower in areas of high socioeconomic status.

Dispensing rates for older adults were higher than for those aged 64 and under, and variations based on socioeconomic factors were less apparent than in younger adults.

Interpretation

Potential reasons for the variation include differences in:

- prescribing practices, training, knowledge and attitudes of clinicians
- the use of antipsychotic medicines outside the guideline recommendations, such as to treat behavioural disturbances in older people[1]
- multiple repeat dispensing, which could influence recorded dispensing rates at the local area level
- the density of aged-care facilities
- private prescriptions, which are not included in this data.

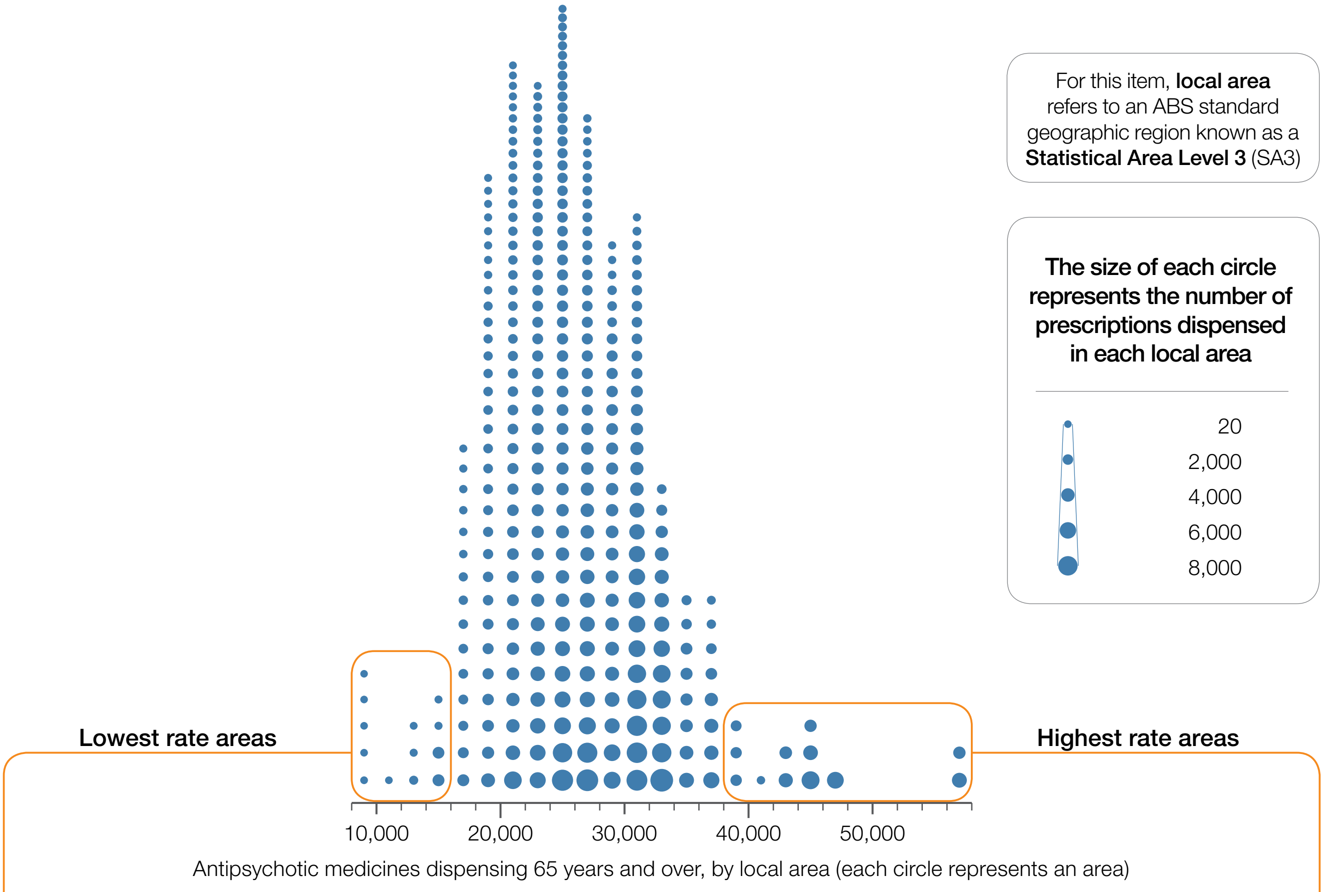
It is also important to note that the dispensing of antipsychotic medicines in remote areas by some Aboriginal Health Services is not captured in the PBS.

To explore this variation, further analysis could focus on:

- individual- and system-level factors that lead to variation in antipsychotic dispensing rates within more specific age groups (for example, 65 years and over, 75 years and over, and 85 years and over, compared to those aged 64 years and under)
- the relationship between dispensing rates and the proportion of older adults living in residential and community settings.

*There are 333 SA3s. For this item, data were suppressed for 9 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 95: Number of PBS prescriptions dispensed for antipsychotic medicines per 100,000 people aged 65 years and over, age standardised, by local area, 2013–14



Local area	State	Rate	Prescriptions
Barkly	NT	8,043	27
Kimberley	WA	8,209	157
Daly - Tiwi - West Arnhem	NT	8,651	63
Gascoyne	WA	8,812	108
Katherine	NT	9,204	79
Litchfield	NT	10,061	99
Huon - Bruny Island	Tas	13,165	383
Port Douglas - Daintree	Qld	13,682	227
Robina	Qld	13,888	1,065
Esperance	WA	14,661	334
Mandurah	WA	14,805	2,853
Melville	WA	15,401	2,954
West Coast	Tas	15,405	396

Local area	State	Rate	Prescriptions
Yarra	Vic	57,130	4,951
Leichhardt	NSW	56,034	3,260
Ipswich Inner	Qld	47,976	6,217
Sydney Inner City	NSW	45,189	7,003
Brunswick - Coburg	Vic	45,117	4,811
Melbourne City	Vic	44,030	3,219
Maribyrnong	Vic	43,047	3,422
Port Phillip	Vic	42,737	4,488
Central Highlands	Tas	40,197	629
Marrickville - Sydenham - Petersham	NSW	39,691	2,551
North Canberra	ACT	39,145	2,246
Darebin - South	Vic	38,887	2,618

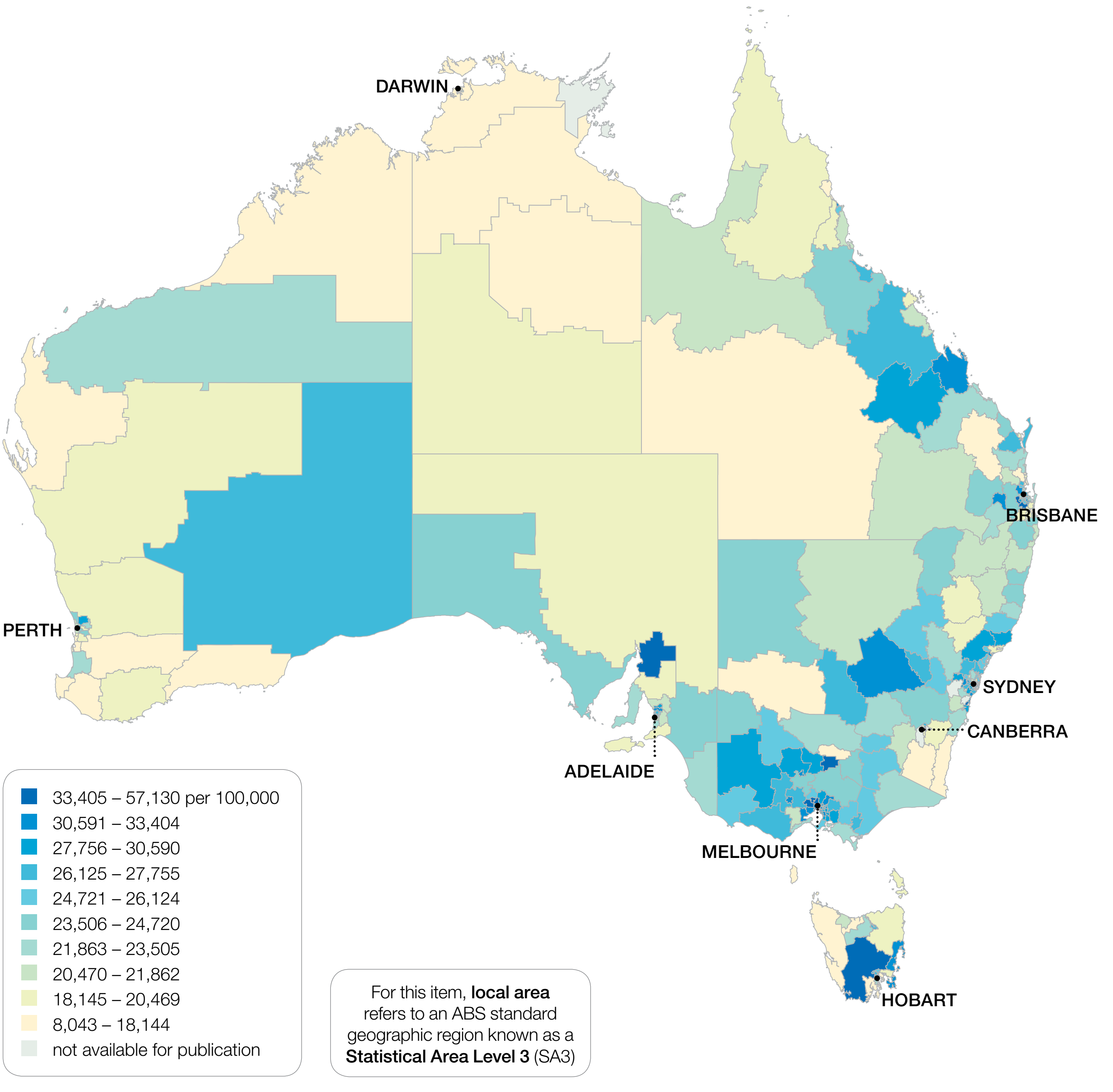
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 34,320 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antipsychotic medicines dispensing 65 years and over

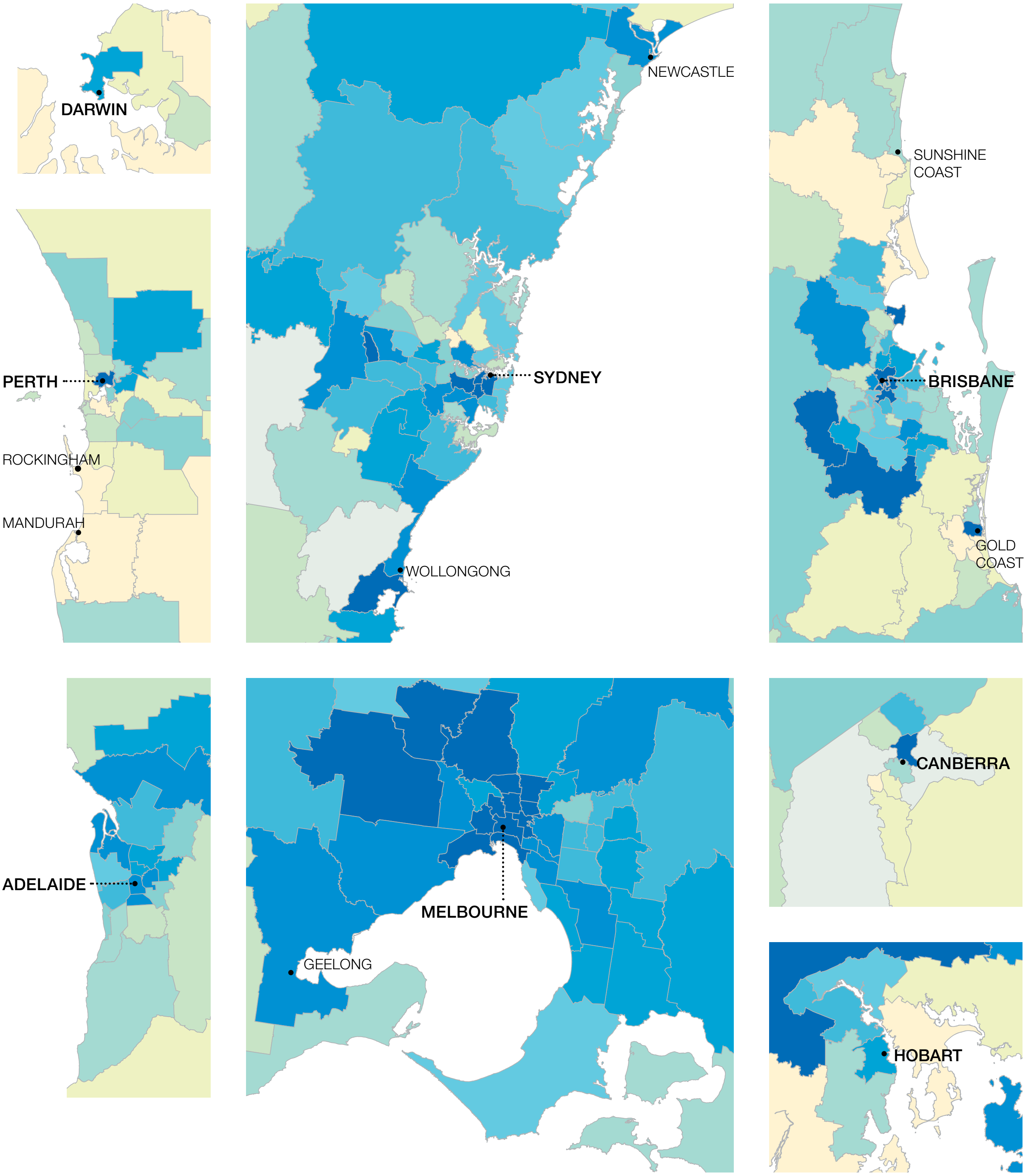
Figure 96: Number of PBS prescriptions dispensed for antipsychotic medicines per 100,000 people aged 65 years and over, age standardised, by local area, 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for antipsychotic medicines across 324 local areas (SA3s) ranged from 8,043 to 57,130 per 100,000 people aged 65 years and over. The number of prescriptions was **7.1 times higher** in the area with the highest rate compared to the area with the lowest rate.

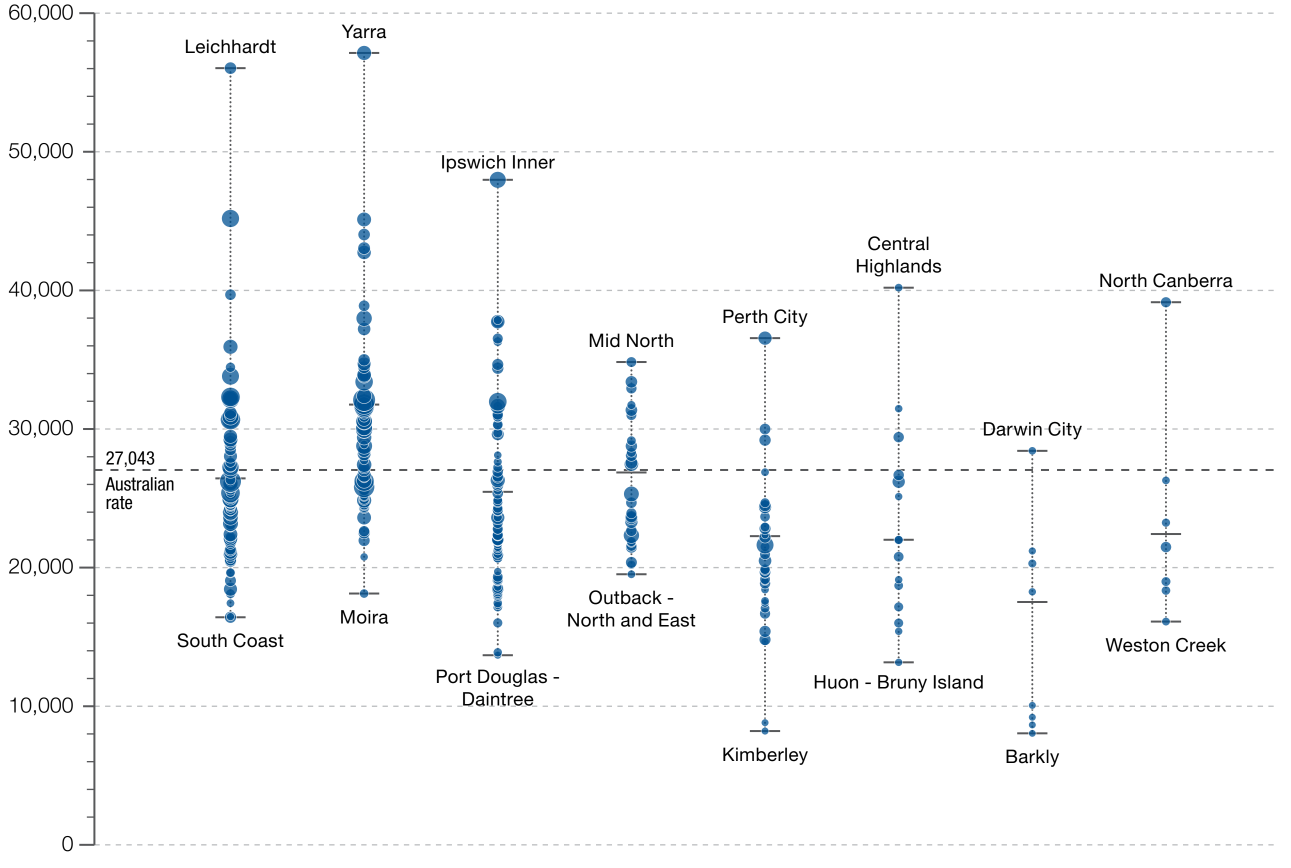


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antipsychotic medicines dispensing 65 years and over

Figure 97: Number of PBS prescriptions dispensed for antipsychotic medicines per 100,000 people aged 65 years and over, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	56,034	57,130	47,976	34,831	36,555	40,197	28,426	39,145
State/territory	26,436	31,763	25,467	26,865	22,270	22,009	17,522	22,425
Lowest rate	16,418	18,130	13,682	19,520	8,209	13,165	8,043	16,108
No. prescriptions	305,145	273,268	160,524	78,255	70,092	19,561	2,270	9,684



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

20 2,000 4,000 6,000 8,000

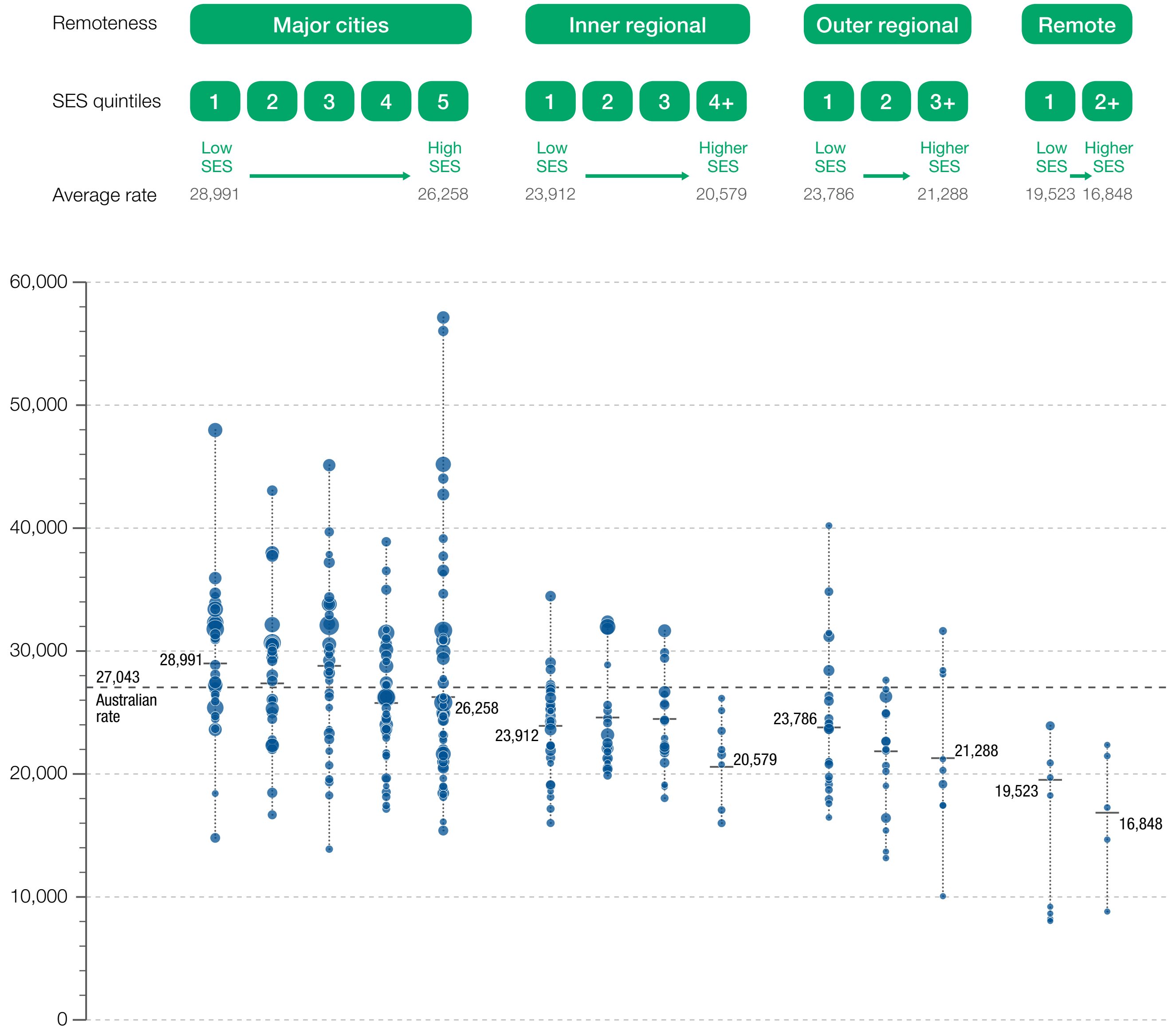
Notes:

Rates are standardised based on the age structure of the Australian population in 2001.

State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 98: Number of PBS prescriptions dispensed for antipsychotic medicines per 100,000 people aged 65 years and over, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

20 2,000 4,000 6,000 8,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Antipsychotic medicines dispensing 65 years and over

Resources

- Royal Australian & New Zealand College of Psychiatrists. *Practice Guideline 10: Antipsychotic medications as a treatment of behavioural and psychological symptoms in dementia*. 2009. Available at: www.ranzcp.org/Files/Resources/College_Statements/Practice_Guidelines/pg10-pdf.aspx.

- NPS MedicineWise. *Medicines for psychotic conditions*. Available at: www.nps.org.au/medicines/brain-and-nervous-system/medicines-for-psychotic-conditions.

- Australian Commission on Safety and Quality in Health Care. *A better way to care: Safe and high-quality care for patients with cognitive impairment (dementia and delirium) in hospital*. 2014. Available from: www.safetyandquality.gov.au/our-work/cognitive-impairment/better-way-to-care/

- McKay R, Casey J, Stevenson J, McGowan H. *Psychiatry services for older people: a report on current issues and evidence to inform the development of services and the revision of RANZCP Position Statement 22*. Royal Australian and New Zealand College of Psychiatrists. 2015. Available at: www.ranzcp.org/Files/Resources/College_Statements/Position_Statements/RPT-FPOA-Psychiatry-services-for-older-people-revi.aspx

- Royal College of Psychiatrists. *Consensus statement on high-dose antipsychotic medication: Council Report CR190*. 2014. Available at: www.rcpsych.ac.uk/files/pdfversion/CR190.pdf

- Pharmaceutical Benefits Scheme. *Australian Statistics on Medicines*. 2015. Available at: www.pbs.gov.au/info/browse/statistics.

1 Drug Utilisation Sub-Committee. Outcome Statement. Canberra: Pharmaceutical Benefits Advisory Committee, Pharmaceutical Benefits Scheme, 2013.
2 National Prescribing Service MedicineWise. Antipsychotic overuse in dementia – is there a problem? Health News and Evidence. Sydney: NPS MedicineWise, 2013.
3 Declercq T, Petrovic M, Azermai M, Vander Stichele R, De Sutter AI, van Driel ML, et al. Withdrawal versus continuation of chronic antipsychotic drugs for behavioural and psychological symptoms in older people with dementia. The Cochrane database of systematic reviews. 2013;3.
4 Hollingworth SA, Siskind DJ, Nissen LM, Robinson M, Hall WD. Patterns of antipsychotic medication use in Australia 2002–2007. ANZJP 2010;44(4):372–7.

4.10 Attention deficit hyperactivity disorder medicines dispensing 17 years and under

Context

This data item examines dispensing rates of medicines for attention deficit hyperactivity disorder (ADHD) for people 17 years and under. These data are sourced from the PBS and relate to the number of prescriptions dispensed per 100,000 people.

Approximately seven per cent of Australian children have ADHD.[1] The condition affects behaviour, concentration and attention; children with ADHD can have problems with inattention, impulsivity and/or overactivity. ADHD is also associated with higher rates of accidents and injuries, school and learning difficulties, alcohol and drug abuse, and family conflict.[2]

ADHD can be successfully managed. A comprehensive assessment involving the child or adolescent and their family and teachers is important in developing an individualised management plan to address the specific needs of the child or adolescent.[3]

The management plan may include psychological, pharmacological or educational interventions, either used individually or in combination.[3] Milder forms of ADHD can be treated with non-pharmacological interventions, and in particular medicine is not recommended as first-line treatment in preschool-aged children.[4]

It is recommended that medicines are used when symptoms are causing significant impairment in academic, social or behavioural function. Stimulant medicines are the main treatment for moderate to severe ADHD, although some medicines, such as atomoxetine, are non-stimulant.

Medicines prescribed for ADHD are specific to ADHD treatment. This provides a robust link between the purpose of the prescription and the recorded dispensing rates.

Attention deficit hyperactivity disorder medicines dispensing 17 years and under

Magnitude of variation

In 2013–14, there were 544,218 PBS prescriptions dispensed for ADHD medicines, representing 10,780 prescriptions per 100,000 people aged 17 years and under (the Australian rate).

The number of PBS prescriptions dispensed for ADHD medicines across 325* local areas (SA3s) ranged from 382 to 28,642 per 100,000 people aged 17 years and under. The number of prescriptions was **75.0 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 5,541 per 100,000 people aged 17 years and under in South Australia, to 13,588 in New South Wales.

After excluding the highest and lowest results, the ADHD medicine prescription rate across the 299 remaining local areas was **7.3 times higher** in one local area compared to another.

Dispensing rates tended to be higher in inner and outer regional areas than in major cities, and were lowest in remote communities.

Dispensing rate and socioeconomic status were associated in inner and outer regional areas: dispensing rates were highest in areas of low socioeconomic status and decreased as the area's socioeconomic status increased. This association was not observed in metropolitan or remote areas.

Interpretation

Potential reasons for the variation include differences in:

- prescriber choices, family preferences, system-related issues or a combination of these. For example, a higher dispensing rate may reflect a lack of accessible and affordable psychological services and/or families choosing medication over other treatments
- rates of behavioural problems such as oppositional defiance disorder and aggression
- state- and territory-based initiatives that encourage child assessment
- access to paediatricians and child psychiatrists who can prescribe stimulant or non-stimulant medicines
- location of youth correction centres in areas of higher dispensing.

It is also important to note that the dispensing of some ADHD medicines in remote areas by some Aboriginal Health Services is not captured in the PBS.

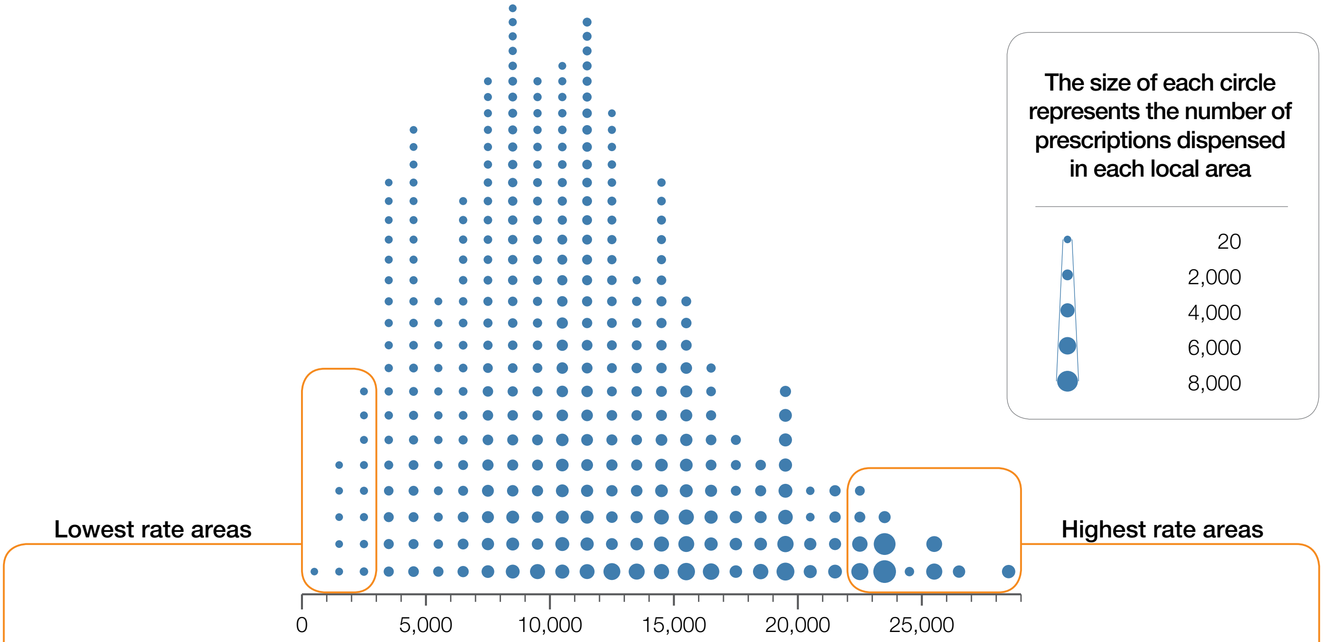
To explore this variation, further analysis could focus on:

- understanding the family-, provider- and system-level factors that affect variations in prescribing and dispensing ADHD medicines for those under 18 years
- determining whether dispensing rates are different for pre- and post-puberty age groups.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 99: Number of PBS prescriptions dispensed for ADHD medicines per 100,000 people aged 17 years and under, age standardised, by local area, 2013–14

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)



ADHD medicines dispensing 17 years and under, by local area (each circle represents an area)

Local area	State	Rate	Prescriptions
Daly - Tiwi - West Arnhem	NT	382	22
Barkly	NT	1,717	34
Norwood - Payneham - St Peters	SA	1,767	106
Unley	SA	1,777	128
East Arnhem	NT	1,923	109
Kimberley	WA	1,937	202
Burnside	SA	2,240	218
Darebin - South	Vic	2,513	214
Campbelltown	SA	2,590	268
Adelaide Hills	SA	2,674	472
Alice Springs	NT	2,738	289
Mitcham	SA	2,893	386
Charles Sturt	SA	2,952	592
Essendon	Vic	2,961	362

Local area	State	Rate	Prescriptions
Taree - Gloucester	NSW	28,642	3,523
Kempsey - Nambucca	NSW	26,200	2,927
Bundaberg	Qld	25,373	5,205
Tamworth - Gunnedah	NSW	25,011	5,017
Brighton	Tas	24,414	1,139
Clarence Valley	NSW	23,582	2,731
Geelong	Vic	23,546	9,168
Wyong	NSW	23,298	8,617
Great Lakes	NSW	22,918	1,381
Inverell - Tenterfield	NSW	22,837	2,062
Lower Hunter	NSW	22,677	4,772
Ipswich Inner	Qld	22,190	5,763

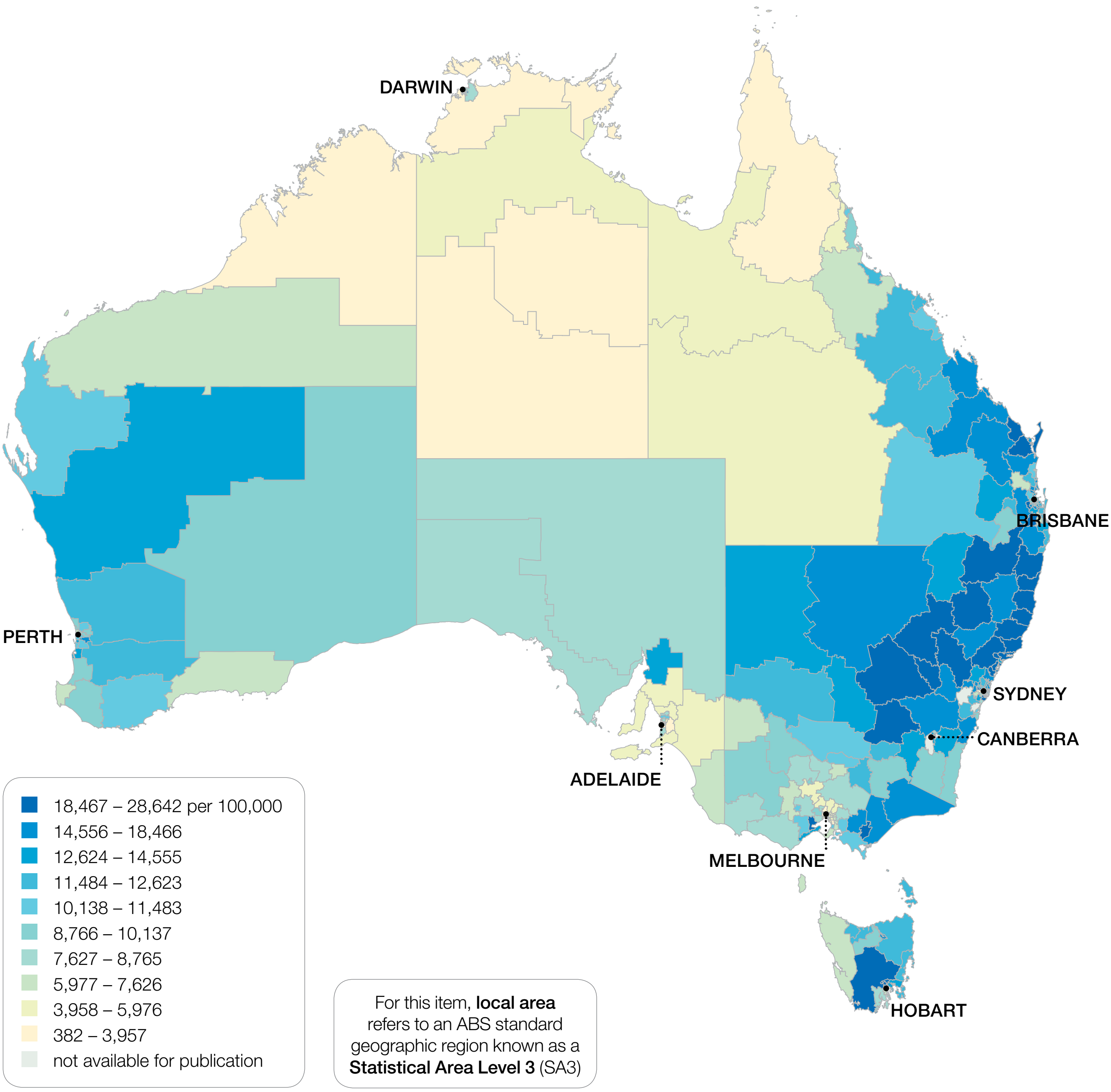
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 490 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

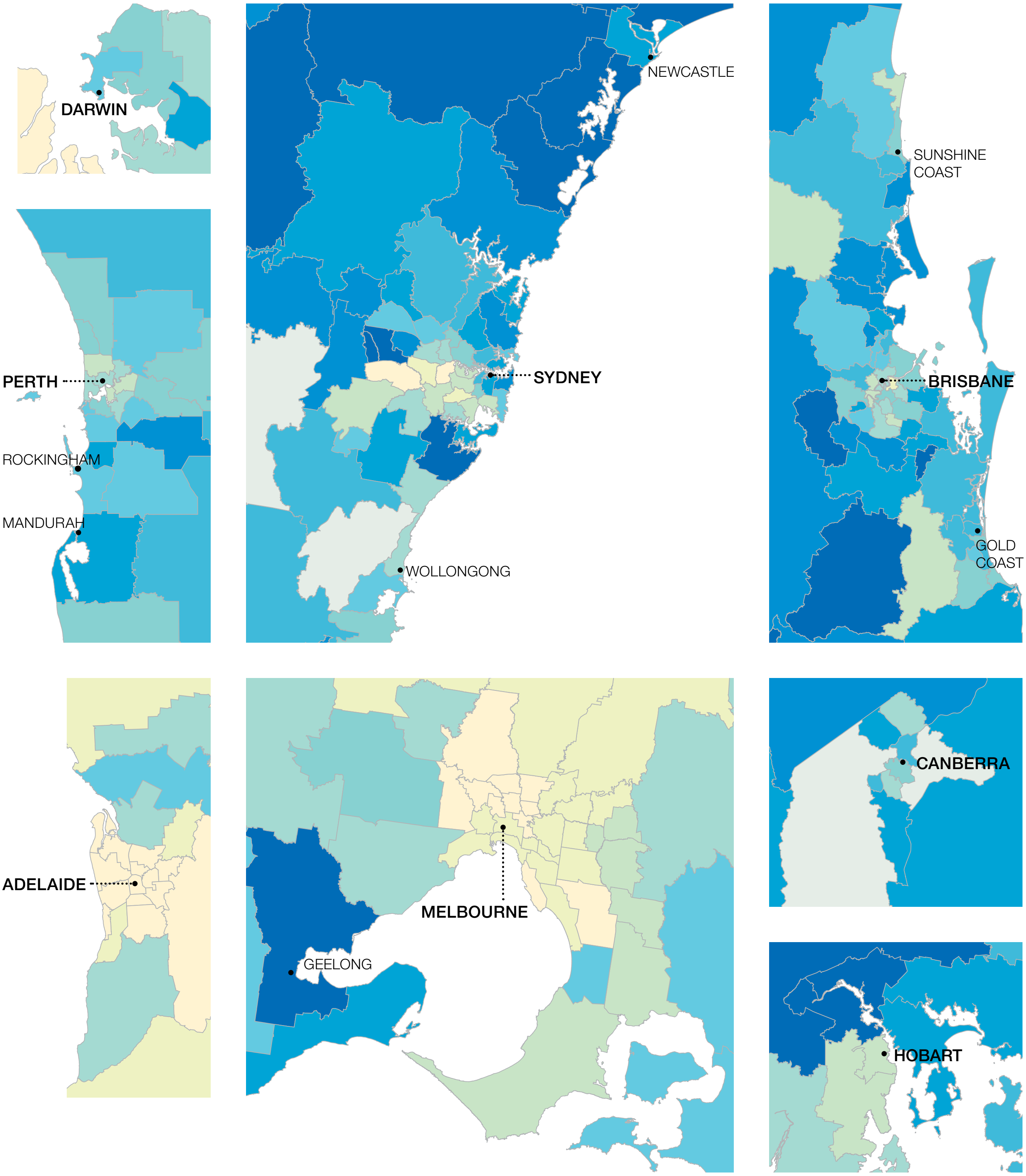
Attention deficit hyperactivity disorder medicines dispensing 17 years and under

Figure 100: Number of PBS prescriptions dispensed for ADHD medicines per 100,000 people aged 17 years and under, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for ADHD medicines across 325 local areas (SA3s) ranged from 382 to 28,642 per 100,000 people aged 17 years and under. The number of prescriptions was **75.0 times higher** in the area with the highest rate compared to the area with the lowest rate.

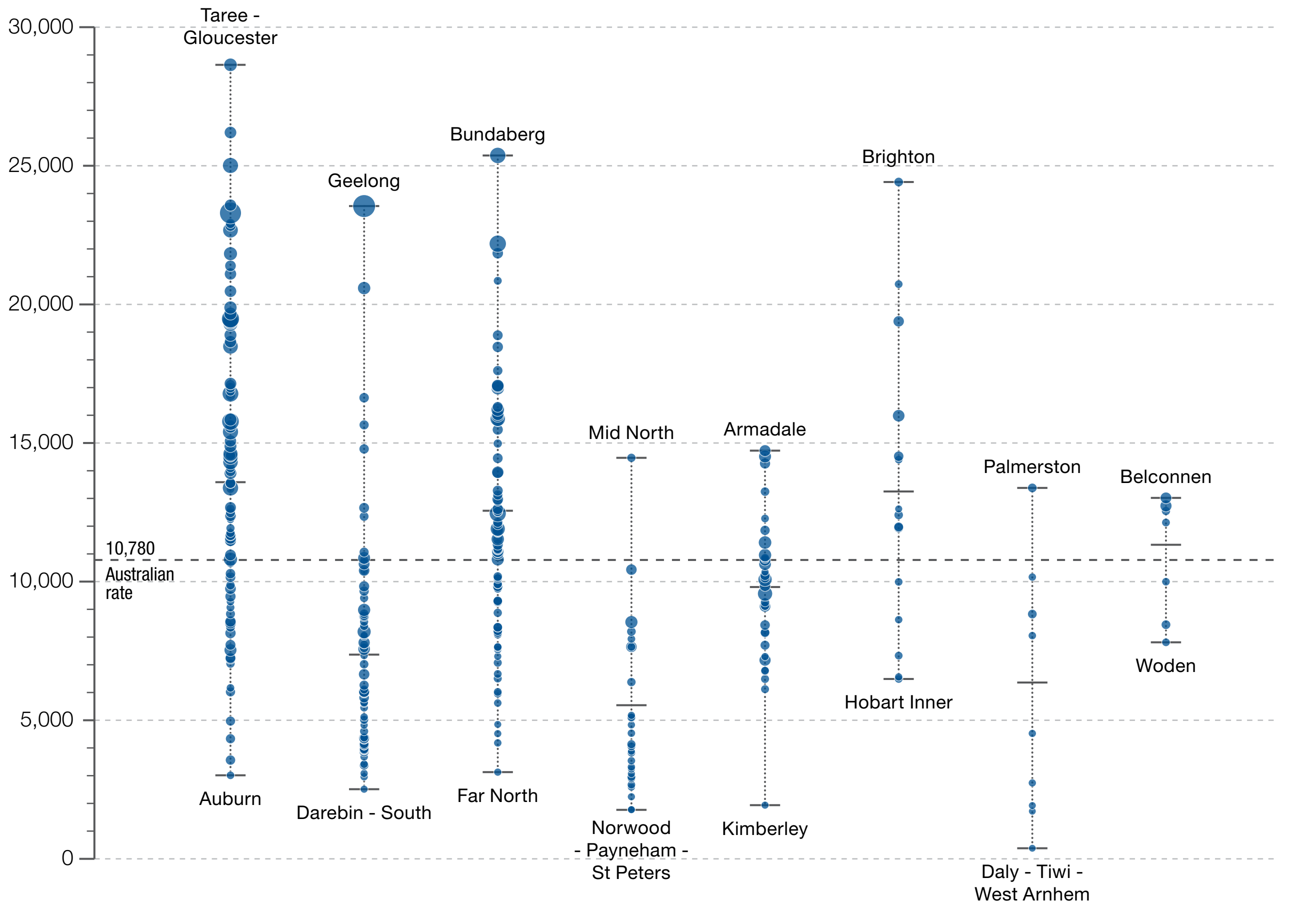


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Attention deficit hyperactivity disorder medicines dispensing 17 years and under

Figure 101: Number of PBS prescriptions dispensed for ADHD medicines per 100,000 people aged 17 years and under, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	28,642	23,546	25,373	14,465	14,725	24,414	13,380	13,020
State/territory	13,588	7,367	12,555	5,541	9,805	13,253	6,361	11,330
Lowest rate	3,013	2,513	3,128	1,767	1,937	6,489	382	7,811
No. prescriptions	218,758	88,917	134,986	19,321	54,289	15,145	3,870	8,847



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

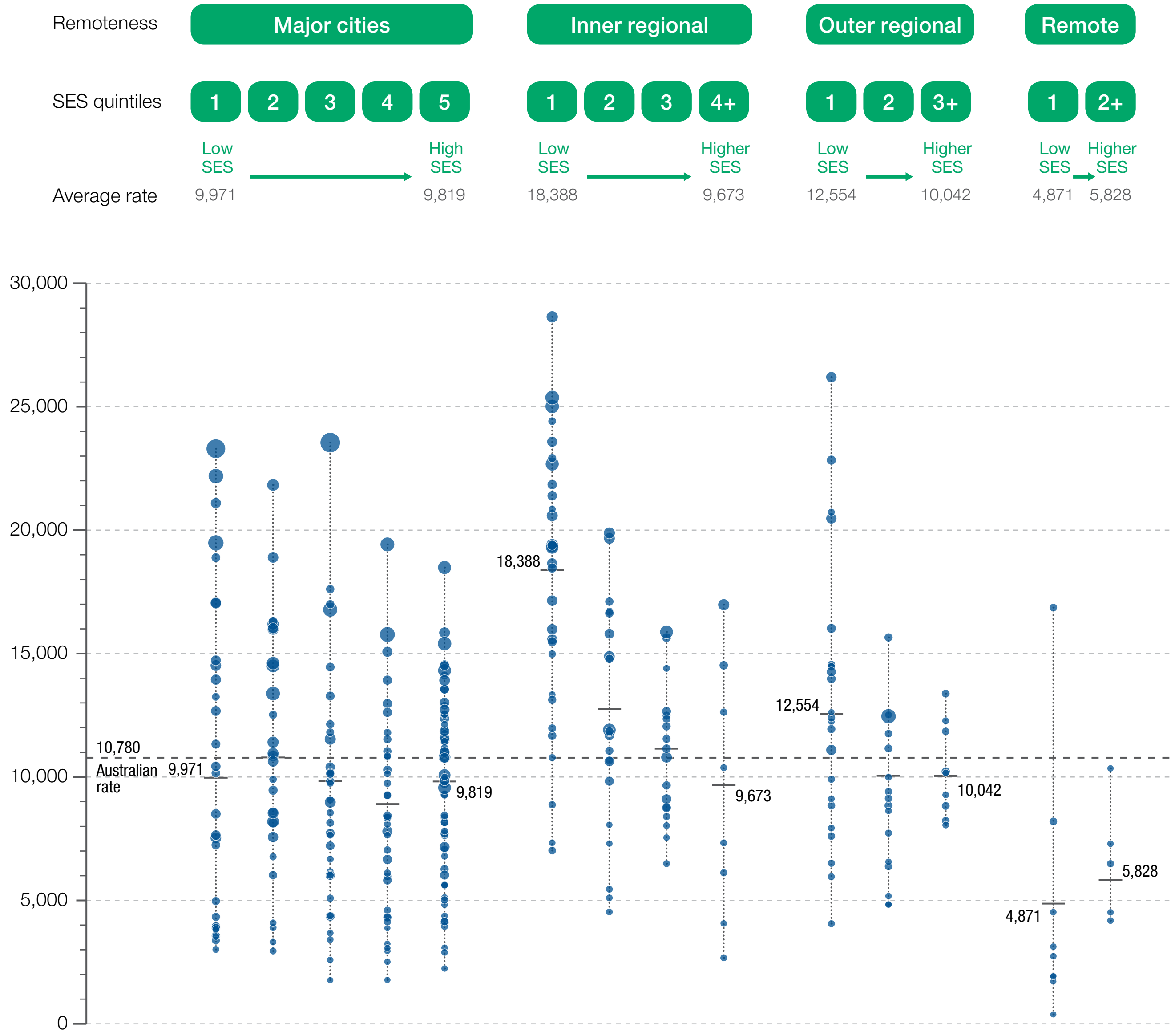
The size of each circle represents the number of prescriptions dispensed in each local area

20 2,000 4,000 6,000 8,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

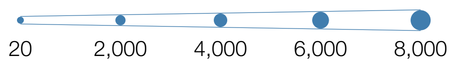
Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 102: Number of PBS prescriptions dispensed for ADHD medicines per 100,000 people aged 17 years and under, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 15/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Attention deficit hyperactivity disorder medicines dispensing 17 years and under

Resources

- Royal Australian College of Physicians. *Australian Guidelines on Attention Deficit Hyperactivity Disorder (ADHD)*. 2009. Available at: www.nhmrc.gov.au/_files_nhmrc/publications/attachments/ch54_draft_guidelines.pdf.
- Royal Australian & New Zealand College of Psychiatrists Faculty of Child and Adolescent Psychiatry. *Position Statement 55 – Attention Deficit Hyperactivity Disorder in Childhood and Adolescence*. 2014. Available at: www.ranzcp.org/Files/Resources/College_Statements/Position_Statements/PS-55-ADHD-in-Childhood-Adolescent-%28October-2014%29.aspx.
- Australian Government Department of Health. *The Mental Health of children and adolescents: report on the second Australian child and adolescent survey of mental health and wellbeing*. 2015. Available at: www.health.gov.au/internet/main/publishing.nsf/Content/mental-pubs-m-child2.
- Pharmaceutical Benefits Scheme. *Australian Statistics on Medicines*. 2015. Available at: www.pbs.gov.au/info/browse/statistics.

1 Lawrence D, Johnson S, Hafekost J, Boterhoven de Haan K, Sawyer M, Ainley J et al. The mental health of children and adolescents. Report on the second Australian child and adolescent survey of mental health and wellbeing. Canberra: Department of Health, 2015.
2 Royal Australian & New Zealand College of Psychiatrists Faculty of Child and Adolescent Psychiatry. *Position Statement 55 – Attention Deficit Hyperactivity Disorder in Childhood and Adolescence*. 2014.
3 National Health and Medical Research Council *Clinical Practice Points on the diagnosis, assessment and management of Attention Deficit Hyperactivity Disorder in children and adolescents*. Commonwealth of Australia 2012
4 Royal Australian College of Physicians. *Australian Guidelines on Attention Deficit Hyperactivity Disorder (ADHD)*. 2009.

Chapter 5
Opioid medicines

At a glance

In 2013–14, nearly 14 million prescriptions were dispensed through the Pharmaceutical Benefits Scheme (PBS) for opioids – medicines that relieve moderate to severe pain. These medicines are very effective in relieving acute pain and cancer pain, and in palliative care. However, studies have shown they are also being prescribed for chronic non-cancer pain. Current evidence does not support the long-term efficacy and safety of opioid therapy for chronic non-cancer pain.

The number of prescriptions dispensed was more than 10 times higher in the area with the highest rate compared to the area with the lowest rate. However, even when the areas with the lowest and highest rates were excluded considerable variation was still seen in prescribing (2.9 times more in the areas with the highest rates than in the areas with lowest rates). No apparent explanation is available for this, although differences in access to alternative pain management options may be a factor.

Recommendations

5a. The Australian Government Department of Health reviews the level of Medicare support available for effective multidisciplinary non-pharmacological treatment options and opioid dependency services, in particular for opioid prescribing for chronic non-cancer pain.

5b. State and territory health departments work with primary health networks to address the barriers in access to non-pharmacological treatments for people with chronic pain who are socioeconomically disadvantaged and those who live in rural and regional settings.

5c. State and territory health departments support Telehealth to enhance rural and remote consultations for assessment and management of chronic pain.

5d. Primary health networks and the Australian Government Department of Health progress implementation of information systems for real-time monitoring of opioid dispensing.

5e. National boards and the Australian Health Practitioner Regulation Agency consider what actions could be taken to ensure relevant registered health practitioners have up-to-date knowledge of prescribing guidelines for opioid medicines.

Opioid medicines

Background

Pain is a very common condition. It is estimated that one in five Australians suffers chronic pain – pain that continues for more than three months.[1] Pain affects people's quality of life and productivity.

Acute pain, which occurs after surgery, trauma or other medical conditions, lasts a short time.[1] Chronic pain is persistent, lasting beyond the time expected for healing after surgery or trauma or other conditions.[1]

Evidence supports the use of opioids to relieve moderate to severe pain, particularly acute and cancer pain.[2] Evidence does not support using opioid therapy for chronic pain. However, the prescribing of opioids for chronic pain is increasing and evidence is growing of the adverse effects of their long-term use.[3,4,5]

Chapter overview

This chapter includes the following data item:

- opioid medicines dispensing.

International comparisons

Dispensing of 'strong' and 'weak' opioids is reported in the New Zealand Atlas of Healthcare Variation.[6] A 'strong' opioid is classed at step 3 of the World Health Organisation analgesic ladder and includes fentanyl, methadone, morphine, oxycodone and pethidine. The New Zealand results for strong opioid use show that:

- excluding people receiving methadone for opioid substitution treatment, in 2013 an average of 17 out of every 1,000 people in New Zealand received a strong opioid
- a greater than three-fold variation was noted in dispensing between district health boards
- 14 per cent of people who were given a strong opioid took it for six or more weeks.

Australian initiatives

Pain Australia has developed a National Pain Strategy, which takes an integrated approach to improving acute, chronic and cancer-related pain.[1] Access to chronic pain prevention and early intervention programs are important.[3]

About the data

PBS data used in this item could potentially underestimate the use of opioid medicines as it does not capture over-the-counter medicines from pharmacies.

1 National Pain Summit initiative. National Pain Strategy. Sydney: Pain Australia, 2010.
2 Macintyre P, Schug S, Scott D, Visser E, Walker S. Acute Pain Management: Scientific Evidence (3rd edition). APM: SE Working Group of the Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine. Melbourne: ANZCA & FPM, 2010.
3 Hunter Integrated Pain Service. Reconsidering Opioid Therapy. A Hunter New England Perspective. Newcastle: HIPS, 2014.
4 Nicholas R, Lee N, Roche A. Pharmaceutical Drug Misuse in Australia: Complex Problems, Balanced Responses. Adelaide: National Centre for Education and Training on Addiction (NCETA), Flinders University, 2011.
5 Blanch B, Pearson SA, Haber PS. An overview of the patterns of prescription opioid use, costs and related harms in Australia. BJCP. 2014;78(5):1159–66.
6 New Zealand Health Quality and Safety Commission. Atlas of Healthcare Variation: Opioids, 2014. (Accessed 27 August 2015 at: www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/atlas-of-healthcare-variation/opioids).

5.1 Opioid medicines dispensing

Context

This data item examines dispensing rates for opioid medicines. The data are sourced from the PBS and relate to the number of prescriptions filled per 100,000 people.

Opioids are medicines that relieve moderate to severe pain.[1,2] According to available evidence, opioid therapy is particularly useful in managing acute pain, cancer pain and pain in the palliative care setting.

Opioids are also used for chronic non-cancer pain. However, evidence does not support the long-term efficacy and safety of opioid therapy for this purpose.[3] In addition, evidence is growing that the use of opioids can lead to adverse events and harm.[3] Despite this, a number of studies indicate increasing levels of opioid prescribing for chronic non-cancer pain, particularly by general practitioners.[4,5] The adverse long-term effects of opioids include hormonal suppression and, paradoxically, increased pain sensitivity.[3]

For management of chronic non-cancer pain, a cautious approach is indicated, with opioid use having little or no role other than as part of a multimodal approach. The preferred multimodal approach includes patient education and self-management, supported by a general practitioner and multidisciplinary, allied health and nursing teams offering non-pharmacological treatments. For a small subset of individuals, cautious use of short-duration, low-dose, opioid treatments is often recommended in guidelines.[6]

While adverse events and the risk of mortality rise proportionally with the opioid dose[7], analgesic and functional benefits do not. The mortality risk rises without increased benefit from a daily opioid dose of more than 100mg of oral morphine or the equivalent.[8]

Opioid medicines dispensing

Magnitude of variation

In 2013–14, there were 13,905,258 PBS prescriptions dispensed for opioid medicines, representing 55,126 prescriptions per 100,000 people (the Australian rate).

The number of PBS prescriptions dispensed for opioid medicines across 325* local areas (SA3s) ranged from 10,945 to 110,172 per 100,000 people. The number of prescriptions was **10.1 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 39,127 per 100,000 people in the Northern Territory, to 73,641 in Tasmania.

After excluding the highest and lowest results, the opioid medicine prescription rate across the 301 remaining local areas was **2.9 times higher** in one local area compared to another.

Dispensing rates were highest in areas of low socioeconomic status and decreased with areas of increasing socioeconomic status. Dispensing rates tended to be higher in inner and outer regional areas than in major cities or remote areas.

Interpretation

Potential reasons for the variation include differences in:

- prescribing practices, training, knowledge and attitudes of general practitioners[9]
- the understanding of individuals about the appropriate use of opioids to treat pain, the risks associated with high-dose and/or long-term opioid use, and the importance and efficacy of alternative non-pharmacological treatments
- the type of opioid dispensed and the number of authority or regulation 24 prescriptions supplied in each region
- access to pain specialists
- availability and accessibility of appropriate non-pharmacological treatment options, particularly in rural and remote locations
- access to alternate management, such as opioid dependency treatments.

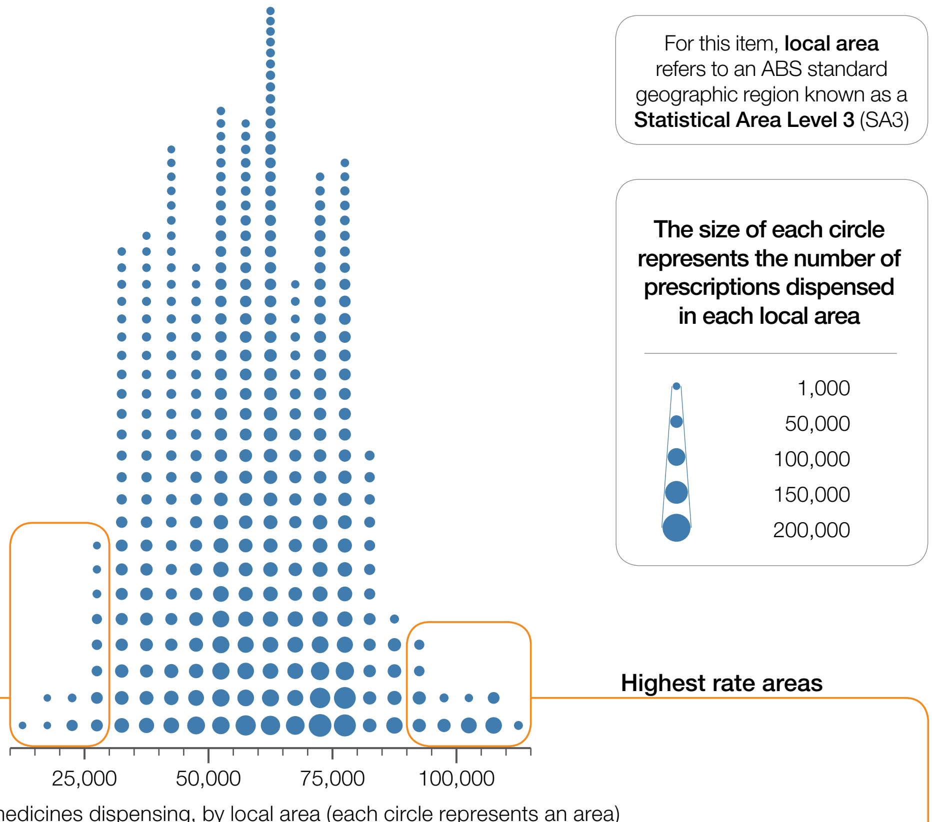
It is important to note that the PBS data used in this item could potentially underestimate the use of opioid medicines as it does not capture over-the-counter medicines from pharmacies. The only opioids available over the counter are codeine in combination with simple analgesics.

To explore this variation, further analysis could focus on:

- understanding the considerable variation in opioid dispensing rates among states and territories, particularly the reason for very high rates in some jurisdictions and very low rates in others
- analysis by volume provided (in oral morphine equivalents)
- analysis of the ratio of simple analgesic use to opioid use
- analysis of weak and strong opioid use
- distinguishing between low-dose and high-dose prescribing of opioids, to assess the extent of inappropriate prescribing practices.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 103: Number of PBS prescriptions dispensed for opioid medicines per 100,000 people, age standardised, by local area, 2013–14



Local area	State	Rate	Prescriptions
Daly - Tiwi - West Arnhem	NT	10,945	1,415
East Arnhem	NT	15,887	1,614
Barkly	NT	18,800	934
Pennant Hills - Epping	NSW	22,376	12,426
Ku-ring-gai	NSW	24,098	36,714
Chatswood - Lane Cove	NSW	25,117	30,335
North Sydney - Mosman	NSW	26,029	28,574
Strathfield - Burwood - Ashfield	NSW	26,362	42,148
Manly	NSW	26,474	12,691
Kimberley	WA	26,653	8,206
Canada Bay	NSW	28,136	26,126
Ryde - Hunters Hill	NSW	28,358	43,401
Katherine	NT	28,437	4,172

Local area	State	Rate	Prescriptions
Central Highlands	Tas	110,172	14,398
Playford	SA	109,191	88,706
Bribie - Beachmere	Qld	106,983	42,173
South East Coast	Tas	102,380	9,001
Latrobe Valley	Vic	101,728	82,057
Brighton	Tas	96,864	15,127
Hobart - North West	Tas	96,835	56,684
Kempsey - Nambucca	NSW	94,170	56,951
Yorke Peninsula	SA	94,065	29,597
Caboolture	Qld	93,574	56,290
Maryborough - Pyrenees	Vic	90,190	26,462

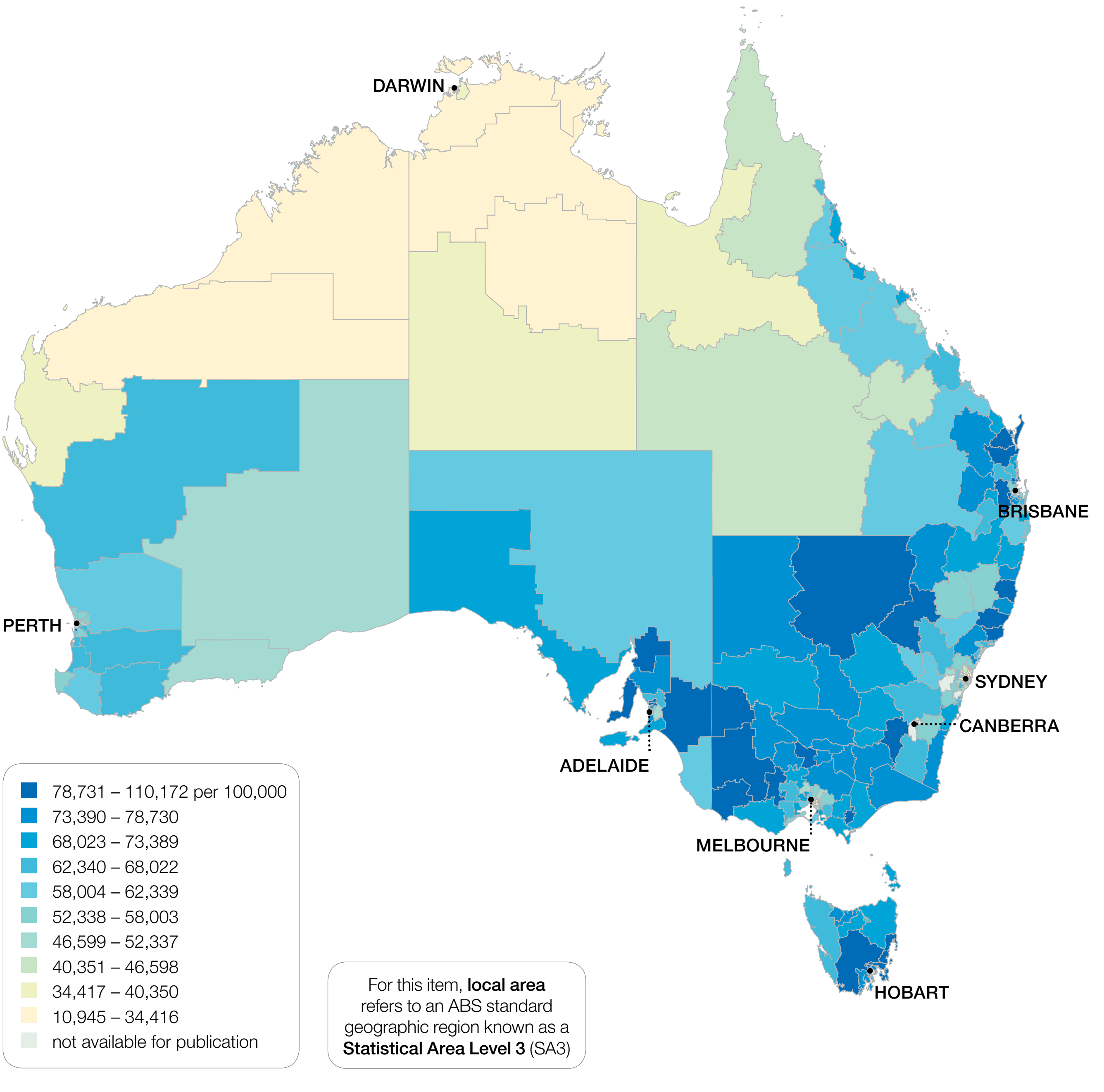
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 48,610 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Opioid medicines dispensing

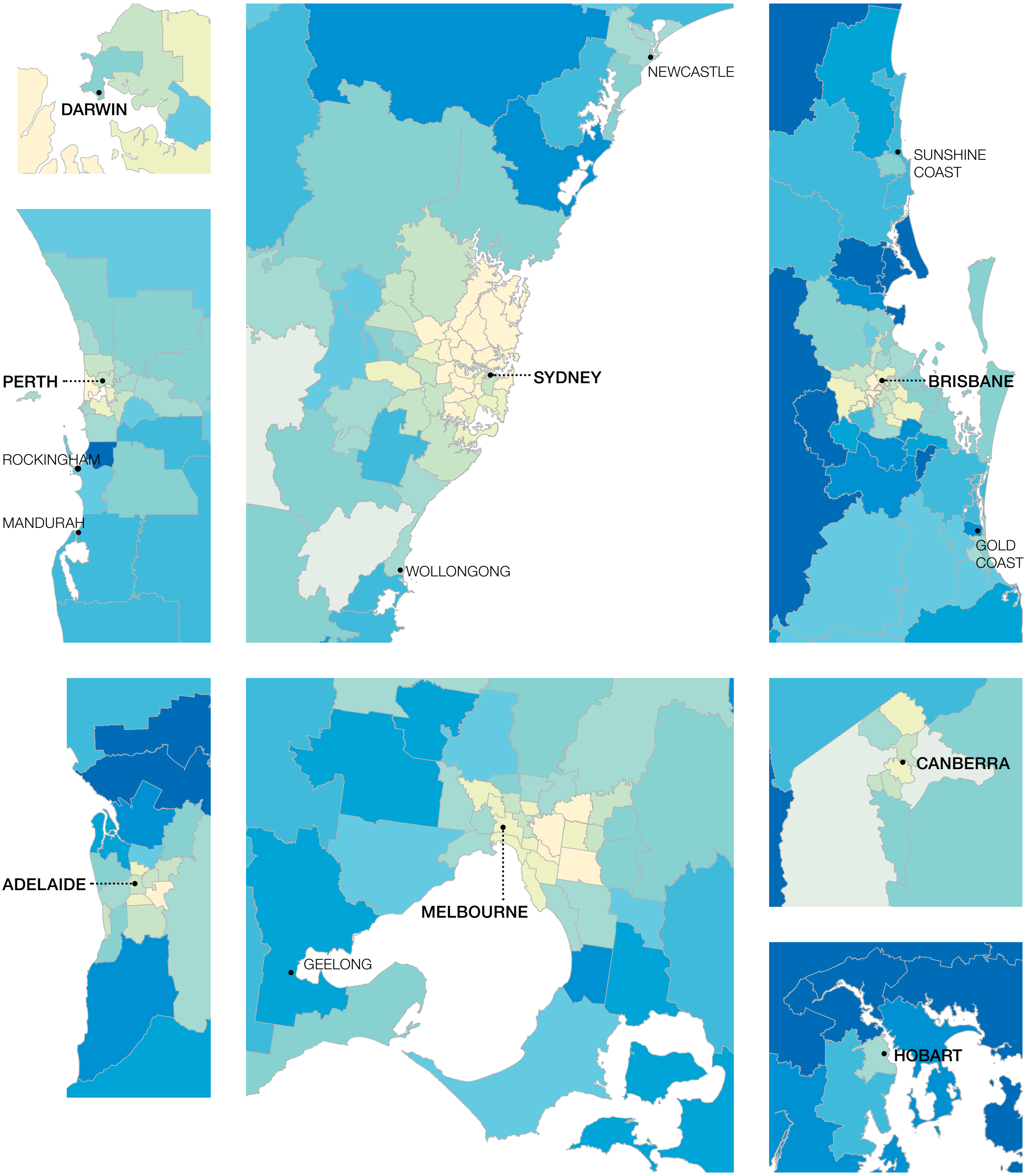
Figure 104: Number of PBS prescriptions dispensed for opioid medicines per 100,000 people, age standardised, by local area, 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for opioid medicines across 325 local areas (SA3s) ranged from 10,945 to 110,172 per 100,000 people. The number of prescriptions was **10.1 times higher** in the area with the highest rate compared to the area with the lowest rate.

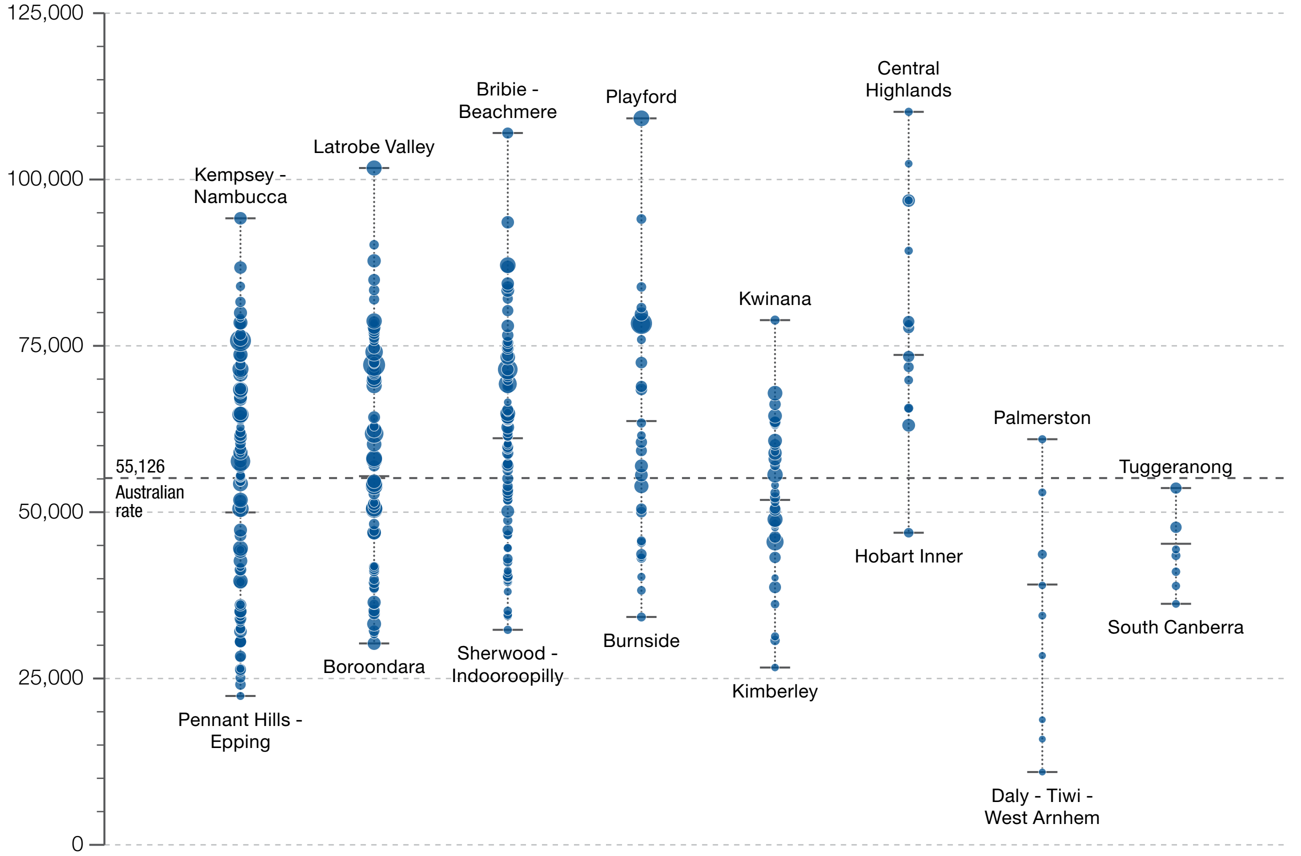


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Opioid medicines dispensing

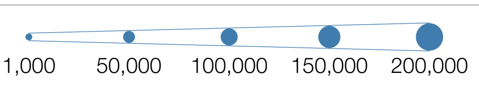
Figure 105: Number of PBS prescriptions dispensed for opioid medicines per 100,000 people, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	94,170	101,728	106,983	109,191	78,866	110,172	60,962	53,620
State/territory	49,967	55,414	61,115	63,688	51,842	73,641	39,127	45,252
Lowest rate	22,376	30,272	32,318	34,245	26,653	46,911	10,945	36,222
No. prescriptions	4,100,081	3,456,533	2,953,710	1,226,901	1,325,226	436,257	74,369	168,155



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

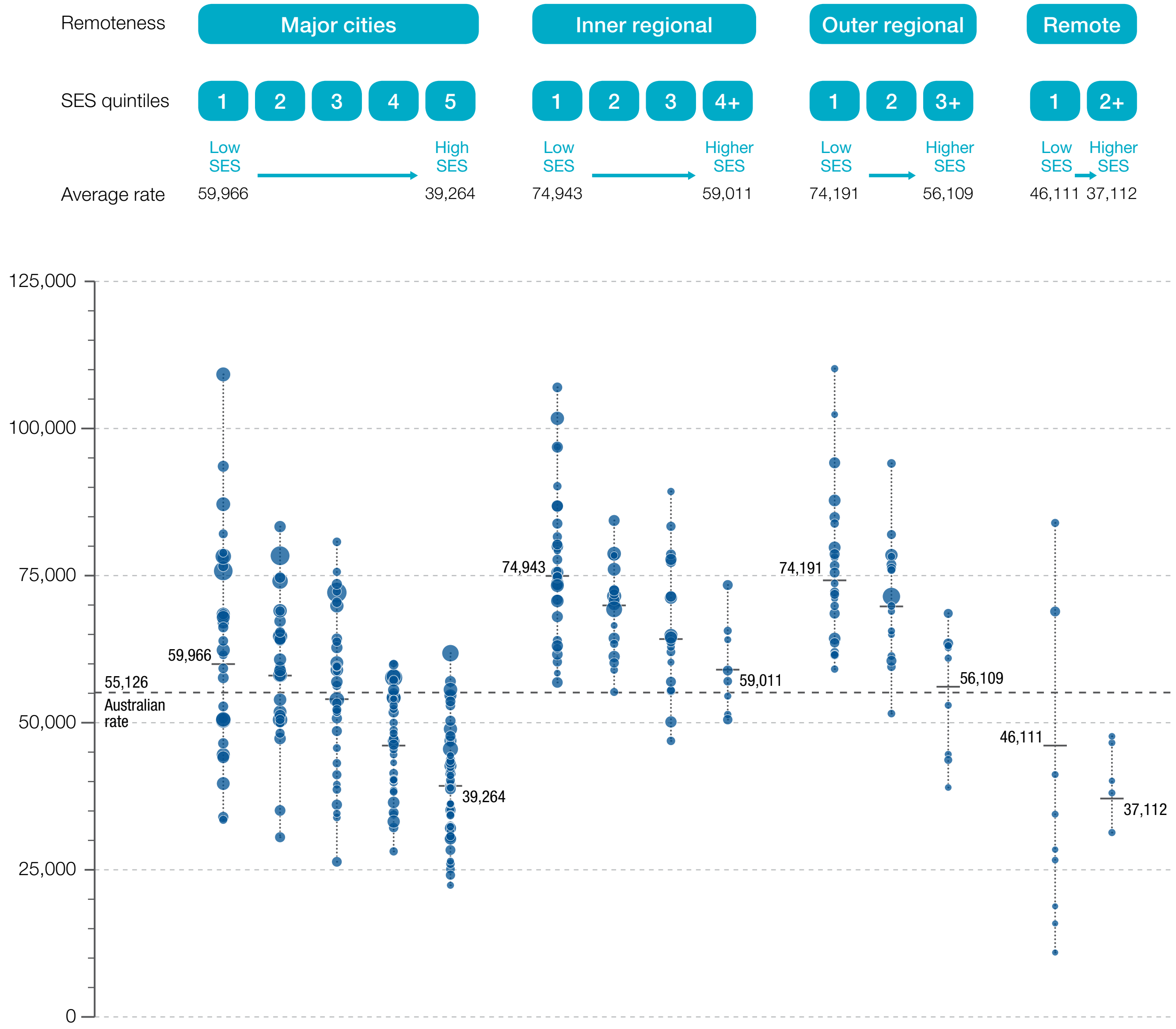
The size of each circle represents the number of prescriptions dispensed in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 106: Number of PBS prescriptions dispensed for opioid medicines per 100,000 people, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 11/02/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Opioid medicines dispensing

Resources

- Faculty of Pain Medicine, Australian and New Zealand College of Anaesthetists. *Principles regarding the use of opioid analgesics in patients with chronic non-cancer pain*. 2010. Available at: www.fpm.anzca.edu.au/resources/professional-documents/documents/PM1%202010.pdf.

- NPS MedicineWise. *Continuing professional development and learning*. 2015. Available at: www.nps.org.au/health-professionals/cpd.

- Australian Government Department of Health. *National guidelines for medication-assisted treatment of opioid dependence*. 2014. Available at: www.nationaldrugstrategy.gov.au/internet/drugstrategy/Publishing.nsf/content/ng-mat-op-dep.

- Drug Utilisation Sub Committee (DUSC) of the Pharmaceutical Benefits Advisory Committee (PBAC) *Opioid analgesics: Overview*. 2014. Available at: www.pbs.gov.au/info/industry/listing/participants/public-release-docs/opioid-analgesics-overview.

- Pharmaceutical Benefits Scheme. *Australian Statistics on Medicines*. 2015. Available at: www.pbs.gov.au/info/browse/statistics.

- NSW Agency for Clinical Innovation (ACI) Pain Management Network. *Opioid recommendations in General Practice*. 2014. Available at: www.aci.health.nsw.gov.au/__data/assets/pdf_file/0004/212746/Opioid_recommendations_in_General_Practice.pdf.

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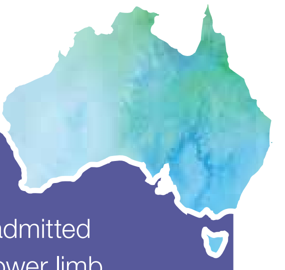
1 Macintyre PE, Schug SA, Scott DA, Visser EJ, Walker SM; APM:SE Working Group of the Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine. Acute Pain Management: Scientific Evidence (3rd edition), ANZCA & FPM, Melbourne, 2010.
2 Australian Institute of Health and Welfare. National opioid pharmacotherapy statistics 2014. Bulletin no. 128. Cat. no. AUS 190. Canberra: AIHW, 2015.
3 Chou R, Turner JA, Devine EB, Hansen RN, Sullivan SD, Blazina I et al. The effectiveness and risks of long-term opioid therapy for chronic pain: a systematic review for a National Institutes of Health Pathways to Prevention Workshop. Annals of internal medicine 2015;162(4):276–86.
4 Nicholas R, Lee N, Roche A. Pharmaceutical drug misuse in Australia: complex problems, balanced responses. Adelaide: National Centre for Education and Training on Addiction (NCETA), Flinders University, 2011.
5 Blanch B, Pearson SA, Haber PS. An overview of the patterns of prescription opioid use, costs and related harms in Australia. BJCP 2014;78(5):1159–66.
6 Chou R, Turner JA, Fanciullo G, Fine P, Adler J, Sullivan SD et al. Clinical Guidelines for the Use of Chronic Opioid Therapy in Chronic Noncancer Pain, J Pain 2009;Feb;10(2):113–130.
7 Bohnert AS, Valenstein M, Bair MJ, Ganoczy D, McCarthy JF, Ilgen MA et al. Association between opioid prescribing patterns and opioid overdose-related deaths. JAMA 2011;305(13):1315–21.
8 NSW Agency for Clinical Innovation (ACI) Pain Management Network. Opioid recommendations in General Practice. Sydney: ACI, 2014.
9 Holliday S, Morgan S, Tapley A, Dunlop A, Henderson K, van Driel M et al. The Pattern of Opioid Management by Australian General Practice Trainees. Pain medicine (Malden, Mass) 2015.

Chapter 6

Interventions for chronic diseases



At a glance

Chronic diseases are the leading cause of illness, disability and death. Australia has higher rates of asthma compared with other countries, but the atlas findings demonstrate that hospitalisation as a result of this disease is low. From 2010–11 to 2012–13, on average 15,111 children and young people were admitted to hospital for asthma in Australia each year. This may reflect a strong emphasis on the use of asthma management plans in primary care. Similarly, the number of admissions among adults was low but admission rates were higher in remote areas of Australia, which reflects the higher prevalence of asthma and chronic obstructive pulmonary disease (COPD) in Aboriginal and Torres Strait Islander peoples. Dispensing of medicines for asthma showed a strong socioeconomic trend, with dispensing rates highest in the lowest socioeconomic groups.

Similar to the patterns of hospital admissions noted for asthma and COPD, hospital admission rates for heart failure in people 40 years and over was markedly higher in remote areas. This may reflect the high prevalence of heart failure among Indigenous peoples. Multidisciplinary heart failure services can decrease the rate of hospital admissions and readmissions for this condition.

In 2012–13, 4,400 people were admitted to hospital for diabetes-related lower limb amputation in Australia. Once again, the rates in remote areas were higher. It is known that Indigenous people are about three times more likely to have diabetes, 10 times more likely to be admitted for diabetic foot complications and 30 times more likely to suffer diabetes-related lower limb amputation than non-Indigenous people.

Anticholinesterase medicines are used to alleviate symptoms of some types of dementia including Alzheimer's disease. There was considerable variation in dispensing of these medicines across Australia, and dispensing rates were highest in major cities.

The findings in this chapter demonstrate the continued need for prevention of chronic disease among Indigenous peoples and those living in remote areas. These efforts need to be sustained over decades given that many of these admissions are the result of years of poor health.

Interventions for chronic diseases

Recommendations

6a. The Commission hosts a roundtable of service providers and consumers from remote areas to identify successful strategies for implementing best practice primary and secondary prevention services for patients with chronic diseases in remote Australia.

Asthma and chronic obstructive pulmonary disease medicines dispensing and hospital admissions

6b. The Australian Government Department of Health encourages primary health networks to develop local models of integrated care for asthma and chronic obstructive pulmonary disease to ensure properly coordinated community prevention strategies are implemented.

6c. State and territory health departments and primary health networks jointly review the uptake of vaccinations against respiratory diseases in high-risk populations and their influence on local variation.

Heart failure hospital admissions 40 years and over

6d. Primary health networks, state and territory health departments and clinicians collaborate to improve access for patients with heart failure to comprehensive heart failure programs consistent with evidence-based best practice.

Diabetes-related lower limb amputation hospital admissions 18 years and over

6e. Public and private hospitals and primary health networks adopt risk-stratified levels of support for managing diabetes care, including earlier diagnosis and intervention.

6f. Primary health networks and state and territory health departments collaborate to improve access to coordinated services that deliver evidence-based care for those with diabetes, including at multidisciplinary foot clinics, and care by vascular, endocrine and orthopaedic specialists.

Stroke average length of stay in hospital 65 years and over

6g. Hospital and ambulance services ensure patients have access to care that aligns with the Acute Stroke Clinical Care Standard.

6h. State and territory health departments consider mechanisms to improve coding, analytics and collection of outcome data for stroke.

6i. Relevant clinical colleges ensure educational and training material, as well as continuing professional development requirements, are in keeping with the Acute Stroke Clinical Care Standard.

Background

Chronic diseases are the leading cause of illness, disability and death in Australia and internationally. Cardiovascular diseases, cancers, respiratory diseases and diabetes account for 82 per cent of chronic disease deaths worldwide[1,2] and 75 per cent of chronic disease deaths in Australia.[2] In Australia, chronic diseases accounted for 90 per cent of all deaths in 2011.[3]

Chronic diseases have complex causes and multiple risk factors. Many share common risk factors, including smoking, poor nutrition, alcohol and lack of physical activity. With changing lifestyles and ageing populations, chronic diseases have become increasingly common in Australia and cause most of the burden of ill health.[4] Depression is also a risk factor for chronic disease.[5]

Chronic diseases affect some population groups more than others; for example, they are more common among socioeconomically disadvantaged people, and Aboriginal and Torres Strait Islander peoples, and often occur at a much younger age in Indigenous people.

Chapter overview

This chapter includes information about chronic diseases, including:

- asthma medicines dispensing 3 – 19 years
- asthma medicines dispensing 20 – 44 years
- asthma and chronic obstructive pulmonary disease medicines dispensing 45 years and over
- asthma and related hospital admissions 3 – 19 years
- asthma hospital admissions 20 – 44 years
- asthma and chronic obstructive pulmonary disease hospital admissions 45 years and over
- heart failure hospital admissions 40 years and over
- diabetes-related lower limb amputation hospital admissions 18 years and over
- stroke average length of stay in hospital by peer group – 65 years and over
- anticholinesterase medicines dispensing 65 years and over.

These data items are likely to be influenced by differences in the prevalence of underlying risk factors, such as smoking for respiratory and cardiac diseases, as well as diabetes. Smoking rates are higher among people from low socioeconomic groups[6] and Aboriginal and Torres Strait Islander peoples.[7]

Some variation in hospital admission rates may be due to system-level differences, such as limited access in some locations to effective and appropriate community-based services to manage worsening conditions. Variations in the quality of patient care provided in different locations may also be a factor.

International comparisons

Globally, many chronic diseases have similar underlying causes, comparable features and increasing costs of related care. They also share a number of prevention, management and treatment strategies.

Despite many gaps in the data, it is estimated that asthma may affect up to 334 million people globally.[8] It is most prevalent in children aged 10 to 14, and elderly people aged 75 to 79. Asthma rates in Australia are high compared to other countries, with more than 2 million people affected.[8] The Global Asthma Report is a useful international resource that contains tools for governments, health organisations, clinicians and patients to improve asthma management.[8]

The international disease burden from heart failure is extremely high. In industrialised countries, chronic heart failure affects two to three per cent of the population, with rates increasing steeply to more than 10 per cent among those aged over 65.[9]

Interventions for chronic diseases

Internationally, stroke care is moving towards comprehensive stroke centres that provide the full range of neurological, neurosurgical and rehabilitation services. Management in a comprehensive stroke centre has been shown to improve clinical outcomes.[10] It is difficult to compare length of stay for stroke patients in Australia and internationally due to the different models of care. Different methods are used for the administrative data count for patient movement from acute to subacute care (for example, rehabilitation and palliative care services).

Some comparisons can be made between data from this atlas and international studies. These show that:

- the rate of admissions in Australia for asthma is low compared to other countries[11]
- in England, a five-fold variation is seen among primary care trusts in the emergency admissions rate for asthma among people aged 18 years and under per 100,000 people and a three-fold variation for people aged 18 and over[12]
- Australia, along with Ireland, New Zealand and Austria, has high admission rates for COPD relative to the Organisation for Economic Co-operation and Development (OECD) average[13]
- in England, a four-fold variation is seen among primary care trusts in the emergency admissions rate for COPD[12]
- in the United States, the rate of hospitalisation for congestive heart failure is reported to be 328 hospitalisations per 100,000 population[14]
- a four-fold variation is seen among England's strategic health authorities in the incidence of major amputations per 1,000 patients with type 1 and type 2 diabetes[15]
- The four significant chronic diseases risk factors are smoking, poor nutrition, alcohol and lack of physical activity. In analysing these by country, Australia's risk profile compares favourably with those of many other OECD countries. However, the burden of preventable disease remains high and is projected to increase.[16]

Australian initiatives

The information contained in this chapter will complement work already underway to address the burden of chronic disease in Australia. At a national level, this work includes:

- the National Chronic Disease Strategy – a national agenda to encourage a coordinated response to the growing burden of chronic disease on the health of Australians and the healthcare system[17]
- National Service Improvement Frameworks – joint initiatives of the Australian, state and territory governments targeting asthma, diabetes, stroke, and heart and vascular diseases. They aim to improve health services, prevent and limit the progression of chronic conditions, slow the onset of complications, reduce preventable hospital admissions and reduce variations in the care provided
- the Australian Chronic Disease Prevention Alliance – an alliance of five non-government health organisations working together on the primary prevention of chronic disease, with particular emphasis on the shared risk factors of poor nutrition, physical inactivity and obesity, and their social determinants
- chronic disease management Medicare Benefits Schedule (MBS) items – an Australian Government initiative that assists general practitioners to manage the health care of people with chronic conditions. It makes MBS rebates available for those requiring multidisciplinary, team-based care from a general practitioner and at least two other healthcare providers
- the National Stroke Foundation's *Clinical Guidelines for Stroke Management 2010*, which provide evidence-based recommendations for managing stroke

- the Commission's Acute Stroke Clinical Care Standard to improve the early assessment and management of patients with stroke, to maximise their recovery and reduce their risk of another stroke
- Commission recommendations that antipsychotic medicines be prescribed in accordance with best practice through the suite of resources developed for *A better way to care: safe and high quality care for patients with cognitive impairment (dementia and delirium) in hospital*, and also in the forthcoming Delirium Clinical Care Standard and version 2 of the National Safety and Quality Health Service Standards.

About the data

The data regarding asthma and COPD medicines are obtained from the PBS and include the number of PBS prescriptions dispensed for the relevant class of medicine. The data are based on patients' residential postcodes (not where the prescription was dispensed or the service was provided). The data relate to the number of prescriptions filled and hospital admissions per 100,000 people, and include repeat dispensing and repeat hospital admissions for individual people.

Hospital admission data are obtained from the Admitted Patient Care National Minimum Data Set and include both public and private hospitals. Repeat admissions for one person are counted and transfers to another hospital are counted twice.

A number of limitations are implicit in this data, including:

- those specific to the medicines dispensing items:
  - asthma relievers can be accessed over the counter without a prescription. Data on over-the-counter medicines are not available
  - calculating asthma medicine dispensing rates is based on every prescription, not the number of people taking asthma medicine
  - the average rate of dispensing, or the lowest rate of hospital admission, does not necessarily represent best practice
  - repeat prescriptions filled for individuals are each counted separately
  - dispensing from some remote area Aboriginal Health Services which are not captured in the PBS, resulting in artificially low rates of dispensing in many remote communities
- those specific to the length of stay item, and administrative care type changes when the episode classification is changed from acute to subacute care (which includes rehabilitation, palliative care, and geriatric evaluation and management)
- variation between SA3s, which can be influenced by the clustering of high-risk individuals or repeat events for some individuals
- the data have not been linked to investigate how dispensing or hospital admission rates relate to health outcomes.

1 Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012;380(9859):2224–60.

2 Mozaffarian D, Fahimi S, Singh GM, Micha R, Khatibzadeh S, Engell RE, Lim S et al. Global Burden of Diseases Nutrition and Chronic Diseases Expert Group. Global sodium consumption and death from cardiovascular causes. NEJM 2014;371(7):624–34.

3 Australian Institute of Health and Welfare. Key indicators of progress for chronic disease and associated determinants: data report 2011. Cat. no. PHE 142. Canberra: AIHW, 2011.

4 Australian Institute of Health and Welfare. Leading types of ill health. Australia's health 2014; Australia's health series no. 14. Cat. no. AUS 178. (Accessed 26 August 2015 at: www.aihw.gov.au/australias-health/2014/ill-health/#t2).

5 Clarke DM, Currie KC. Depression, anxiety and their relationship with chronic diseases: a review of the epidemiology, risk and treatment evidence. MJA 2009;190(7):54–60.

6 Australian National Preventive Health Agency. Smoking & Disadvantage Evidence Brief. 2013. (Accessed 25 August 2015 at: www.health.gov.au/internet/anpha/publishing.nsf/Content/smoking-disadvantage-evidence-brief).

7 Australian Institute of Health and Welfare. Indigenous health. 2014. (Accessed 25 August 2015 at: www.aihw.gov.au/australias-health/2014/indigenous-health/).

8 Global Asthma Network. The Global Asthma Report 2014. Auckland: GAN, 2014.

9 Curtis LH, Whellan DJ, Hammill BG, Hernandez AF, Anstrom KJ, Shea AM et al. Incidence and prevalence of heart failure in elderly persons, 1994–2003. Archives of internal medicine 2008;168(4):418–24.

10 McKinney JS, Cheng JQ, Rybinnik I, Kostis JB. Comprehensive stroke centers may be associated with improved survival in hemorrhagic stroke. JAHA 2015.
11 Australian Institute of Health and Welfare. Asthma hospitalisations in Australia 2010–11. Cat. no. ACM 27. Canberra: AIHW, 2013.
12 Right Care. Problems of the respiratory system. The NHS Atlas of Variation in Healthcare: Reducing unwarranted variation to increase value and improve quality. London: NHS; 2015.
13 Organisation for Economic Co-operation and Development. Health at a Glance 2011: OECD Indicators. Paris: OECD Publishing, 2011.
14 Hall MJ, Levant S, DeFrances CJ. Hospitalization for congestive heart failure: United States, 2000–2010. Centers for Disease Control and Prevention. NCHS Data Brief no. 108. 2012.
15 Right Care. Cardiovascular family of diseases: Diabetes. The NHS Atlas of Variation in Healthcare: Reducing unwarranted variation to increase value and improve quality. London: NHS; 2015.
16 Australian Bureau of Statistics. Australian Social Trends. Cat. no. 4102.0. Canberra: ABS, 2012 (Accessed 26 August 2015 at: www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features20Jun+2012).
17 The Department of Health. National chronic disease strategy. 2010. (Accessed 26 August 2015 at: www.health.gov.au/internet/main/publishing.nsf/Content/pq-ncds).

6.1 Asthma medicines dispensing 3–19 years

Context

This data item examines asthma medicines dispensing for people aged three to 19 years. The data are sourced from the PBS and relate to the number of prescriptions filled per 100,000 people.

Asthma is an inflammatory lung condition characterised by reversible airway obstruction and bronchospasms, causing episodes of wheezing, breathlessness, coughing and chest tightness. Asthma is the most common long-term medical condition diagnosed in Australian children, with almost 21 per cent between birth and age 15 being identified as having asthma.[1] Asthma is not curable; however, treatments can control symptoms and improve quality of life. Some children grow out of asthma.

Medicines used to manage asthma include[2]:

- short-acting bronchodilators (relievers), which open the airways by relaxing the smooth muscle; and long-acting bronchodilators, which provide control rather than quick relief
- oral and inhaled corticosteroids (preventers), which suppress inflammation and are typically used for acute exacerbations or prevention respectively
- leukotriene receptor antagonists, which inhibit the release of leukotrienes, a substance that constricts airways and increases mucus production, swelling and inflammation in the lungs.

Clinical practice guidelines for young people with asthma allow treatments to be adjusted according to their level of asthma control. Management is recommended as follows:

- All children should have a reliever medicine to use as needed.
- Children with interval or persistent symptoms should also have regular low-dose preventer inhaled corticosteroids.
- For some children, a leukotriene receptor antagonist may be used as an alternative preventer medicine.[3]

Asthma medicines dispensing 3–19 years

Magnitude of variation

In 2013–14, there were 1,270,400 PBS prescriptions dispensed for asthma medicines, representing 25,750 prescriptions per 100,000 people aged 3 to 19 years (the Australian rate).

The number of PBS prescriptions dispensed for asthma medicines across 325* local areas (SA3s) ranged from 1,298 to 53,379 per 100,000 people aged 3 to 19 years. The number of prescriptions was **41.1 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 8,754 per 100,000 people aged 3 to 19 years in the Northern Territory, to 32,456 in Tasmania.

After excluding the highest and lowest results, the asthma medicine prescription rate across the 304 remaining local areas was **3.2 times higher** in one local area compared to another.

Dispensing rates were highest in major cities and lowest in remote areas. Dispensing rates were also highest in areas of low socioeconomic status and decreased as the socioeconomic status increased.

Interpretation

Potential reasons for the variation include differences in:

- clinical decision making and clinicians' adherence to clinical guidelines
- risk factors, including low socioeconomic status[1], low income, remoteness[1], parental smoking[1], environmental allergens[5], humidity and crowded housing[6], which are more prevalent in disadvantaged communities[7]
- patient factors, such as taking appropriate asthma preventer medicine and seeking health care early in the progression of asthma. Both of these may be less prevalent in disadvantaged communities
- practitioner factors and preferences, including the preference for combination products or single-agent products
- levels of access to, and the costs of, over-the-counter reliever medications.

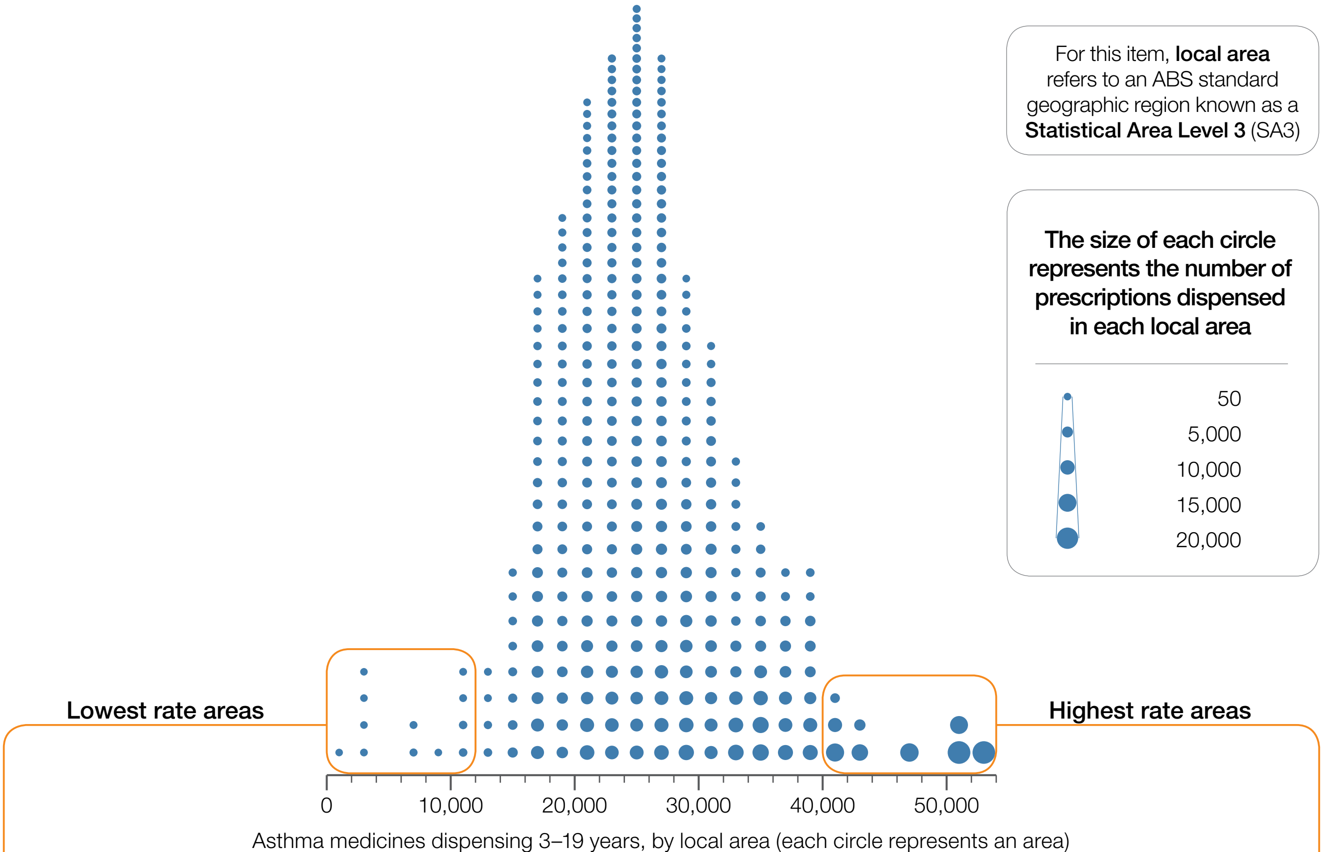
It is also important to note that the dispensing of medicines in remote areas by some Aboriginal Health Services is not captured in the PBS.

To explore this variation, further analysis could focus on:

- the family, provider and system factors that increase variations in prescribing and dispensing asthma medicine to those aged three to 19
- comparing the dispensing of asthma preventer and reliever medicines overall, and by levels of socioeconomic disadvantage to examine whether variation is greater with preventers than with relievers
- the variability of dispensing for young children versus school-aged children.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 107: Number of PBS prescriptions dispensed for asthma medicines per 100,000 people aged 3 to 19 years, age standardised, by local area, 2013–14



Local area	State	Rate	Prescriptions
Daly - Tiwi - West Arnhem	NT	1,298	74
Barkly	NT	2,561	51
Katherine	NT	2,965	184
East Arnhem	NT	2,968	158
Kimberley	WA	3,768	376
Far North	Qld	6,945	601
Alice Springs	NT	7,927	817
Gascoyne	WA	8,142	171
Litchfield	NT	10,668	495
Pilbara	WA	11,237	1,388
Darwin City	NT	11,869	438
Darwin Suburbs	NT	11,873	1,525

Local area	State	Rate	Prescriptions
Bankstown	NSW	53,379	21,876
Canterbury	NSW	51,418	15,079
Fairfield	NSW	51,259	21,993
Merrylands - Guildford	NSW	46,388	15,841
St Marys	NSW	42,663	5,490
Mount Druitt	NSW	42,036	13,034
Campbelltown	NSW	41,075	15,388
Gawler - Two Wells	SA	40,768	3,129
Bringelly - Green Valley	NSW	40,692	9,536

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

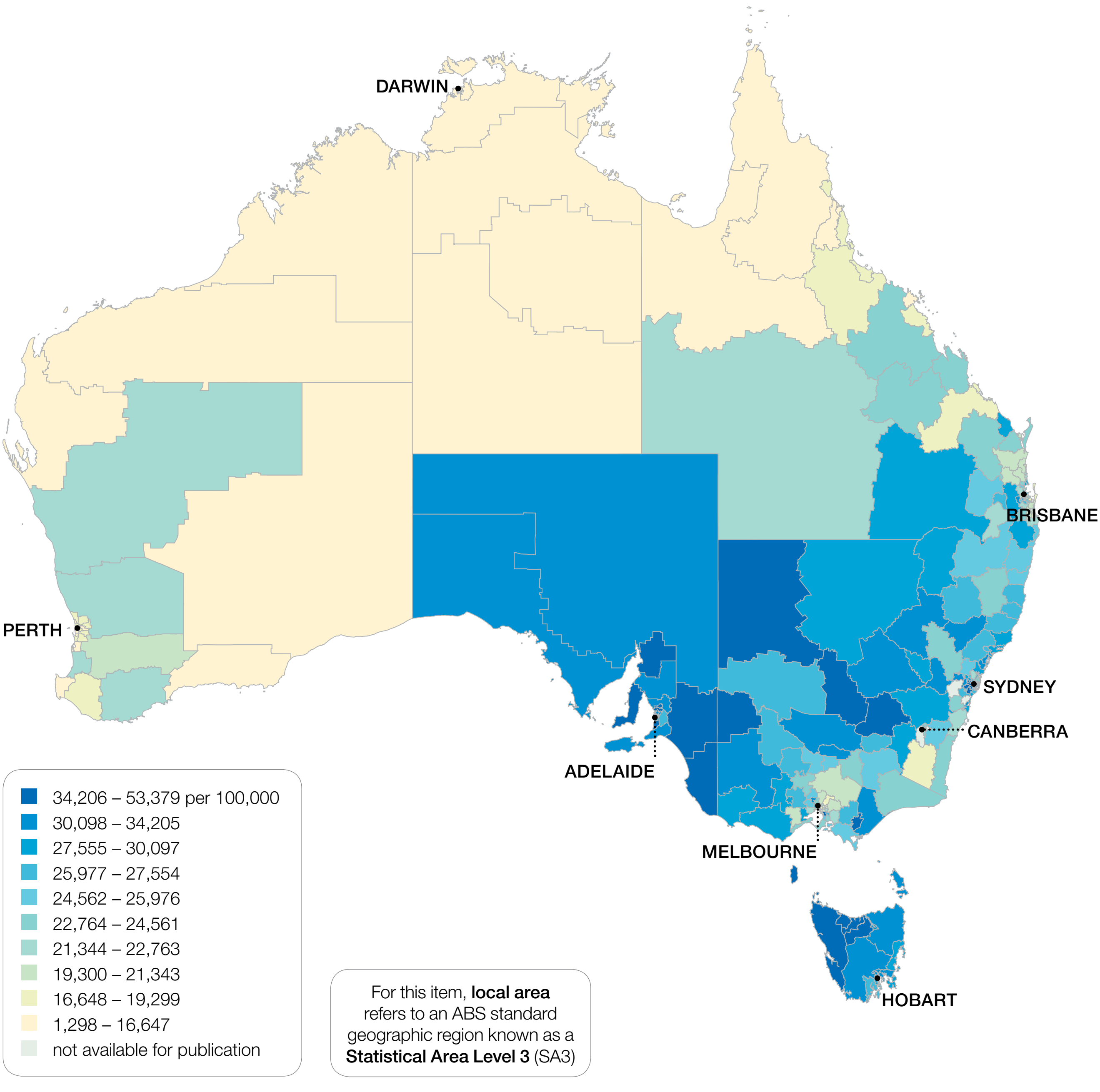
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 540 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

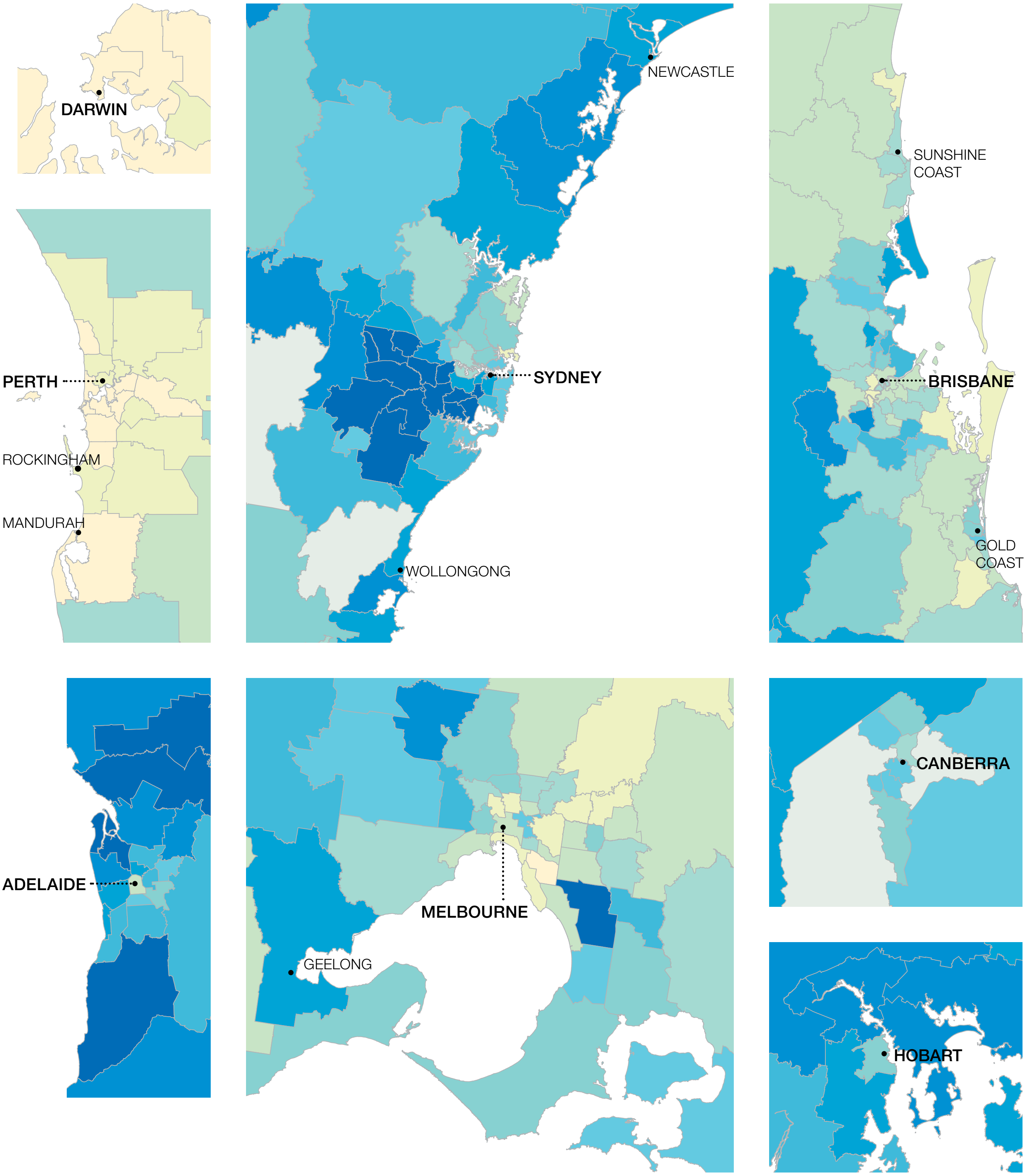
Asthma medicines dispensing 3–19 years

Figure 108: Number of PBS prescriptions dispensed for asthma medicines per 100,000 people aged 3 to 19 years, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for asthma medicines across 325 local areas (SA3s) ranged from 1,298 to 53,379 per 100,000 people aged 3 to 19 years. The number of prescriptions was **41.1 times higher** in the area with the highest rate compared to the area with the lowest rate.

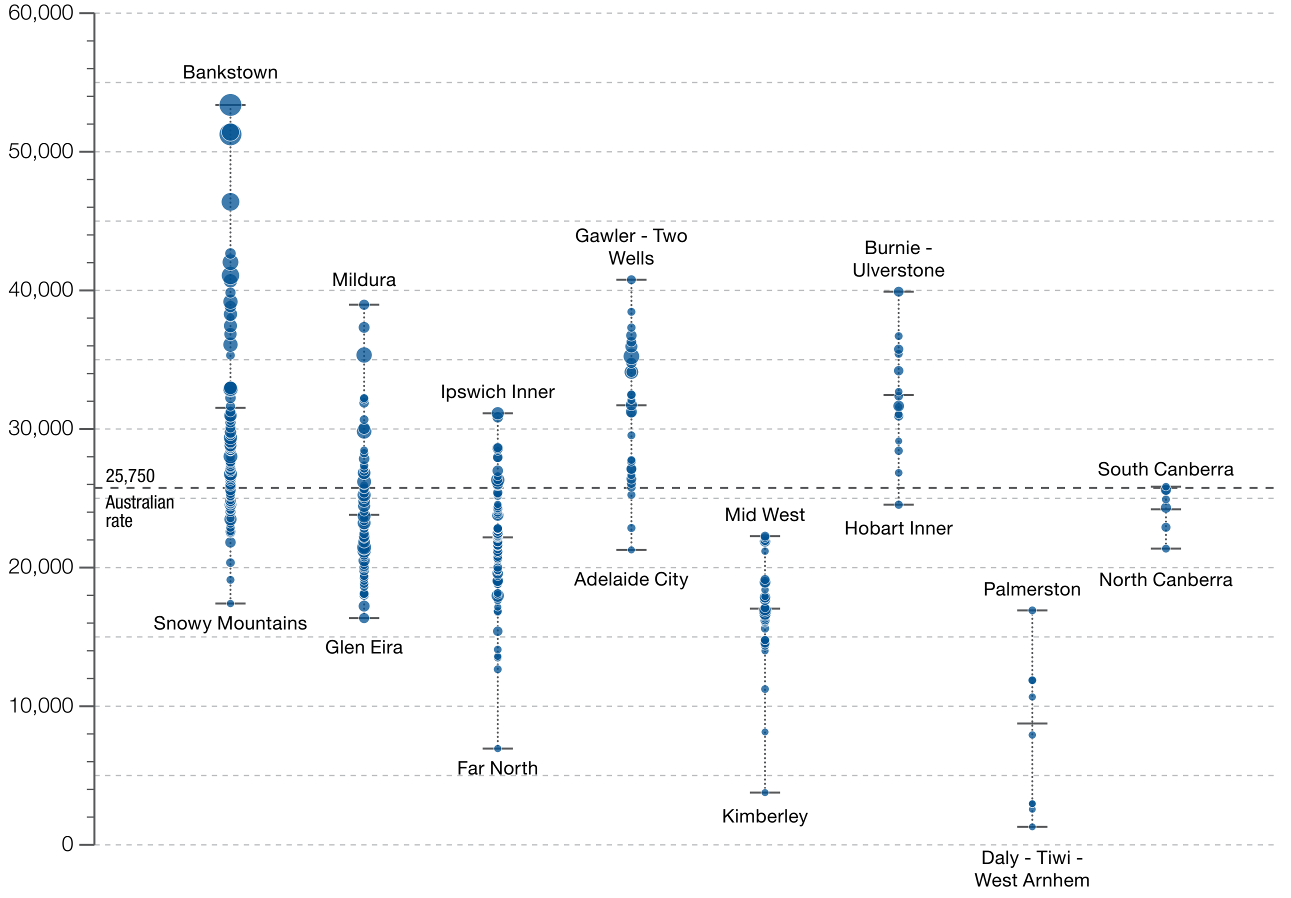


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma medicines dispensing 3–19 years

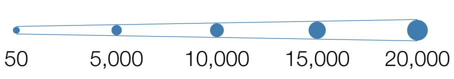
Figure 109: Number of PBS prescriptions dispensed for asthma medicines per 100,000 people aged 3 to 19 years, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	53,379	38,965	31,137	40,768	22,270	39,906	16,915	25,839
State/territory	31,527	23,810	22,181	31,713	17,039	32,456	8,754	24,207
Lowest rate	17,409	16,359	6,945	21,278	3,768	24,538	1,298	21,370
No. prescriptions	496,339	282,082	232,161	107,204	92,600	35,629	5,226	18,939



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

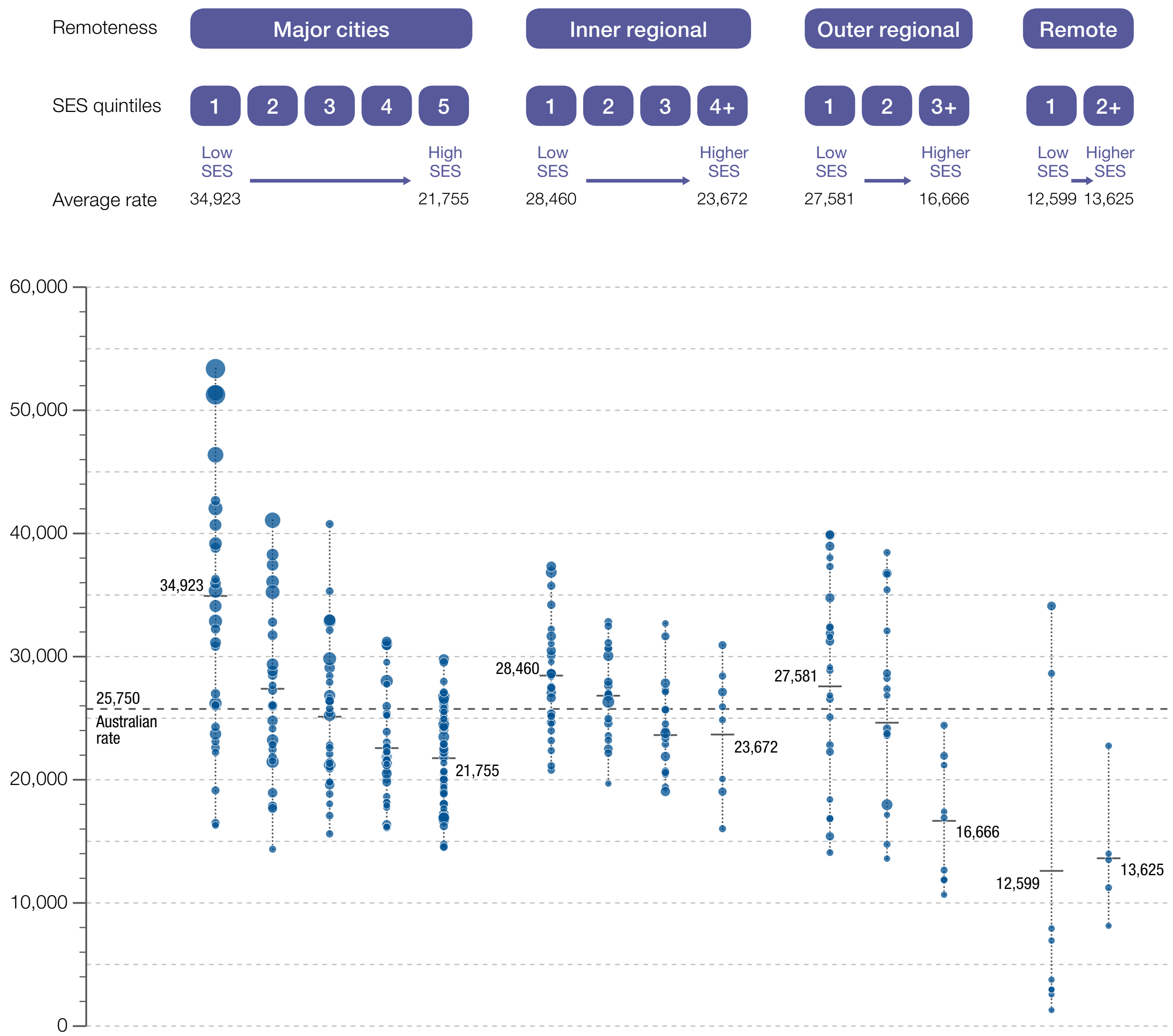
The size of each circle represents the number of prescriptions dispensed in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 110: Number of PBS prescriptions dispensed for asthma medicines per 100,000 people aged 3 to 19 years, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area

50 5,000 10,000 15,000 20,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma medicines dispensing 3–19 years

Resources

- National Asthma Council of Australia. *Australian Asthma Handbook*. 2015. Available at: www.asthmahandbook.org.au/.
- Australian Institute of Health and Welfare. *Respiratory medication use in Australia 2003–2013*. 2015. Available at: www.aihw.gov.au/publication-detail/?id=60129550778.
- Royal Children's Hospital Melbourne. *Paediatric Pharmacopoeia 13th edition*. 2002. Available at: ww2.rch.org.au/pharmacopoeia/pages/a-znames.html.
- Pharmaceutical Benefits Scheme. *Australian Statistics on Medicines*. 2015. Available at: www.pbs.gov.au/info/browse/statistics.
- Raising Children Network: the Australian parenting website. Available at: http://raisingchildren.net.au/.

1 Australian Centre for Asthma Monitoring. Asthma in Australian children: findings from growing up in Australia, the longitudinal study of Australian children. Cat. no. ACM 17. Canberra: AIHW, 2009.
2 Asthma Australia. Medications Reference Chart. 2015. (Accessed 6 October 2015 at: www.asthmaaustralia.org.au/Medications_reference_chart.aspx).
3 National Asthma Council of Australia. Australian Asthma Handbook. 2015. (Accessed 14 September 2015 at: www.asthmahandbook.org.au).
4 Kozyrskyj AL, Kendall GE, Jacoby P, Sly PD, Zubrick SR. Association between socioeconomic status and the development of asthma: analyses of income trajectories. American Journal of Public Health 2010;100(3):540.
5 Gold DR, Wright R. Population disparities in asthma. Annual review of public health 2005;26:89–113.
6 Krieger J. Home is where the triggers are: increasing asthma control by improving the home environment. Pediatric Allergy, Immunology, and Pulmonology 2010. Vol. 23. No. 2.
7 Australian Institute of Health and Welfare. Who gets asthma? 2015. (Accessed 25 August 2015 at: www.aihw.gov.au/asthma/prevalence/).

6.2 Asthma medicines dispensing 20–44 years

Context

This data item examines dispensing rates of asthma medicine for people aged 20 to 44 years. The data are sourced from the PBS and relate to the number of prescriptions filled per 100,000 people.

Asthma is an inflammatory lung condition characterised by reversible airway obstruction and bronchospasms, causing episodes of wheezing, breathlessness, coughing and chest tightness. Medicines used to manage asthma include:

- short-acting bronchodilators (relievers), which open the airways by relaxing the smooth muscle; and long-acting bronchodilators, which provide control rather than quick relief
- oral and inhaled corticosteroids (preventers), which suppress inflammation and are typically used for acute exacerbations or prevention respectively
- leukotriene receptor antagonists, which inhibit the release of leukotrienes, a substance that constricts airways and increases mucus production, swelling and inflammation in the lungs.

The recommended management for adults with asthma is:

- for very mild symptoms, using a short-acting reliever
- for persistent and mild symptoms, using a reliever as well as regular low-dose preventer inhaled corticosteroids
- for moderate symptoms, building up the reliever and preventer dosage to the level required to control symptoms
- for persistent and frequent symptoms, adding a long-acting reliever. Patients should have a written Asthma Action Plan to help them recognise and manage worsening asthma. In most cases, preventers may help during periods of exacerbation.

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Asthma medicines dispensing 20–44 years

Magnitude of variation

In 2013–14, there were 1,659,993 PBS prescriptions dispensed for asthma medicines, representing 20,425 prescriptions per 100,000 people aged 20 to 44 years (the Australian rate).

The number of PBS prescriptions dispensed for asthma medicines across 325* local areas (SA3s) ranged from 2,244 to 44,092 per 100,000 people aged 20 to 44 years. The number of prescriptions was **19.6 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 9,521 per 100,000 people aged 20 to 44 years in the Northern Territory, to 32,260 in Tasmania.

After excluding the highest and lowest results, the asthma medicine prescription rate across the 306 remaining local areas was **3.4 times higher** in one local area compared to another.

Dispensing rates tended to be higher in inner and outer regional areas than in major cities and were lowest in remote communities.

There was a clear relationship with socioeconomic status in all categories of remoteness, with dispensing rates highest in areas of low socioeconomic status and decreasing as the socioeconomic status increased.

Interpretation

Potential reasons for the variation include differences in:

- rates of smoking, which is a known trigger for asthma. Higher rates of smoking are evident in those from low socioeconomic groups[1], and among Aboriginal and Torres Strait Islander people[2]
- distribution of Indigenous people, who are almost twice as likely as non-Indigenous people to report having asthma[3]
- levels of adherence to medicines – poor adherence to preventive medicines results in poor asthma control[4,5]
- clinicians' prescribing preferences, including for combination products or single-agent products
- distribution of concession cardholders as current PBS arrangements result in a cost gap for buying asthma relievers but not preventers
- use of spirometric assessments by general practitioners to determine asthma severity
- levels of access to, and costs of, over-the-counter reliever medications.

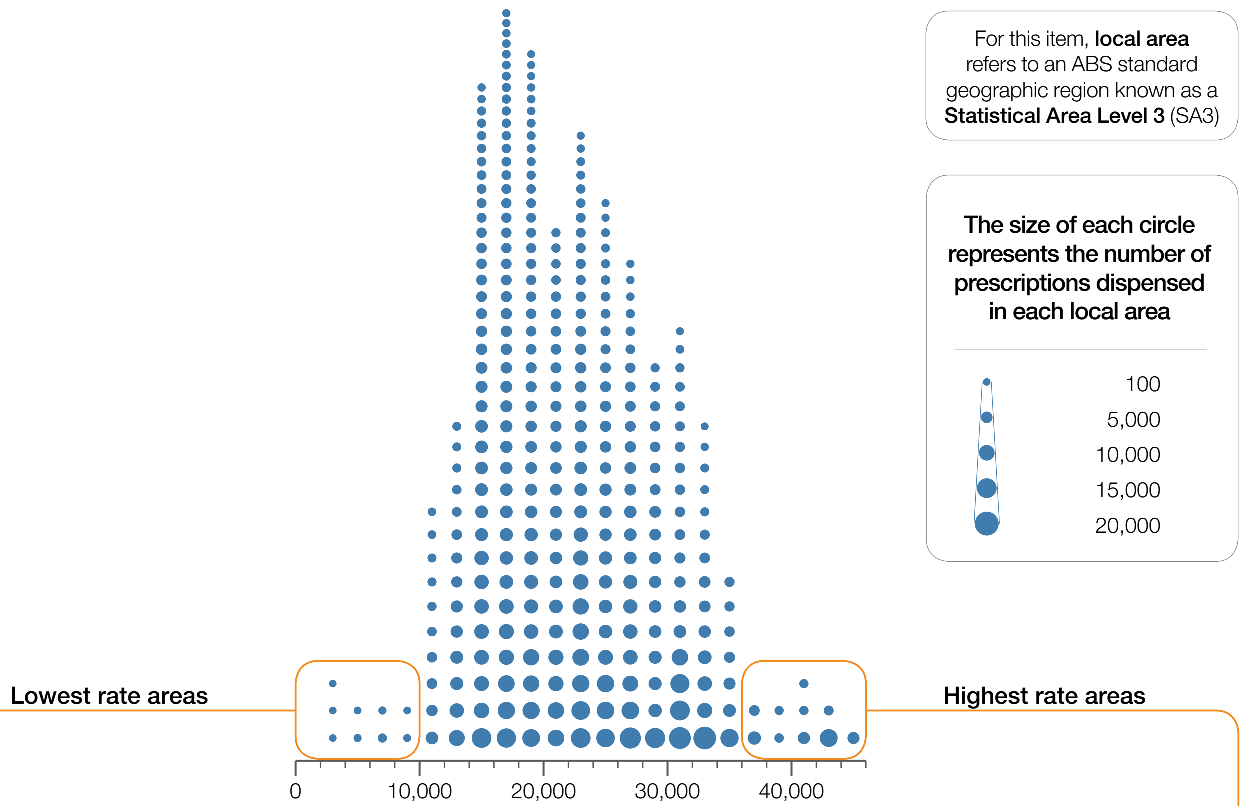
It is also important to note that the dispensing of medicines in remote areas by some Aboriginal Health Services is not captured in the PBS.

To explore this variation, further analysis could focus on:

- the variation in dispensing rates of relievers and preventers for asthma across states and territories
- the extent to which higher smoking rates are linked to locations with higher asthma medicine dispensing rates.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 111: Number of PBS prescriptions dispensed for asthma medicines per 100,000 people aged 20 to 44 years, age standardised, by local area, 2013–14



Asthma medicines dispensing 20–44 years, by local area (each circle represents an area)

Local area	State	Rate	Prescriptions
Daly - Tiwi - West Arnhem	NT	2,244	152
East Arnhem	NT	3,340	222
Barkly	NT	3,938	95
Katherine	NT	4,978	383
Kimberley	WA	4,990	801
Pilbara	WA	6,301	2,142
Far North	Qld	7,490	895
Litchfield	NT	8,823	701
Gascoyne	WA	9,932	347

Local area	State	Rate	Prescriptions
Devonport	Tas	44,092	5,634
Playford	SA	43,555	12,680
Mid North	SA	42,587	3,037
Burnie - Ulverstone	Tas	41,722	5,796
Lower North	SA	41,414	2,344
West Coast	Tas	40,311	2,181
Yorke Peninsula	SA	38,646	2,155
Great Lakes	NSW	38,045	2,491
Limestone Coast	SA	36,934	7,177
Fleurieu - Kangaroo Island	SA	36,319	4,048

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

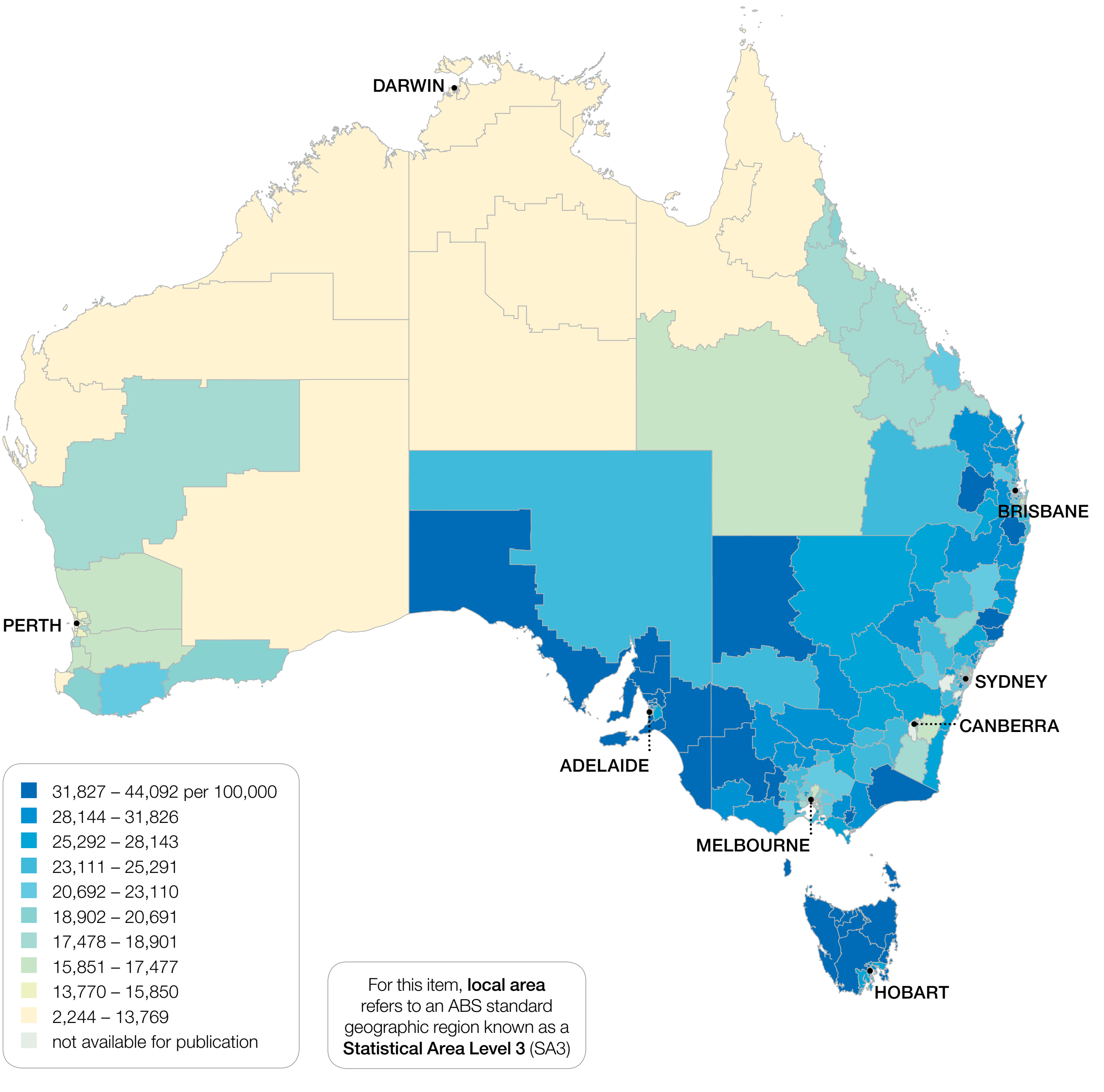
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 4,800 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma medicines dispensing 20–44 years

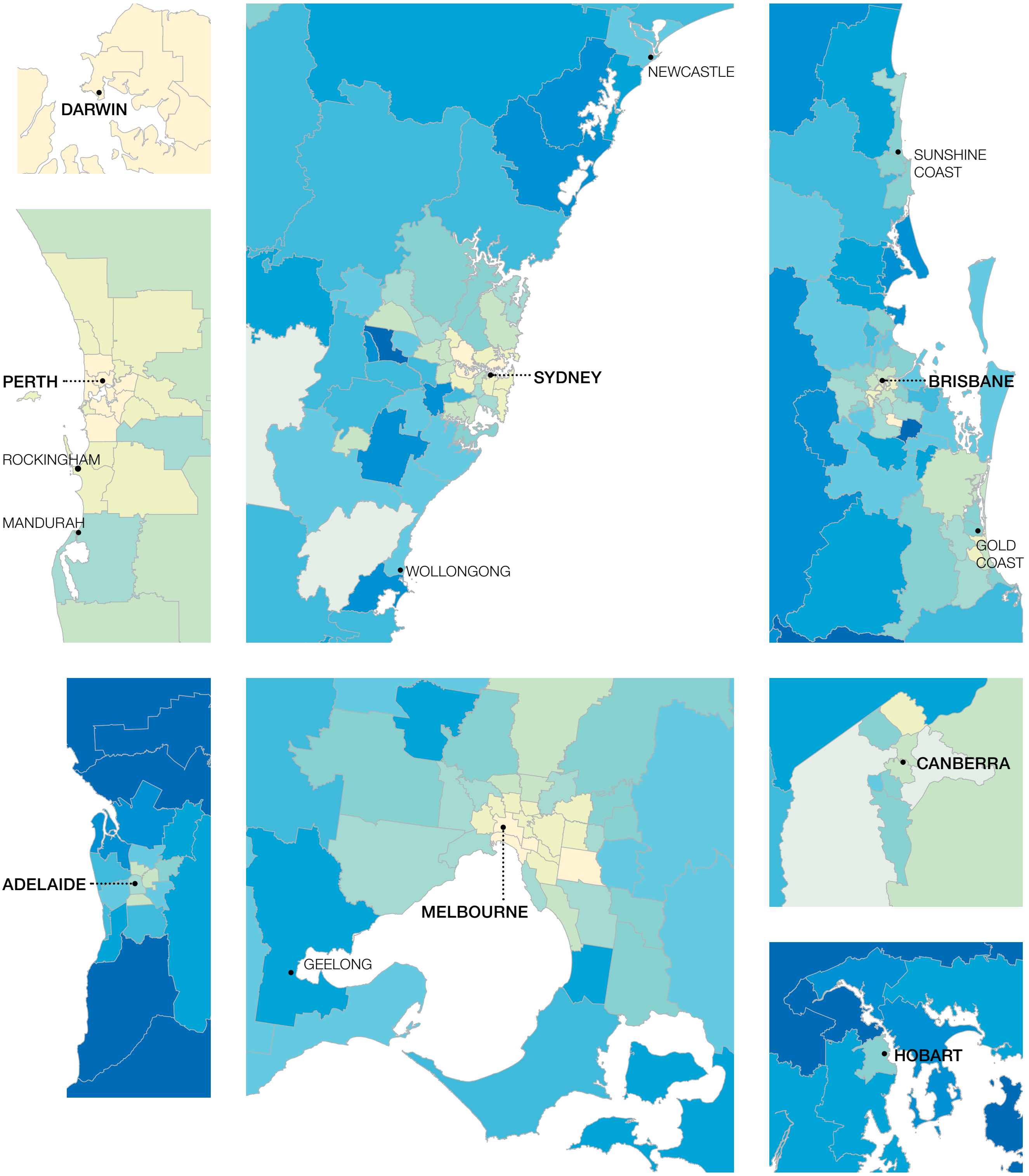
Figure 112: Number of PBS prescriptions dispensed for asthma medicines per 100,000 people aged 20 to 44 years, age standardised, by local area, 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for asthma medicines across 325 local areas (SA3s) ranged from 2,244 to 44,092 per 100,000 people aged 20 to 44 years. The number of prescriptions was **19.6 times higher** in the area with the highest rate compared to the area with the lowest rate.

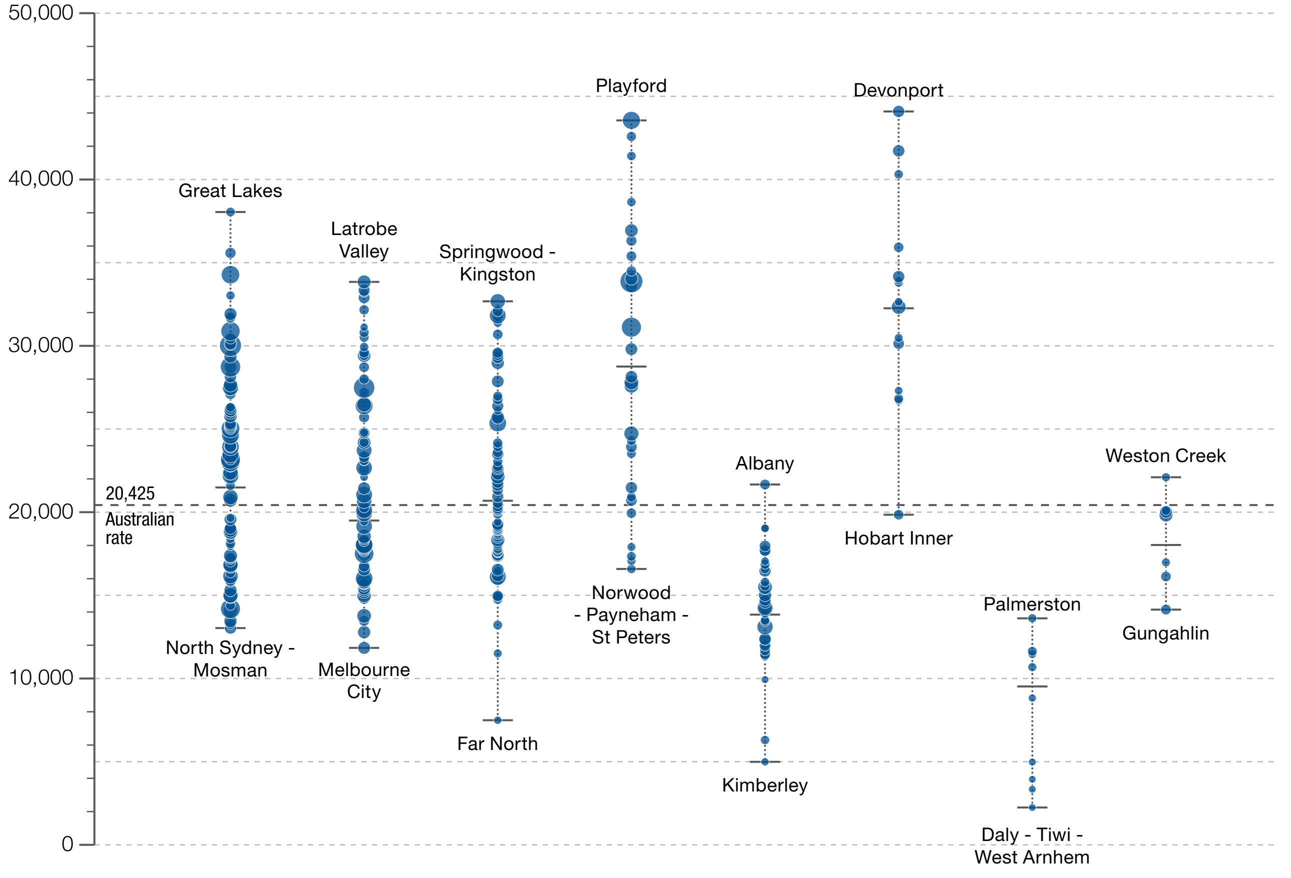


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma medicines dispensing 20–44 years

Figure 113: Number of PBS prescriptions dispensed for asthma medicines per 100,000 people aged 20 to 44 years, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	38,045	33,845	32,676	43,555	21,662	44,092	13,620	22,102
State/territory	21,487	19,496	20,685	28,754	13,841	32,260	9,521	18,027
Lowest rate	13,033	11,840	7,490	16,587	4,990	19,845	2,244	14,143
No. prescriptions	549,637	402,013	335,723	157,733	128,653	49,754	9,215	26,980



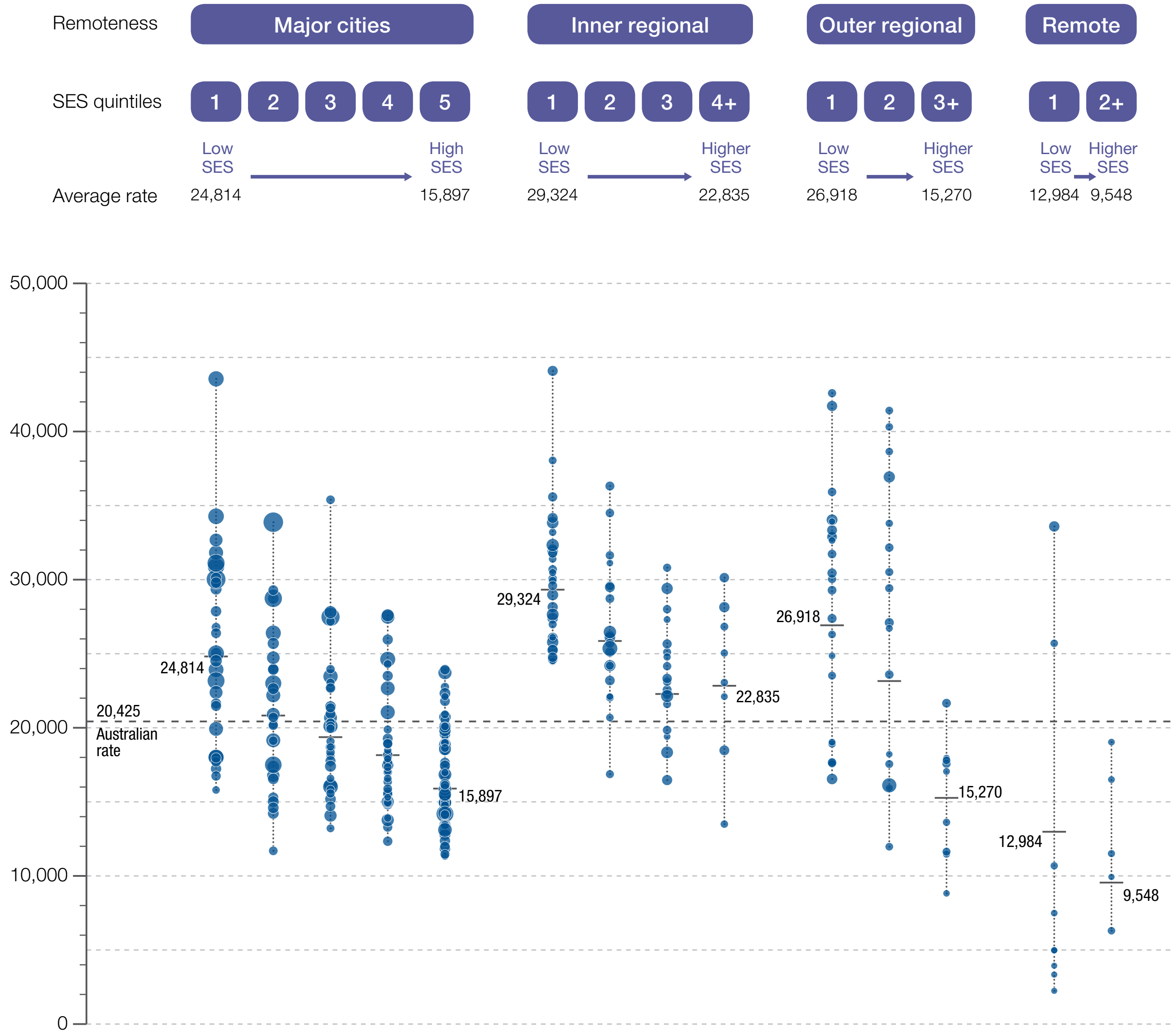
For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area 100 5,000 10,000 15,000 20,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 114: Number of PBS prescriptions dispensed for asthma medicines per 100,000 people aged 20 to 44 years, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area 100 5,000 10,000 15,000 20,000

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma medicines dispensing 20–44 years

Resources

- National Asthma Council of Australia. *Australian Asthma Handbook*. 2015. Available at: www.asthmahandbook.org.au/.

- Pharmaceutical Benefits Scheme. *Australian Statistics on Medicines*. 2015. Available at: www.pbs.gov.au/info/browse/statistics.

1 Australian National Preventive Health Agency. Smoking and disadvantage evidence brief. 2013. (Accessed 25 August 2015 at www.health.gov.au/internet/anpha/publishing.nsf/Content/smoking-disadvantage-evidence-brief).

2 Australian Institute of Health and Welfare. Indigenous health. 2014. (Accessed 25 August 2015 at: www.aihw.gov.au/australias-health/2014/indigenous-health/).

3 Australian Bureau of Statistics. Asthma: Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012–13. Cat. No. 4727.0.55.001. 2013 (Accessed 25 August 2015 at: www.abs.gov.au/ausstats/abs@.nsf/Lookup/82D0F5F67DDB24F5CA257C2F00145871?opendocument#).

4 Horne R, Weinman J. Self-regulation and self-management in asthma: exploring the role of illness perceptions and treatment beliefs in explaining non-adherence to preventer medicine. Psychol Health 2002;17:17–32.

5 Reddel HK, Sawyer SM, Everett PW, Flood PV, Peters MJ. Asthma control in Australia: a cross-sectional web-based survey in a nationally representative population. MJA 2015;202(9):492–96.

6.3 Asthma and chronic obstructive pulmonary disease medicines dispensing 45 years and over

Context

This data item examines dispensing rates of asthma and chronic obstructive pulmonary disease (COPD) medicines for people aged 45 years and over. The data are sourced from the PBS and relate to the number of prescriptions filled per 100,000 people.

Asthma is an inflammatory condition of the airways characterised by reversible airway obstruction and bronchospasms, causing episodes of wheezing, breathlessness, coughing and chest tightness. COPD is a serious long-term lung disease that mainly affects middle-aged and older adults. It is characterised by airway narrowing that is not fully reversible with treatment. Symptoms include shortness of breath, coughing, phlegm and wheezing. Tobacco smoking is the main cause of COPD.[1]

The same medicines are used to treat asthma and COPD, but the management is different for each condition. The two primary classes of medicine used to treat asthma and COPD are bronchodilators (relievers) and inhaled corticosteroids (preventers).

The recommended management for adults with asthma is:

- for very mild symptoms, using a short-acting reliever
- for persistent and mild symptoms, using a reliever as well as a low-dose inhaled preventer
- for moderate symptoms, building up the reliever and preventer dosages to the level required to control symptoms
- for persistent and frequent symptoms, adding a long-acting reliever. Patients should have a written Asthma Action Plan to help them recognise and manage worsening asthma.

The recommended management for COPD is:

- for minimal symptoms, stopping smoking, engaging in regular physical activity and receiving regular flu and pneumococcal vaccinations
- for increased symptoms, adding pulmonary rehabilitation and short-acting relievers
- for frequent exacerbations, adding a low-dose inhaled preventer.

Asthma and chronic obstructive pulmonary disease medicines dispensing 45 years and over

Magnitude of variation

In 2013–14, there were 7,276,843 PBS prescriptions dispensed for asthma and COPD medicines, representing 78,463 prescriptions per 100,000 people aged 45 years and over (the Australian rate).

The number of PBS prescriptions dispensed for asthma and COPD medicines across 325* local areas (SA3s) ranged from 17,415 to 146,961 per 100,000 people aged 45 years and over. The number of prescriptions was **8.4 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 56,420 per 100,000 people aged 45 years and over in the Northern Territory, to 87,929 in Tasmania.

After excluding the highest and lowest results, the asthma amd COPD medicine prescription rate across the 299 remaining local areas was **2.2 times higher** in one local area compared to another.

Dispensing rates were generally highest in major cities and lowest in remote communities. Dispensing rates were highest in areas of low socioeconomic status and decreased as the socioeconomic status increased.

Interpretation

Potential reasons for the variation include differences in:

- smoking rates, because smoking is the main cause of COPD and a trigger for asthma. Higher smoking rates are evident in people from low socioeconomic groups[2], regional areas and among Aboriginal and Torres Strait Islander people[3]
- the distribution of Indigenous people, who are almost twice as likely as non-Indigenous people to report having asthma[4] and 2.5 times as likely to report having COPD[5]
- the distribution of concession cardholders, with more living in areas of lower socioeconomic status – current PBS arrangements result in a cost gap for buying relievers but not preventers
- understanding the optimal treatment for asthma and COPD, and the need to adhere to medicines
- practitioner factors and preferences, including preference for combination products or single-agent products
- the exclusion of data on long-acting bronchodilators of the long-acting muscarinic antagonist class, which are used almost exclusively for COPD
- levels of access to, and costs of, over-the-counter reliever medications.

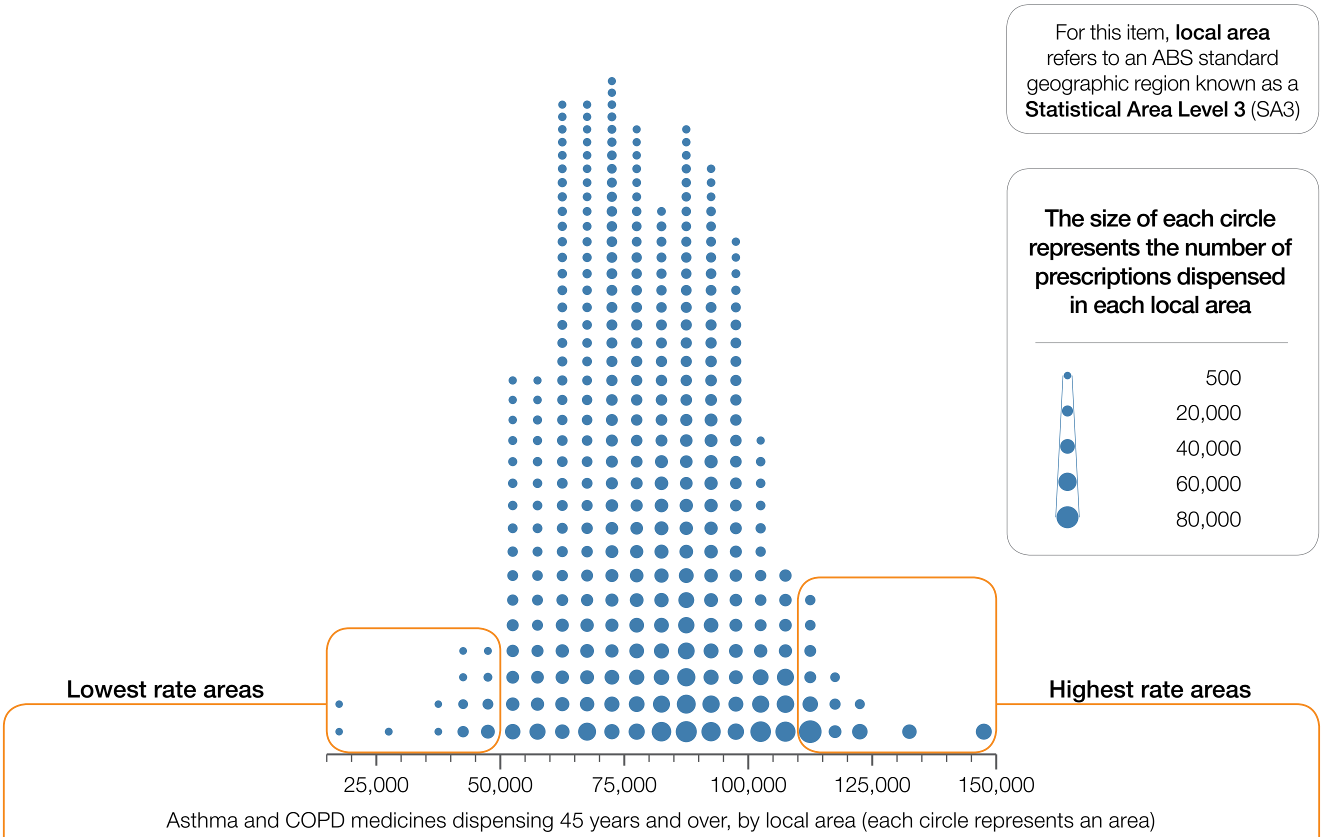
It is also important to note that the dispensing of medicines in remote areas by some Aboriginal Health Services is not captured in the PBS.

To explore this variation, further analysis could focus on:

- dispensing rates for asthma and COPD medicines, particularly to distinguish between prescribing for asthma and COPD, and mapping prescription rates against smoking rates in the population.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 115: Number of PBS prescriptions dispensed for asthma and COPD medicines per 100,000 people aged 45 years and over, age standardised, by local area, 2013–14



Local area	State	Rate	Prescriptions
East Arnhem	NT	17,415	546
Daly - Tiwi - West Arnhem	NT	19,302	794
Kimberley	WA	27,682	2,425
Katherine	NT	39,083	1,637
Barkly	NT	39,179	641
Pilbara	WA	40,811	3,923
Cottesloe - Claremont	WA	41,020	13,147
Melville	WA	43,443	21,636
Gascoyne	WA	43,533	1,670
South Perth	WA	45,947	8,026
Litchfield	NT	46,737	2,825
Boroondara	Vic	48,545	35,358
North Sydney - Mosman	NSW	49,375	18,694

Local area	State	Rate	Prescriptions
Mount Druitt	NSW	146,961	47,065
Playford	SA	132,355	38,678
Bourke - Cobar - Coonamble	NSW	122,330	14,132
Ipswich Inner	Qld	121,078	44,467
St Marys	NSW	119,224	20,483
Jimboomba	Qld	117,756	12,582
Springwood - Kingston	Qld	117,356	29,625
Springfield - Redbank	Qld	114,056	17,650
Caboolture	Qld	113,235	24,702
Mid North	SA	112,066	16,218
Wagga Wagga	NSW	110,511	44,474
Browns Plains	Qld	110,099	24,242
Wyong	NSW	110,071	83,722

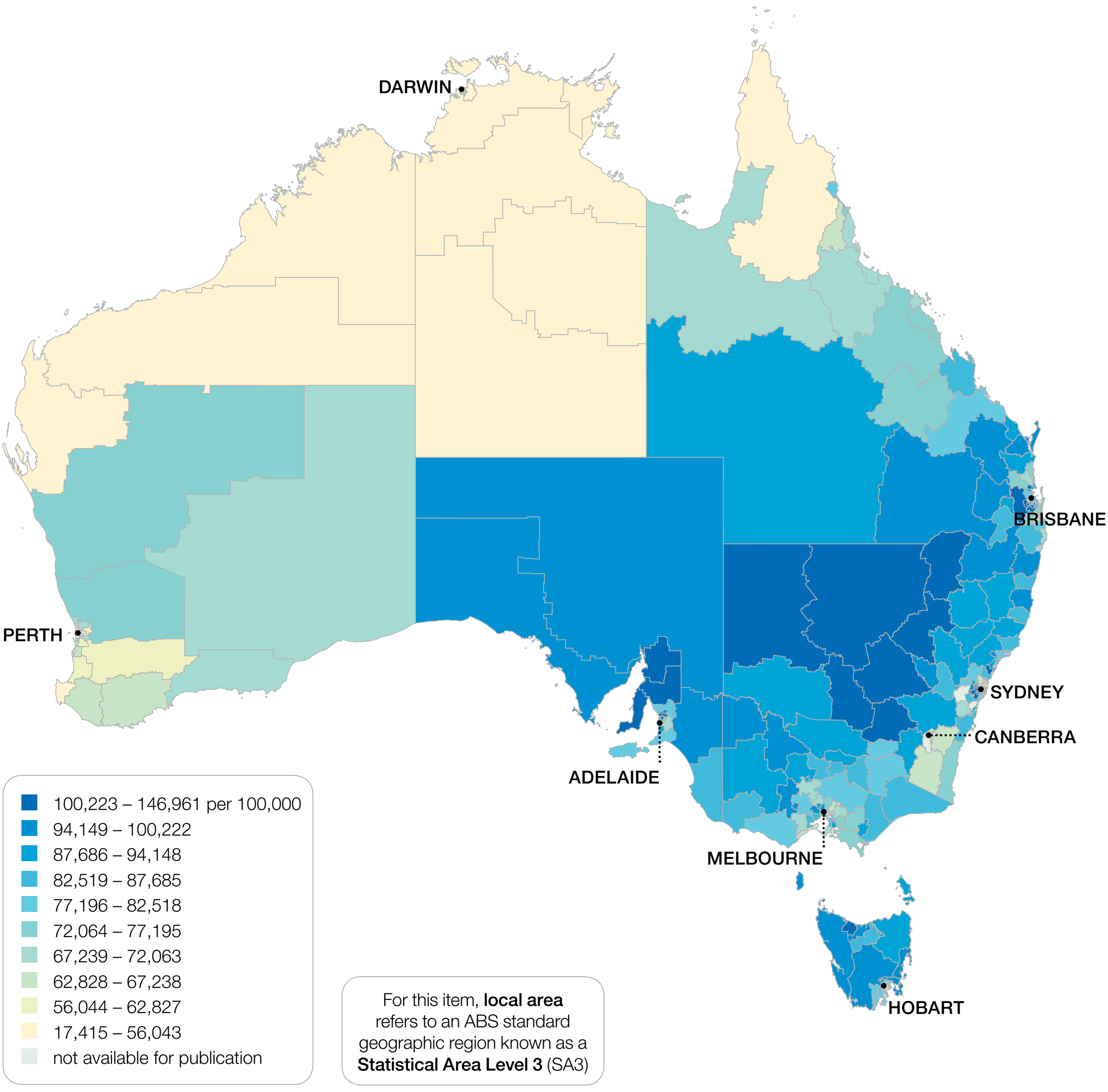
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 18,550 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

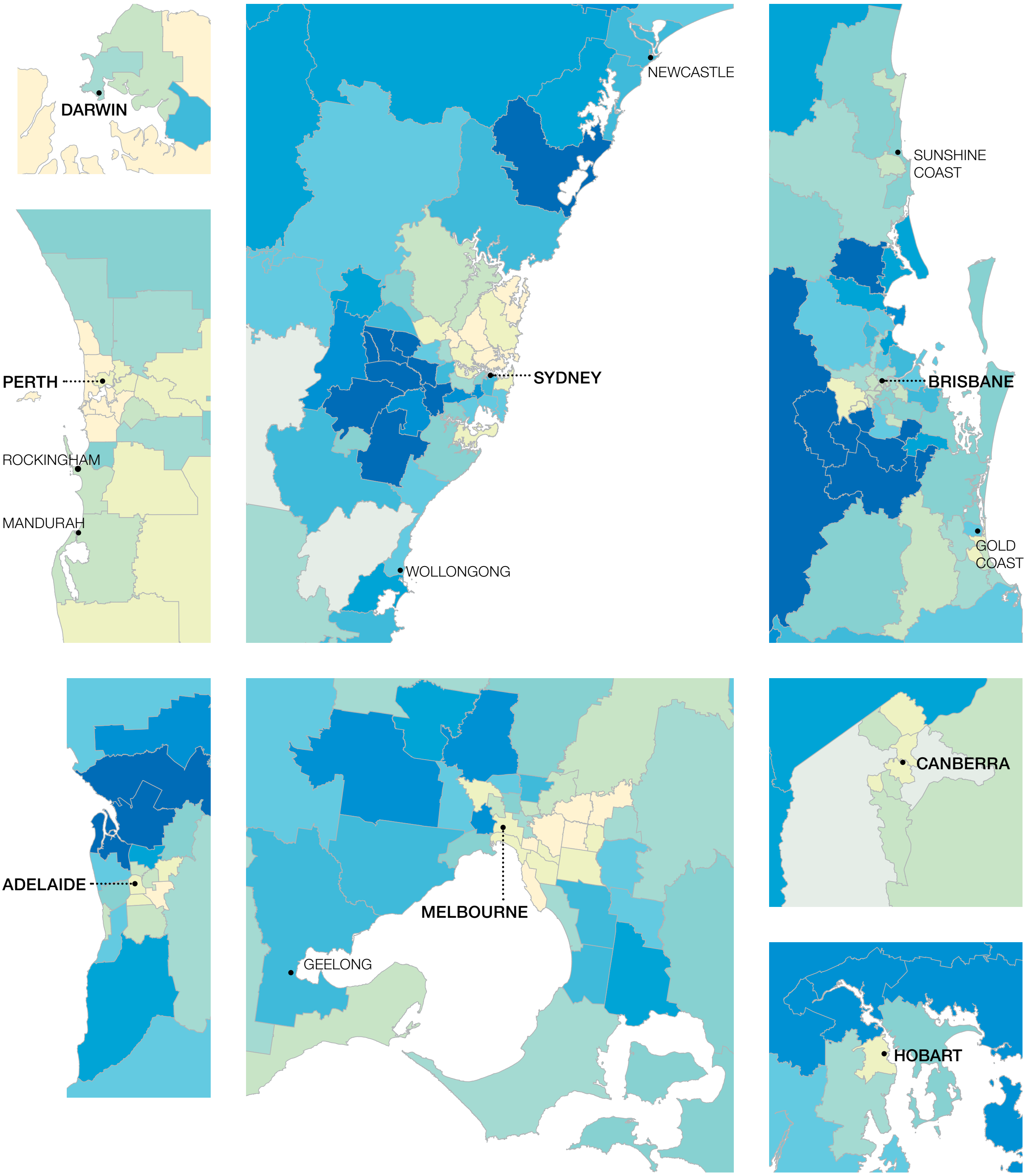
Asthma and chronic obstructive pulmonary disease medicines dispensing 45 years and over

Figure 116: Number of PBS prescriptions dispensed for asthma and COPD medicines per 100,000 people aged 45 years and over, age standardised, by local area, 2013–14



Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for asthma and COPD medicines across 325 local areas (SA3s) ranged from 17,415 to 146,961 per 100,000 people aged 45 years and over. The number of prescriptions was **8.4 times higher** in the area with the highest rate compared to the area with the lowest rate.

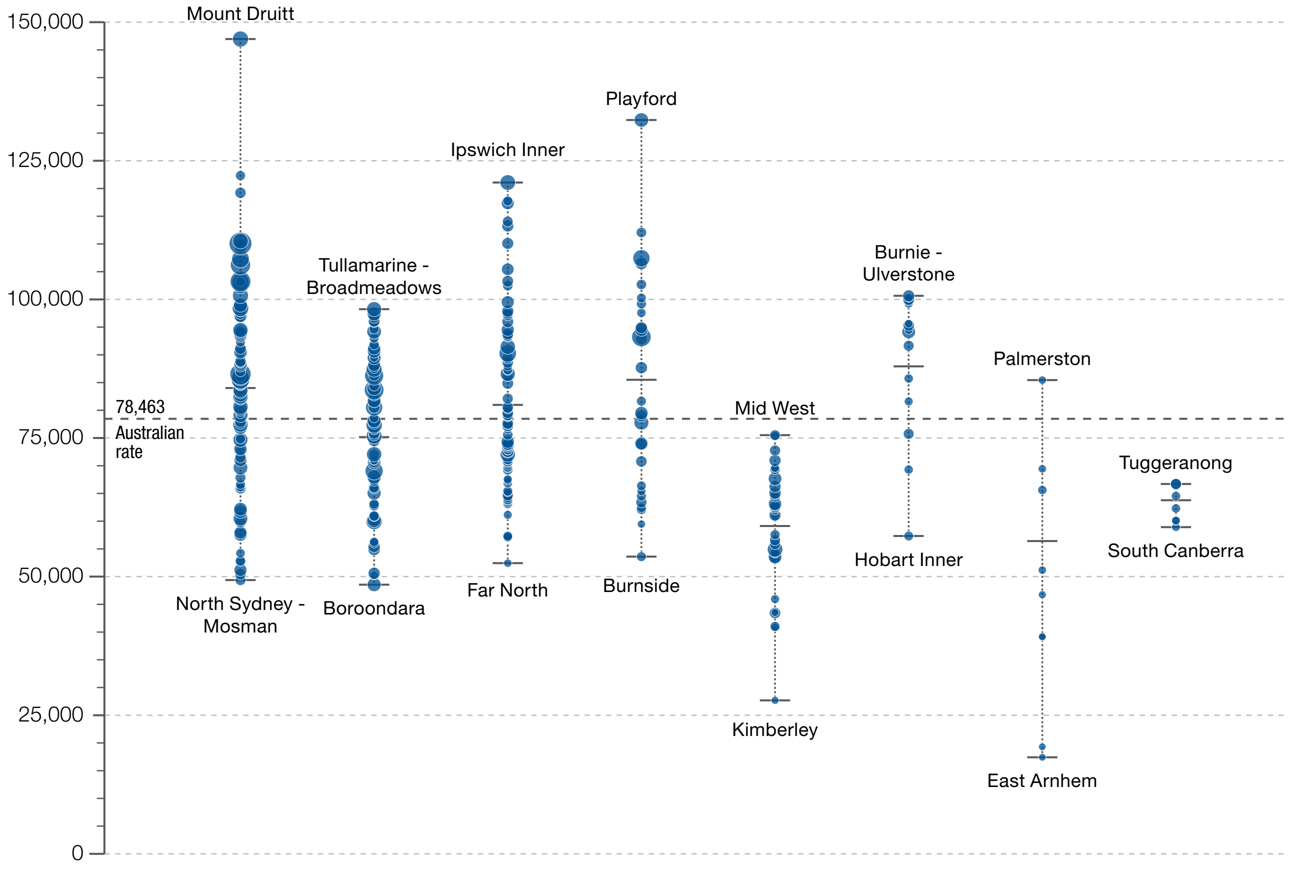


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma and chronic obstructive pulmonary disease medicines dispensing 45 years and over

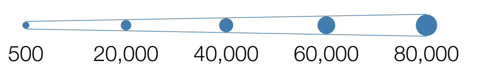
Figure 117: Number of PBS prescriptions dispensed for asthma and COPD medicines per 100,000 people aged 45 years and over, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	146,961	98,243	121,078	132,355	75,520	100,646	85,441	66,713
State/territory	84,020	75,164	80,979	85,504	59,129	87,929	56,420	63,780
Lowest rate	49,375	48,545	52,429	53,604	27,682	57,326	17,415	58,922
No. prescriptions	2,585,114	1,740,727	1,449,540	638,663	538,779	210,116	31,379	81,729



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

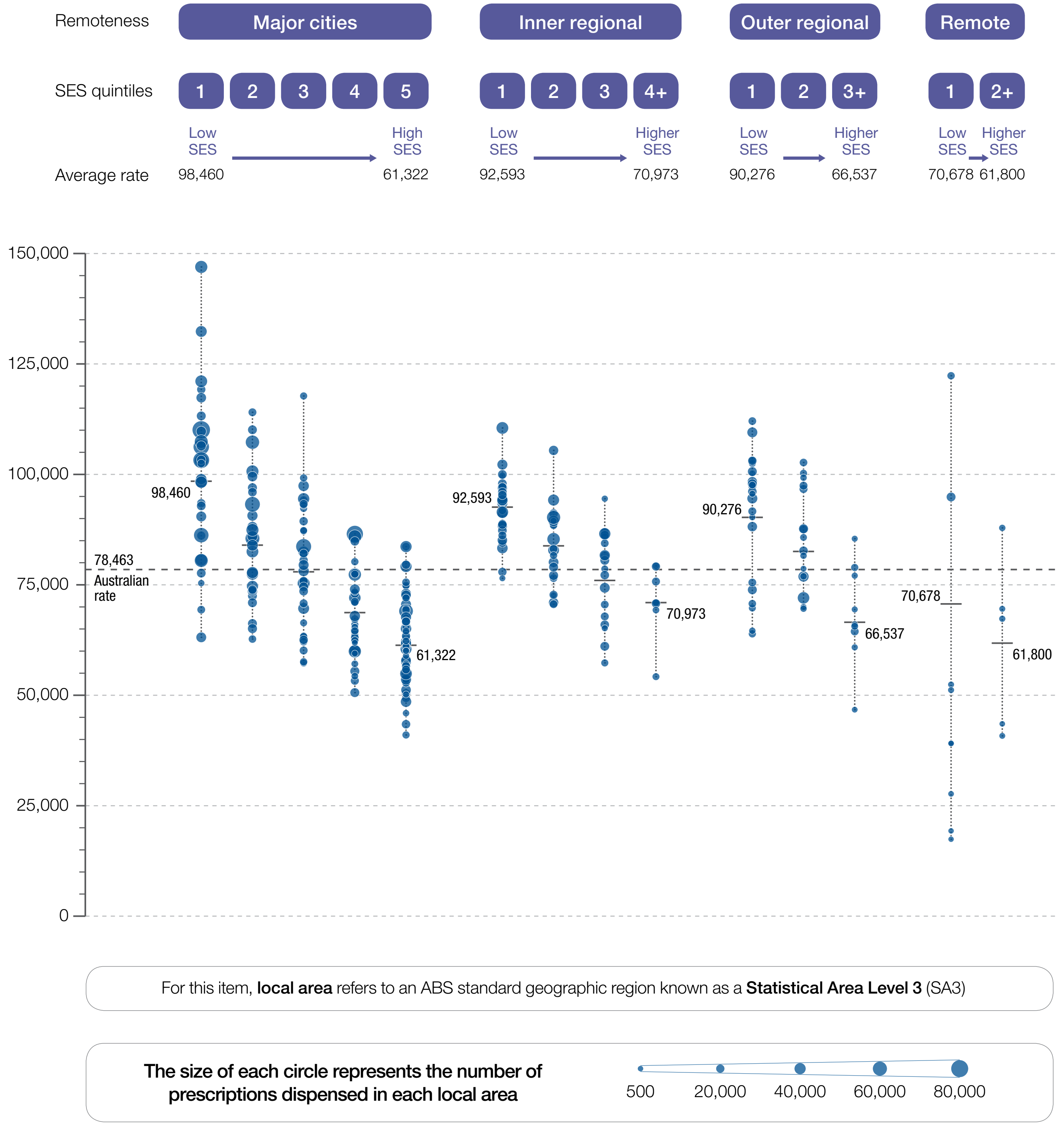
The size of each circle represents the number of prescriptions dispensed in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 118: Number of PBS prescriptions dispensed for asthma and COPD medicines per 100,000 people aged 45 years and over, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 10/04/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma and chronic obstructive pulmonary disease medicines dispensing 45 years and over

Resources

- National Asthma Council of Australia. *Australian Asthma Handbook*. 2015. Available at: www.asthmahandbook.org.au/.
- Global initiative for chronic obstructive lung disease. *Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease*. 2015. Available at: www.goldcopd.org/uploads/users/files/GOLD_Report_2015_Apr2.pdf.
- Pharmaceutical Benefits Scheme. *Australian Statistics on Medicines*. 2015. Available at: www.pbs.gov.au/info/browse/statistics.

1 Forey B, Thornton A, Lee P. Systematic review with meta-analysis of the epidemiological evidence relating smoking to COPD, chronic bronchitis and emphysema. BMC Pulm Med 2011;11(1):1–61.
2 Australian National Preventive Health Agency. Smoking & disadvantage evidence brief. 2013. (Accessed 25 August 2015 at: www.health.gov.au/internet/anpha/publishing.nsf/Content/smoking-disadvantage-evidence-brief).
3 Australian Institute of Health and Welfare. Indigenous health. 2014. (Accessed 25 August 2015 at: www.aihw.gov.au/australias-health/2014/indigenous-health/).
4 Australian Bureau of Statistics. Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012–13. Cat. No. 4727.0.55.001. Canberra: ABS, 2013.
5 Australian Institute of Health and Welfare. Coronary heart disease and chronic obstructive pulmonary disease in Indigenous Australians. Cat. no. IHW 126. Canberra: AIHW, 2014.

6.4 Asthma and related respiratory hospital admissions 3–19 years

Context

This data item examines the rate of hospital admissions for asthma and bronchiolitis for people aged three to 19 years. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set. This includes both public and private hospitals. Rates are described as the number of admissions per 100,000 people. Repeat admissions for one person and transfers to other hospitals are both counted as separate admissions.

Asthma is an inflammatory condition of the airways characterised by reversible airway obstruction and bronchospasms, causing episodes of wheezing, breathlessness, coughing and chest tightness. Asthma is the most common long-term medical condition diagnosed in Australian children. Almost 21 per cent of children between birth and age 15 are diagnosed with asthma.[1]

Most symptoms are managed at home through medicine and primary healthcare interventions. Presentations to emergency departments for asthma are reasonably frequent but hospital admissions are less so. Hospitalisation is usually only required when asthma exacerbations cannot be managed at home.

Bronchiolitis is an acute viral infection of the lower respiratory tract that causes inflammation of the bronchioles, the small breathing tubes in the lungs. Symptoms include coughing and wheezing. Bronchiolitis generally affects children aged under 12 months and is the most frequent cause of hospitalisation in infants aged less than six months.[2]

Asthma and related respiratory hospital admissions 3–19 years

Magnitude of variation

From 2010–11 to 2012–13, there were 15,111 asthma and related respiratory admissions to hospital on average per annum, representing 309 admissions per 100,000 people aged 3 to 19 years (the Australian rate).

The estimated annual number of asthma and related respiratory admissions to hospital across 323* local areas (SA3s) ranged from 61 to 651 per 100,000 people aged 3 to 19 years. The number of admissions was **10.7 times higher** in the area with the highest rate compared to the area with the lowest rate. The estimated annual average number of admissions varied across states and territories, from 157 per 100,000 people aged 3 to 19 years in Tasmania, to 361 in South Australia.

After excluding the highest and lowest results, the asthma and related respiratory hospital admission rate across the 298 remaining local areas was **3.3 times higher** in one local area compared to another.

Local areas with high asthma and bronchiolitis admission rates were mainly in remote and outer metropolitan locations. In major cities and inner and outer regional locations, admission rates were highest in areas of low socioeconomic status and decreased as the socioeconomic status increased.

Interpretation

The number of admissions was relatively small so chance fluctuations could have influenced the geographical patterns seen. Other potential reasons for variation include differences in:

- distribution of Aboriginal and Torres Strait Islander peoples, who are almost twice as likely as non-Indigenous people to report having asthma[3]
- the incidence of infectious bronchiolitis
- systems-based factors, including differing access to primary and secondary community care services for timely management of acute exacerbations, availability of hospital beds and hospital admission criteria
- service provider factors, such as the use of evidence-based guidelines for acute and chronic asthma management in primary care, which may decrease hospital admissions
- low parent education levels, smoking and lower socioeconomic status[1,4] which may increase the risk of developing asthma, decrease adherence to preventer medicines and increase the likelihood of delay in presenting for treatment, thereby increasing the likelihood of admission[5]
- the severity of asthma and improper use of medicines, which can affect admission rates[6]
- geographical airborne allergens, particulate matter and cold weather extremes, which can trigger asthma attacks despite best-practice medicine use.

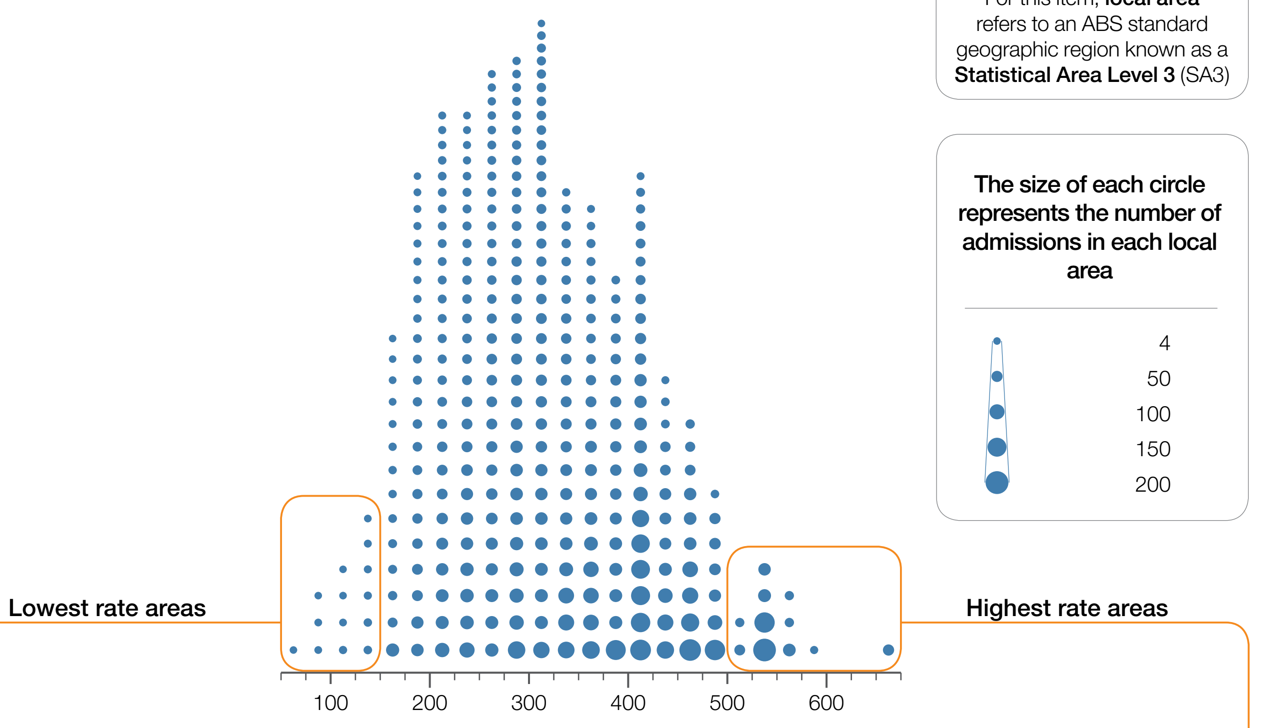
To explore this variation, further analysis could focus on:

- asthma and bronchiolitis hospital admission rates for children aged between three and 19 to understand the impact of patient, family, provider and system factors, including prevalence of asthma at the state and territory level
- the high prescription rate for asthma medicines and low admission rate among children in Tasmania compared to other states and territories
- influence of the private and public sectors on rates of asthma and respiratory-related admissions.

*There are 333 SA3s. For this item, data were suppressed for 10 SA3s. This is because of confidentiality requirements given the small numbers of admissions in these areas.

Figure 119: Estimated annual number of asthma and related respiratory admissions to hospital per 100,000 people aged 3 to 19 years, age standardised, by local area, 2010–11 to 2012–13

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)



Asthma and related respiratory hospital admissions 3–19 years, by local area (each circle represents an area)

Local area	State	Rate	Admissions
Daly - Tiwi - West Arnhem	NT	61	4
Hobart Inner	Tas	81	7
Hobart - South and West	Tas	88	7
Huon - Bruny Island	Tas	94	4
Meander Valley - West Tamar	Tas	105	5
Darwin City	NT	108	4
East Arnhem	NT	121	7
Hobart - North East	Tas	124	13
South Perth	WA	134	10
Litchfield	NT	136	6
Palmerston	NT	138	12
Hobart - North West	Tas	148	16
Buderim	Qld	149	17
Katherine	NT	149	9

Local area	State	Rate	Admissions
Nathan	Qld	651	51
Barkly	NT	583	12
Griffith - Murrumbidgee (West)	NSW	572	70
Broken Hill and Far West	NSW	569	26
Lower North	SA	553	27
Holland Park - Yeronga	Qld	546	67
Mount Druitt	NSW	543	168
Campbelltown	NSW	533	198
Maribyrnong	Vic	531	73
Brisbane Inner	Qld	513	26
Tablelands (East) - Kuranda	Qld	500	46

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

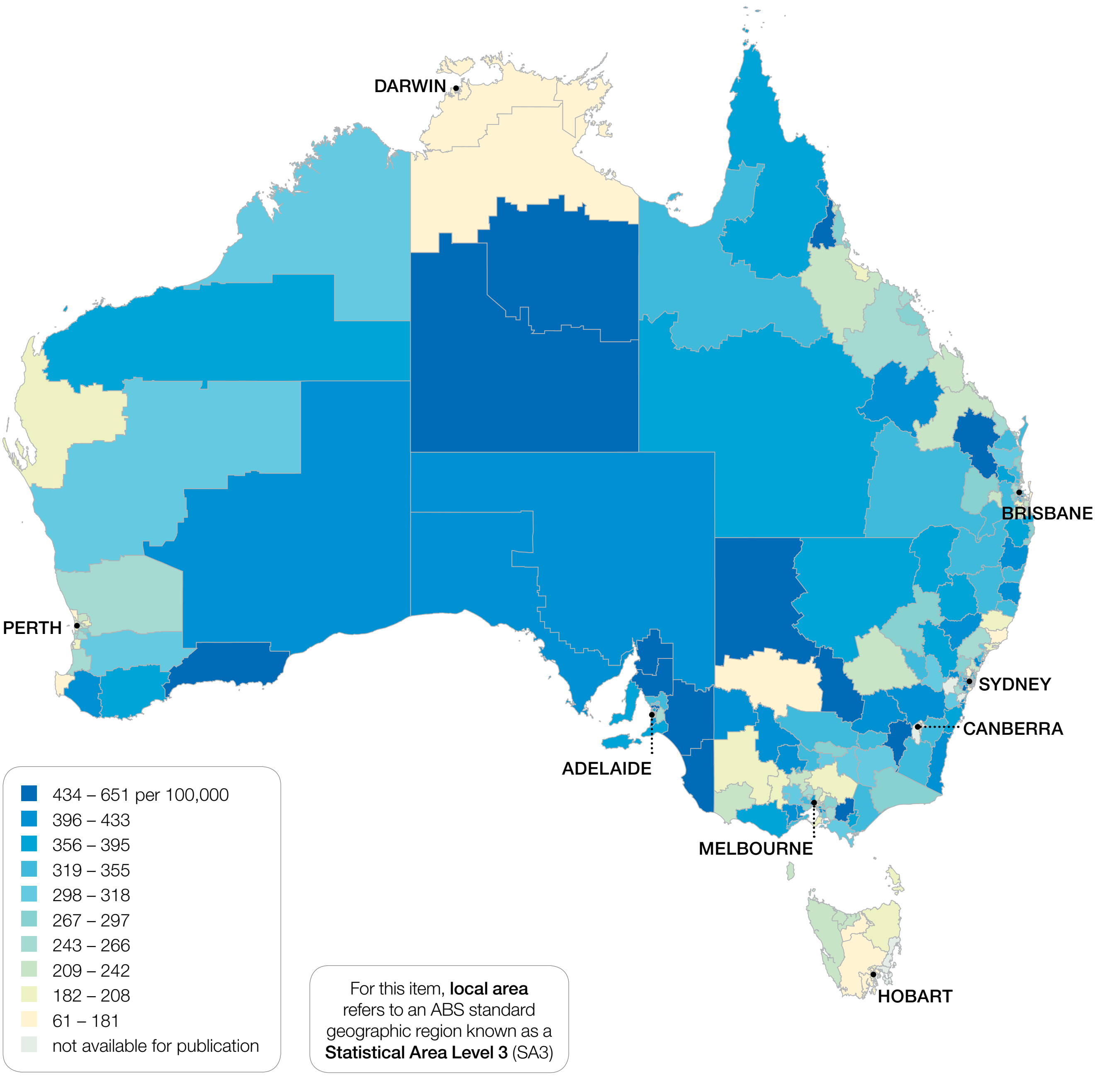
Includes all public hospitals, private hospitals and day hospital facilities.
The rate and number of admissions is the average per annum over three years.
There is variation in administrative practices as to whether patients who attend emergency departments are admitted. This may influence the results for this item.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

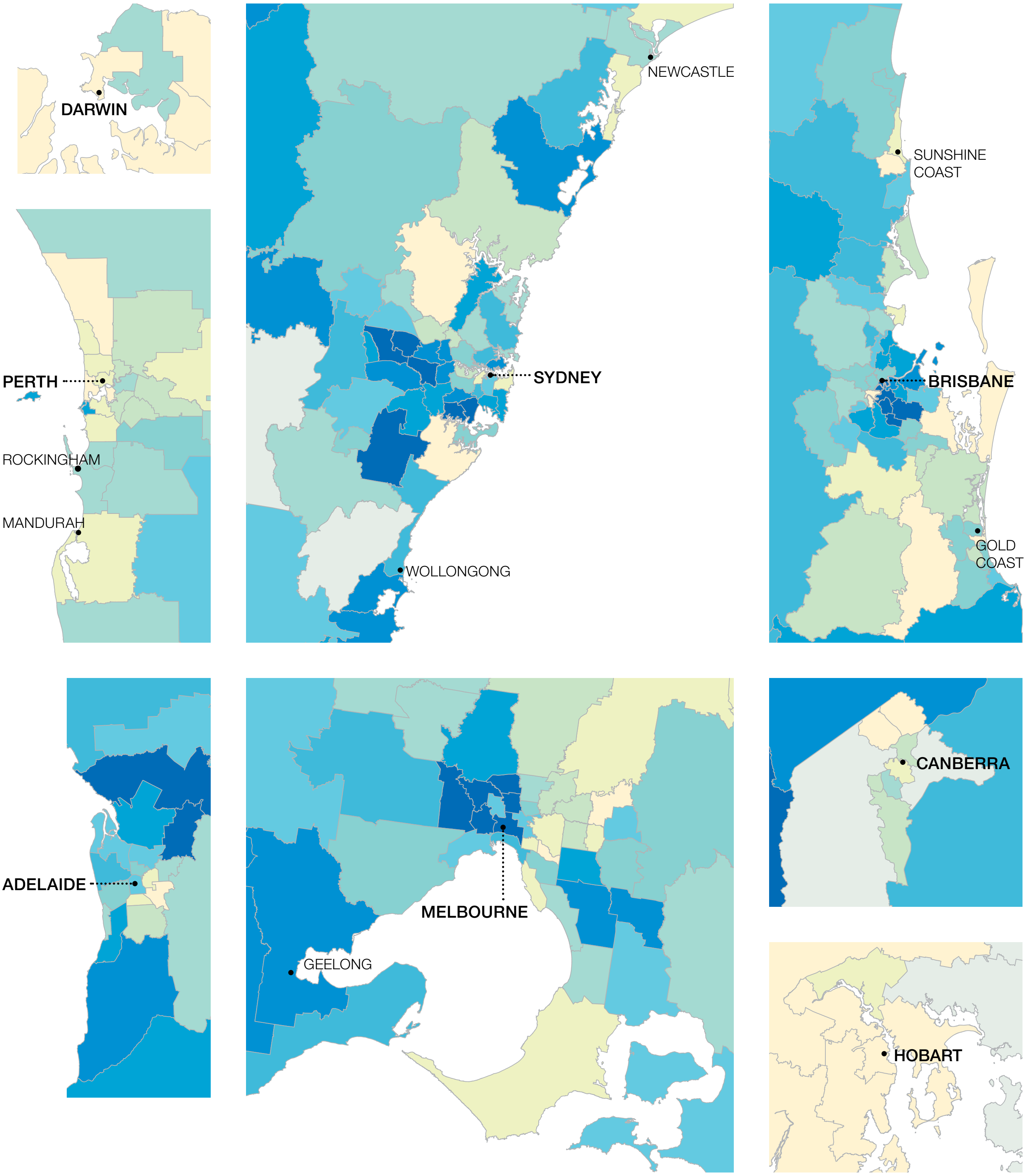
Asthma and related respiratory hospital admissions 3–19 years

Figure 120: Estimated annual number of asthma and related respiratory admissions to hospital per 100,000 people aged 3 to 19 years, age standardised, by local area, 2010–11 to 2012–13



Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The estimated annual number of asthma and related respiratory admissions to hospital across 323 local areas (SA3s) ranged from 61 to 651 per 100,000 people aged 3 to 19 years. The number of admissions was **10.7 times higher** in the area with the highest rate compared to the area with the lowest rate.

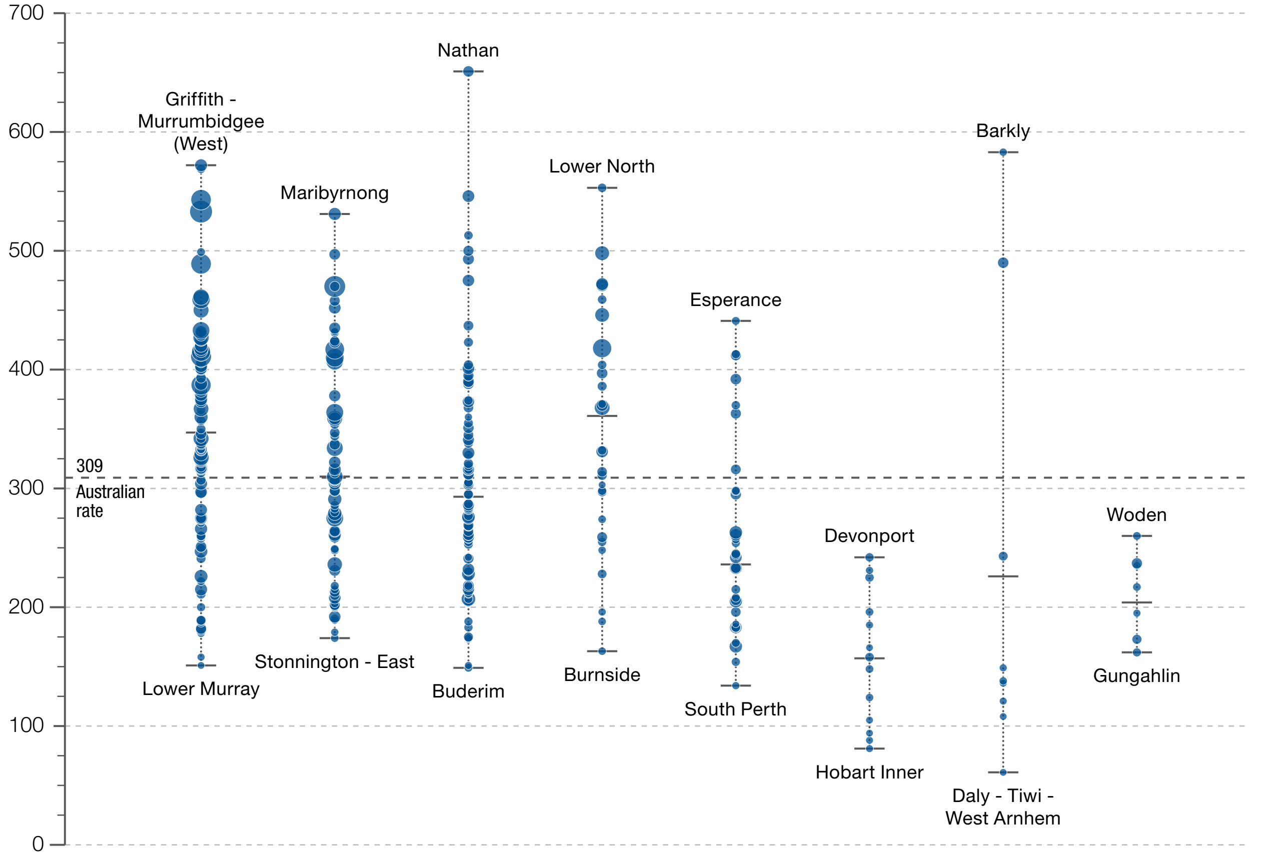


Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma and related respiratory hospital admissions 3–19 years

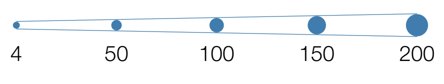
Figure 121: Estimated annual number of asthma and related respiratory admissions to hospital per 100,000 people aged 3 to 19 years, age standardised, by local area, state and territory, 2010–11 to 2012–13

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	572	531	651	553	441	242	583	260
State/territory	347	310	293	361	236	157	226	204
Lowest rate	151	174	149	163	134	81	61	162
No. admissions	5,456	3,647	3,039	1,206	1,257	171	136	159



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

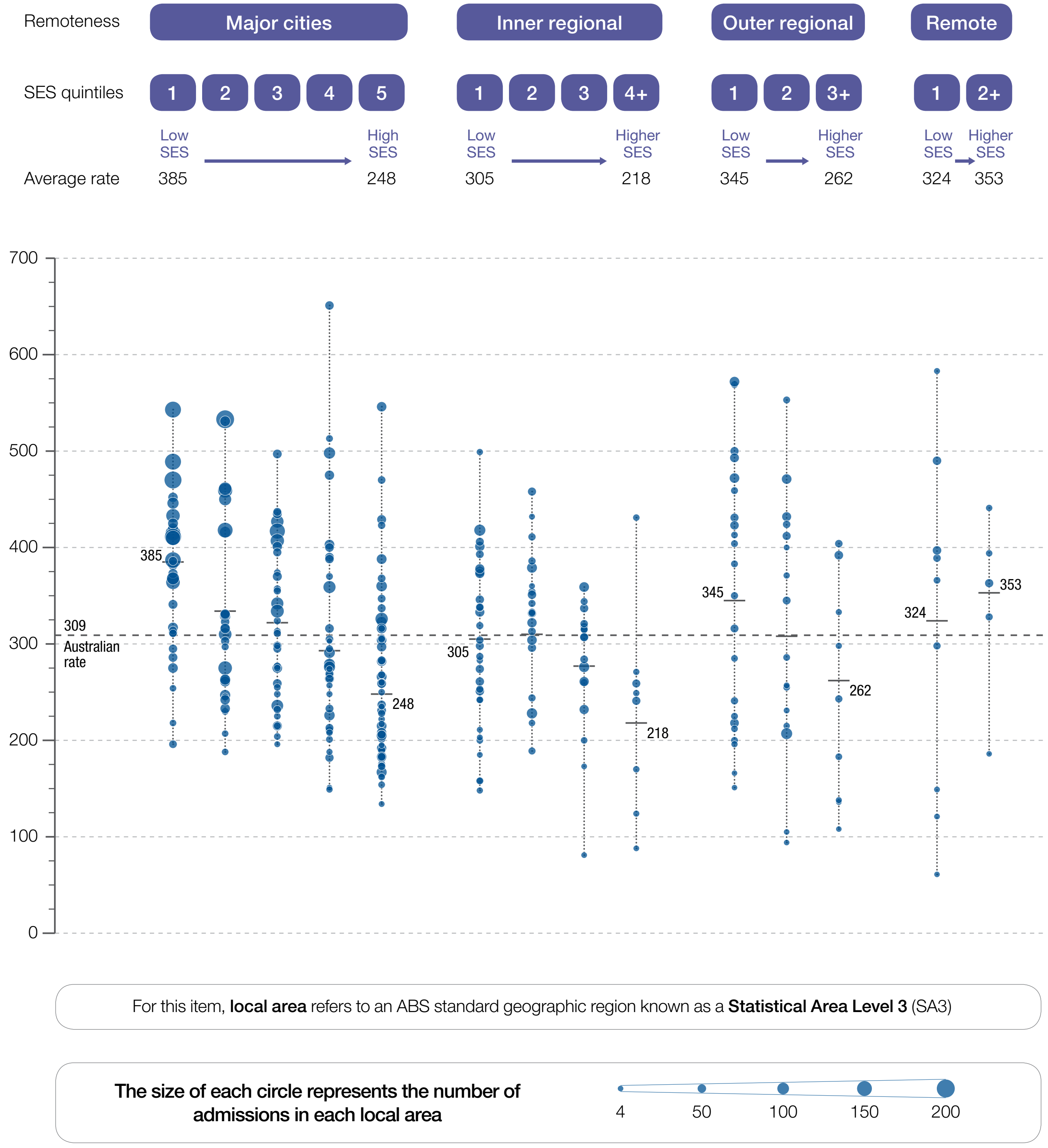
The size of each circle represents the number of admissions in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 122: Estimated annual number of asthma and related respiratory admissions to hospital per 100,000 people aged 3 to 19 years, age standardised, by local area, remoteness and socioeconomic status (SES), 2010–11 to 2012–13



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of admissions and people in Australia.
Average rates are based on the total number of admissions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma and related respiratory hospital admissions 3–19 years

Resources

- NSW Ministry of Health. *NSW Health policy infants and children – acute management of bronchiolitis*. 2012. Available at www.health.nsw.gov.au/policies/pd/2012/pdf/PD2012_004.pdf.

- Royal Children's Hospital Melbourne. *Clinical practice guidelines asthma acute*. 2015. Available at: www.rch.org.au/clinicalguide/guideline_index/Asthma_Acute/.

1 Australian Centre for Asthma Monitoring. Asthma in Australian children: findings from growing up in Australia, the longitudinal study of Australian children. Cat. no. ACM 17. Canberra: AIHW, 2009.
2 Yanney M, Vyas H. The treatment of bronchiolitis. Arch Dis Child 2008;Sep;93(9):793–8.
3 Australian Bureau of Statistics. Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012–13. Cat. No. 4727.0.55.001. Canberra: ABS, 2013.
4 Kozyrskyj AL, Kendall GE, Jacoby P, Sly PD, Zubrick SR. Association between socioeconomic status and the development of asthma: analyses of income trajectories. AJPH 2010;100(3):540–6.
5 Christakis DA, Mell L, Koepsell TD, Zimmerman FJ, Connell FA. Association of lower continuity of care with greater risk of emergency department use and hospitalization in children. Pediatrics Vol. 103 no. 3. March 2001;524–9.
6 Rasmussen F, Taylor DR, Flannery EM, Cowan JO, Greene JM, Herbison GP et al. Risk factors for hospital admission or asthma from childhood to young adulthood: a longitudinal population study. Journal of Allergy and Clinical immunology 2002;110(2):220–7.

6.5 Asthma hospital admissions 20–44 years

Context

This data item examines hospital admission rates for asthma for people aged 20 to 44 years. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set. This includes both public and private hospitals. Rates are described as the number of admissions per 100,000 people. Repeat admissions for one person and transfers to other hospitals are both counted as separate admissions.

Asthma is an inflammatory condition of the airways characterised by reversible airway obstruction and bronchospasms, causing episodes of wheezing, breathlessness, coughing and chest tightness.

Emergency presentations to hospital for asthma are reasonably frequent but admissions are less so, as most symptoms are managed in the home through medicine and primary healthcare interventions.

Asthma exacerbations range in severity, with most being mild to moderate. Evidence suggests that adhering to inhaled preventer medicines reduces the frequency and severity of exacerbations. Severe, life-threatening exacerbations require emergency treatment and usually admission to hospital.

Asthma hospital admissions 20–44 years

A number of factors contribute to hospitalisation rates including:

- the severity of the exacerbation
- smoking prevalence
- asthma prevalence – the total number of asthma cases that exist in the community
- the appropriateness of asthma management, especially adherence to preventer medicines
- access to primary healthcare, hospital alternatives and emergency services
- hospital admission practices such as decisions about whether to admit patients or treat them as outpatients
- hospital bed availability
- the presence of co-morbidities that complicate management and increase the likelihood of hospitalisation, such as obesity and cardiovascular disease
- patient factors, such as the availability of carers and compliance with treatment.

Magnitude of variation

From 2010–11 to 2012–13, there were 6,558 asthma admissions to hospital on average per annum, representing 81 admissions per 100,000 people aged 20 to 44 years (the Australian rate).

The estimated annual number of asthma admissions to hospital across 310* local areas (SA3s) ranged from 18 to 530 per 100,000 people aged 20 to 44 years. The number of admissions was **29.4 times higher** in the area with the highest rate compared to the area with the lowest rate. The estimated annual average number of admissions varied across states and territories, from 54 per 100,000 people aged 20 to 44 years in Tasmania, to 124 in the Northern Territory.

After excluding the highest and lowest results, the asthma hospital admission rate across the 292 remaining local areas was **8.0 times higher** in one local area compared to another.

Hospital admission rates for asthma tended to be higher in remote areas. Some socioeconomic patterns were seen across all categories of remoteness, with admission rates highest in areas of low socioeconomic status and decreasing as socioeconomic status increased.

Interpretation

The number of admissions was relatively small at the local level, increasing the likelihood that the variations were due to chance. Other potential reasons for the variation include differences in:

- the distribution of populations with high rates of asthma, particularly Aboriginal and Torres Strait Islander peoples, who are almost twice as likely as non-Indigenous people to report having asthma[1] and twice as likely to be hospitalised for asthma[2]
- levels of poorly controlled asthma, which has been observed in about 15 to 25 per cent of patients.[3] Causes include not adhering to medicines; reduced prescribing of and/or adherence to regular preventer medicines; and overuse of reliever medicines, which are available over the counter at pharmacies
- geographical airborne allergens, particulate matter and cold weather extremes, which can trigger asthma attacks despite best-practice medicine use
- smoking rates
- structural reasons, such as unavailability of hospitals for treatment in remote areas.

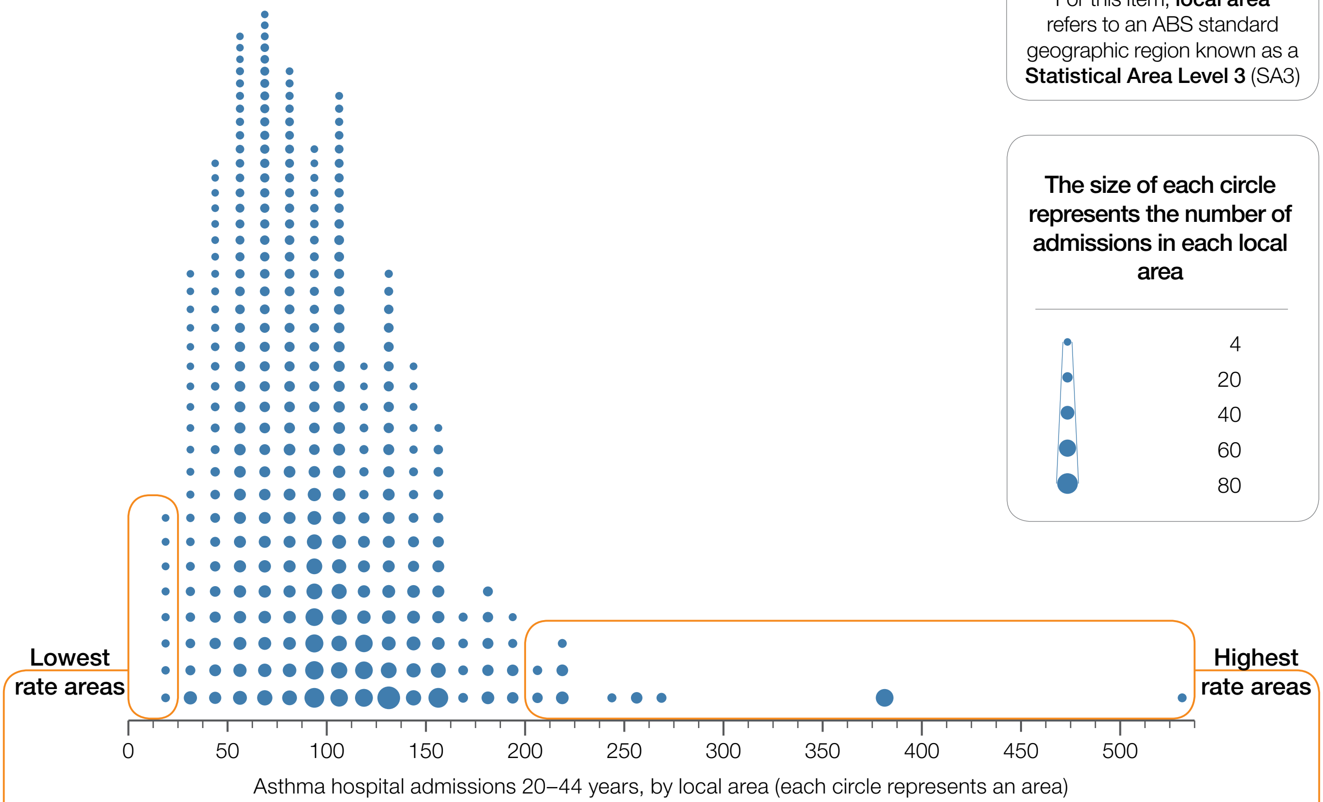
To explore this variation, further analysis could focus on:

- the differences between states and territories
- access to primary care services in remote areas, where the admission rates are higher.

*There are 333 SA3s. For this item, data were suppressed for 23 SA3s. This is because of confidentiality requirements given the small numbers of admissions in these areas.

Figure 123: Estimated annual number of asthma admissions to hospital per 100,000 people aged 20 to 44 years, age standardised, by local area, 2010–11 to 2012–13

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)



Local area	State	Rate	Admissions
Eastern Suburbs - North	NSW	18	11
Sherwood - Indooroopilly	Qld	18	5
Chatswood - Lane Cove	NSW	19	8
North Sydney - Mosman	NSW	20	8
Baulkham Hills	NSW	21	9
Hornsby	NSW	22	6
Ku-ring-gai	NSW	24	7
Launceston	Tas	24	6

Local area	State	Rate	Admissions
Barkly	NT	530	12
Alice Springs	NT	383	63
Bribie - Beachmere	Qld	271	18
Fleurieu - Kangaroo Island	SA	253	27
Yorke Peninsula	SA	245	13
Burnett	Qld	224	28
Lower North	SA	222	12
Kimberley	WA	217	34
Mid North	SA	208	15
Innisfail - Cassowary Coast	Qld	208	21

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).

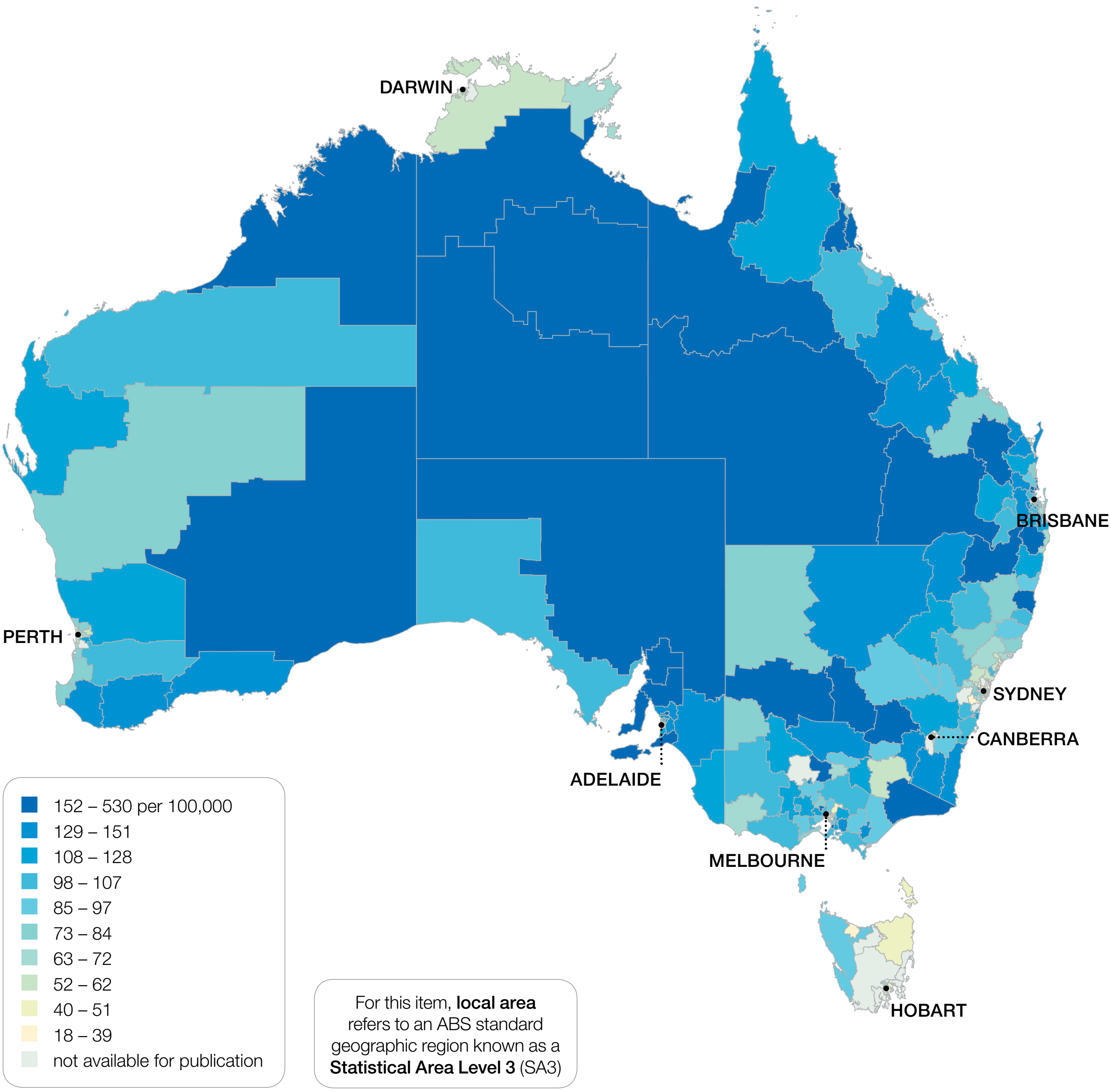
Includes all public hospitals, private hospitals and day hospital facilities.
The rate and number of admissions is the average per annum over three years.
There is variation in administrative practices as to whether patients who attend emergency departments are admitted. This may influence the results for this item.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma hospital admissions 20–44 years

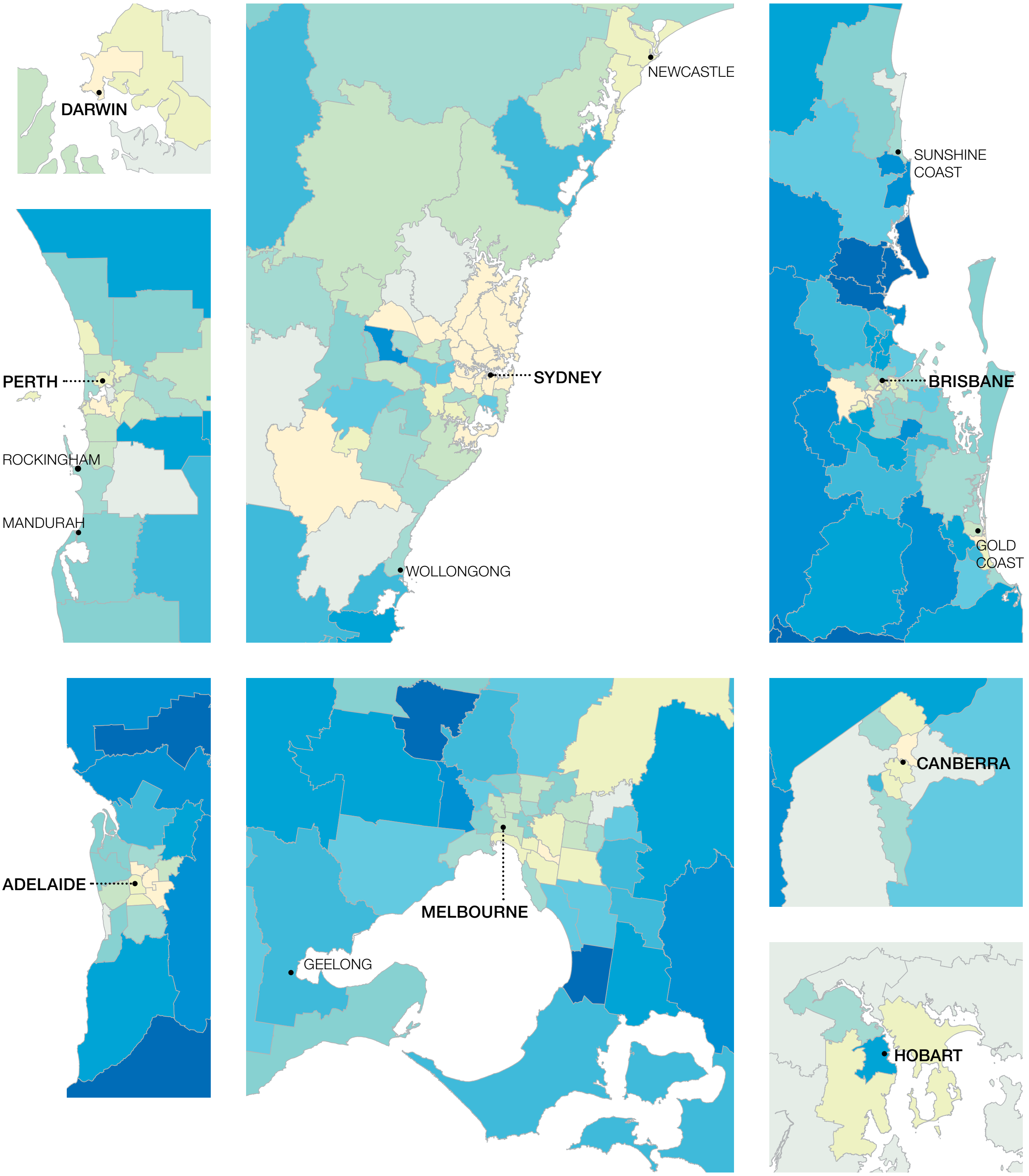
Figure 124: Estimated annual number of asthma admissions to hospital per 100,000 people aged 20 to 44 years, age standardised, by local area, 2010–11 to 2012–13



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The estimated annual number of asthma admissions to hospital across 310 local areas (SA3s) ranged from 18 to 530 per 100,000 people aged 20 to 44 years. The number of admissions was **29.4 times higher** in the area with the highest rate compared to the area with the lowest rate.

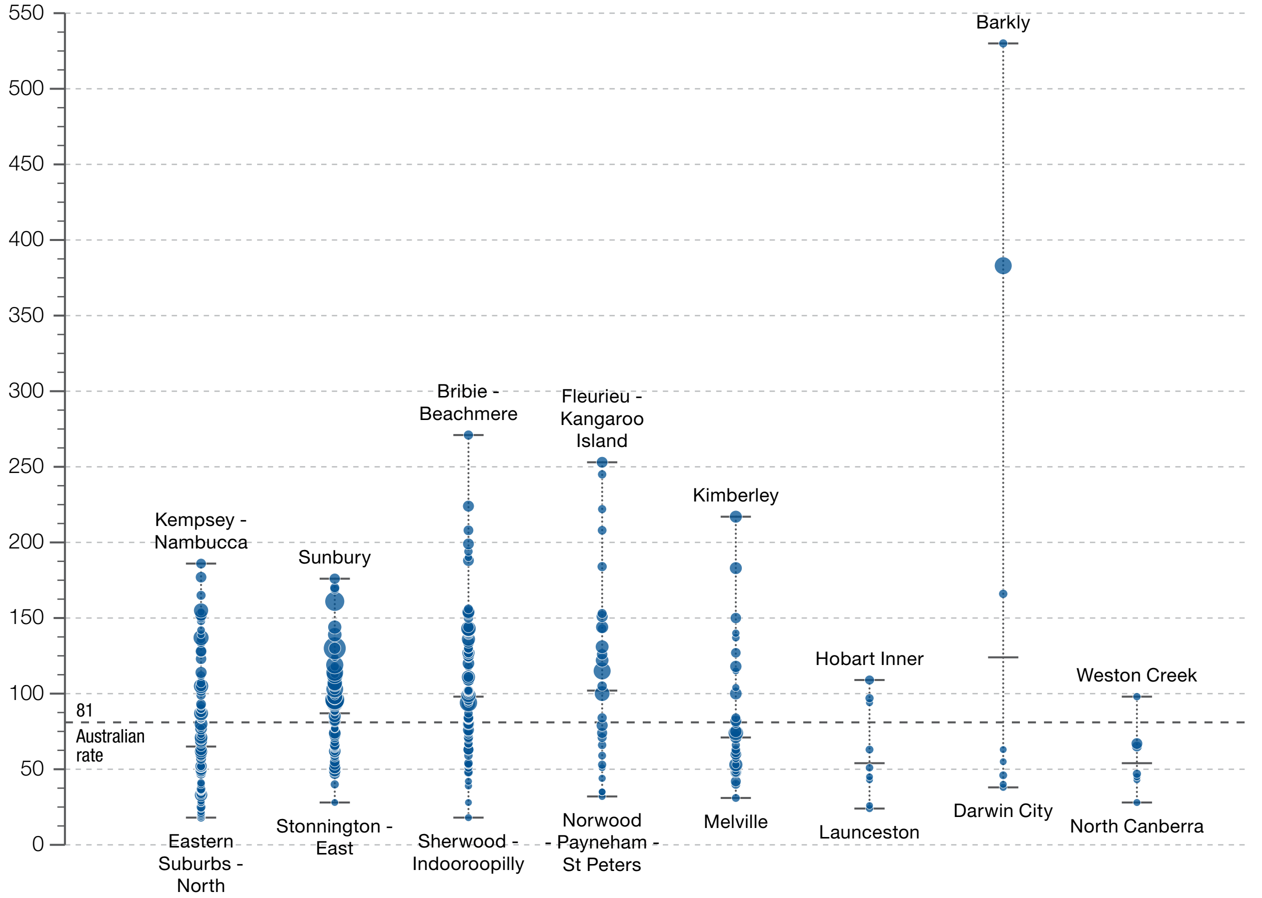


Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma hospital admissions 20–44 years

Figure 125: Estimated annual number of asthma admissions to hospital per 100,000 people aged 20 to 44 years, age standardised, by local area, state and territory, 2010–11 to 2012–13

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	186	176	271	253	217	109	530	98
State/territory	65	87	98	102	71	54	124	54
Lowest rate	18	28	18	32	31	24	38	28
No. admissions	1,652	1,788	1,576	563	637	82	117	83



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

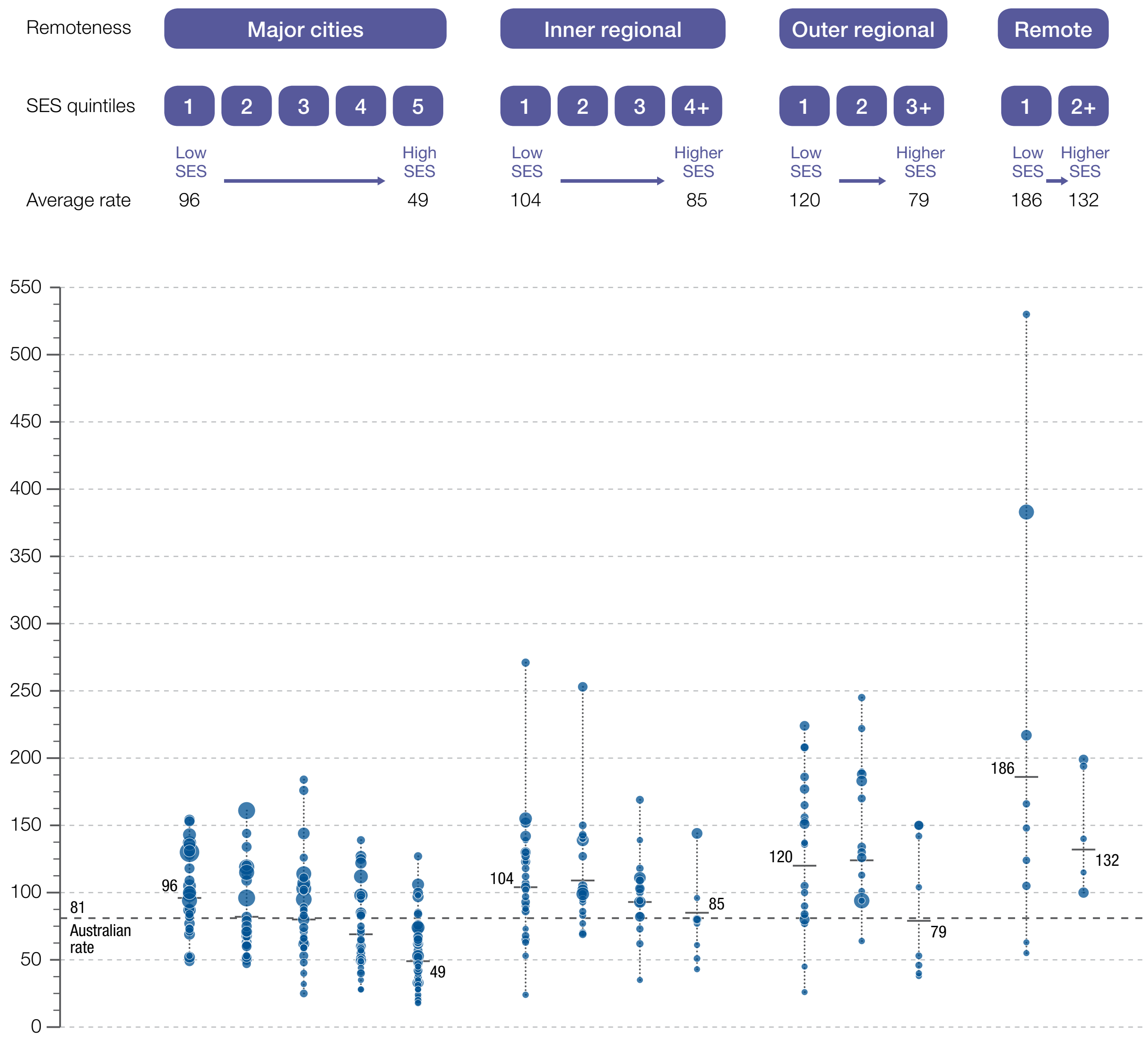
The size of each circle represents the number of admissions in each local area

4 20 40 60 80

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 126: Estimated annual number of asthma admissions to hospital per 100,000 people aged 20 to 44 years, age standardised, by local area, remoteness and socioeconomic status (SES), 2010–11 to 2012–13



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of admissions in each local area

4 20 40 60 80

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of admissions and people in Australia.
Average rates are based on the total number of admissions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Sets from 2010–11 to 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma hospital admissions 20–44 years

Resources

- Australian Institute of Health and Welfare. *Asthma hospitalisations in Australia 2010–11*. 2013. Available at: www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129544536.

- Australian Institute of Health and Welfare. *Geographic distribution of asthma and chronic obstructive pulmonary disease hospitalisations in Australia, 2007–08 to 2009–10*. 2013. Available at: www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129542788.

1 Jenkins CR, Chang AB, Poulos LM, Marks GB. Asthma in Indigenous Australians: so much yet to do for Indigenous lung health. Mind the Gap. MJA 2009. Vol. 190. No. 10.
2 Australian Bureau of Statistics. Australian Aboriginal and Torres Strait Islander health survey: first results, Australia, 2012–13. Cat. No. 4727.0.55.001. Canberra: ABS, 2013.
3 Woolcock Institute of Medical Research. Asthma control in Australia 1990–2011. 21 years since the introduction of asthma management guidelines – where are we now? Sydney: Woolcock Institute of Medical Research, University of Sydney, 2013.

6.6 Asthma and chronic obstructive pulmonary disease hospital admissions 45 years and over

Context

This data item examines hospital admission rates for asthma and chronic obstructive pulmonary disease (COPD) for people aged 45 years and over. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set. This includes both public and private hospitals. Rates are described as the number of admissions per 100,000 people. Repeat admissions for one person and transfers to other hospitals are both counted as separate admissions.

Asthma is an inflammatory condition of the airways characterised by reversible airway obstruction and bronchospasms, causing episodes of wheezing, breathlessness, coughing and chest tightness.

COPD is a serious long-term lung disease. The term COPD encompasses chronic bronchitis and emphysema. It is characterised by airway narrowing that is not fully reversible with treatment. Symptoms include shortness of breath, coughing, phlegm and wheezing.

Presentations to hospital for asthma are reasonably frequent but admission is rarely required, as most symptoms are managed in the home through medication and primary healthcare interventions. In people aged 55 years and over most admissions are for COPD[1], with smaller numbers for asthma.

Patients with COPD may require hospital admission for severe exacerbations, which are most frequently caused by infections of the respiratory tract or the tracheobronchial tree. Potential indications for hospital admission for COPD include:

- a marked increase in the intensity of symptoms
- severe underlying COPD
- the onset of new physical signs, such as cyanosis and peripheral oedema
- initial medical treatments failing to relieve the exacerbation
- the presence of serious co-morbidities such as heart failure.[2]

Evidence shows that, despite early diagnosis of COPD improving outcomes, rates of under-diagnosis and misdiagnosis are high in Australia.[3]

Asthma and chronic obstructive pulmonary disease hospital admissions 45 years and over

Magnitude of variation

In 2012–13, there were 70,932 asthma and COPD admissions to hospital, representing 759 admissions per 100,000 people aged 45 years and over (the Australian rate).

The number of asthma and COPD admissions to hospital across 325* local areas (SA3s) ranged from 201 to 3,893 per 100,000 people aged 45 years and over. The number of admissions was **19.4 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of admissions varied across states and territories, from 620 per 100,000 people aged 45 years and over in the Australian Capital Territory, to 1,685 in the Northern Territory.

After excluding the highest and lowest results, the asthma and COPD hospital admission rate across the 309 remaining local areas was **5.3 times higher** in one local area compared to another.

A strong trend was seen towards higher hospital admission rates for asthma and COPD in remote areas. Socioeconomic patterning was also noted across all categories of remoteness, with admission rates highest in areas of low socioeconomic status and decreasing as socioeconomic status increased.

Interpretation

Potential reasons for the variation include differences in:

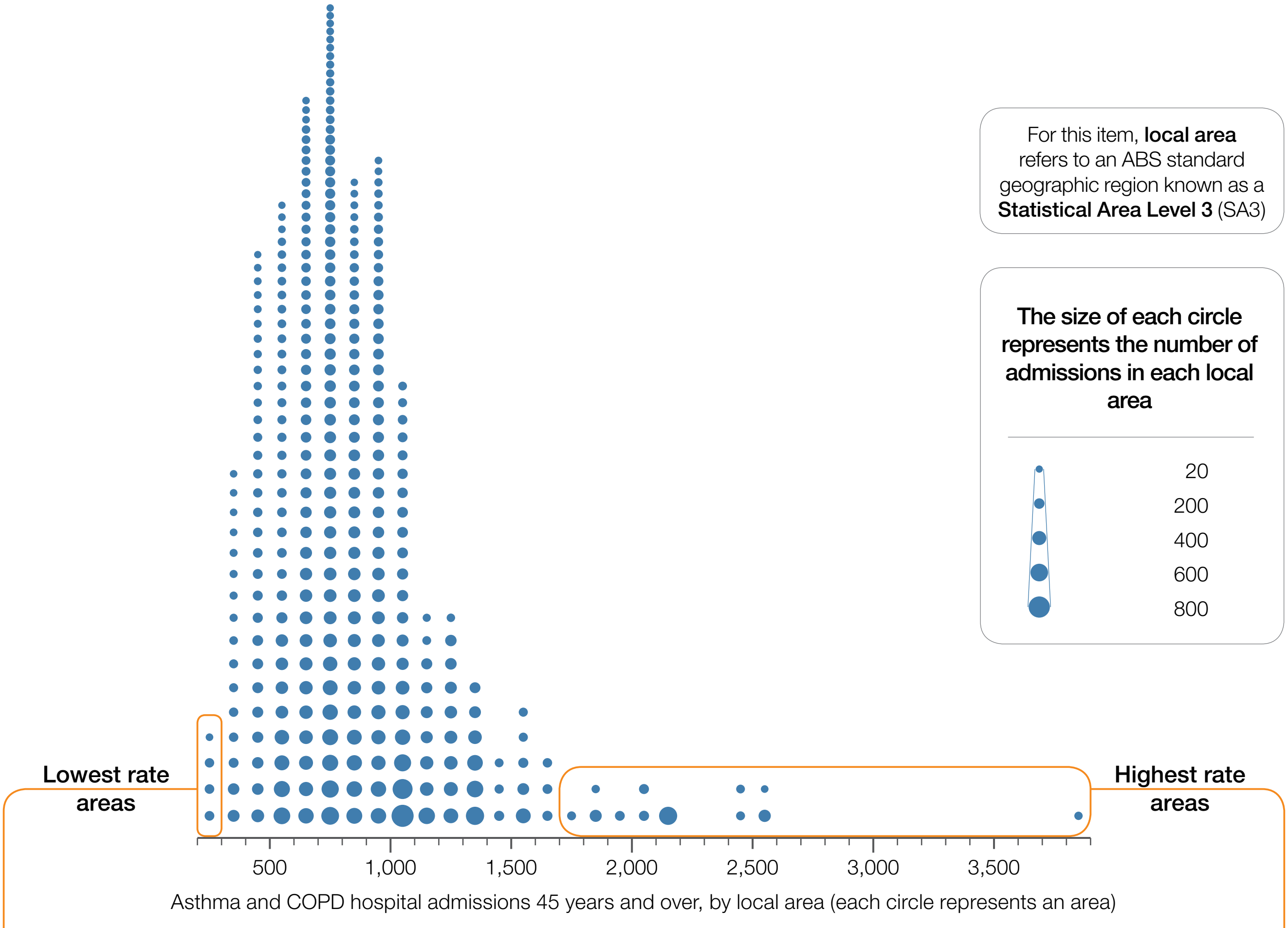
- the distribution of populations with high rates of asthma and COPD, particularly among Aboriginal and Torres Strait Islander people
- the distribution of Indigenous peoples who have higher rates of bronchiectasis[4] resulting in increased hospital admission rates. This may account for the higher numbers in the Northern Territory and remote locations
- smoking rates
- availability of pulmonary rehabilitation services, especially in rural areas. COPD patients with shortness of breath when walking benefit from attending pulmonary rehabilitation programs, which can improve exercise tolerance and reduce fatigue and shortness of breath.[2] Pulmonary rehabilitation programs are also shown to reduce hospitalisation
- degrees of adherence to preventer medicines for asthma
- geographical airborne allergens, particulate matter and cold weather extremes, which can trigger asthma attacks despite best-practice medicine use.

To explore this variation, further analysis could focus on:

- whether the variation in admissions in rural and remote locations is due to lower access to pulmonary rehabilitation services.

*There are 333 SA3s. For this item, data were suppressed for 8 SA3s. This is because of confidentiality requirements given the small numbers of admissions in these areas.

Figure 127: Number of asthma and COPD admissions to hospital per 100,000 people aged 45 years and over, age standardised, by local area, 2012–13



Local area	State	Rate	Admissions
Pennant Hills - Epping	NSW	201	42
Ku-ring-gai	NSW	211	143
Melville	WA	285	152
Eastern Suburbs - North	NSW	296	157

Local area	State	Rate	Admissions
East Arnhem	NT	3,893	82
Bourke - Cobar - Coonamble	NSW	2,586	300
Barkly	NT	2,585	42
Daly - Tiwi - West Arnhem	NT	2,472	117
Katherine	NT	2,469	106
Mount Druitt	NSW	2,132	628
Far North	Qld	2,090	173
Alice Springs	NT	2,016	183
Kimberley	WA	1,907	165
St Marys	NSW	1,865	290
Palmerston	NT	1,811	83
Loddon - Elmore	Vic	1,795	116

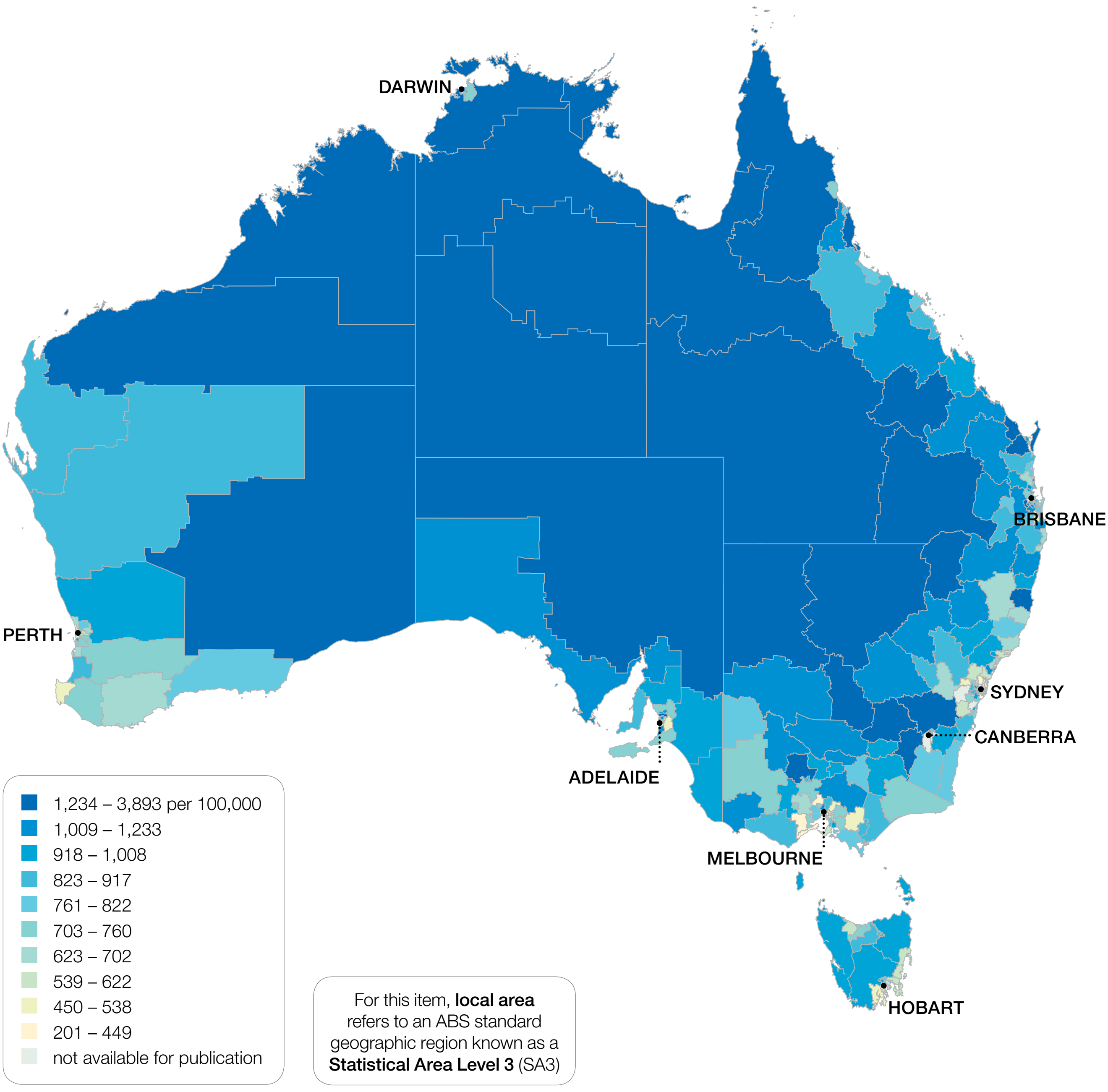
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
Includes all public hospitals, private hospitals and day hospital facilities.
There is variation in administrative practices as to whether patients who attend emergency departments are admitted. This may influence the results for this item.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

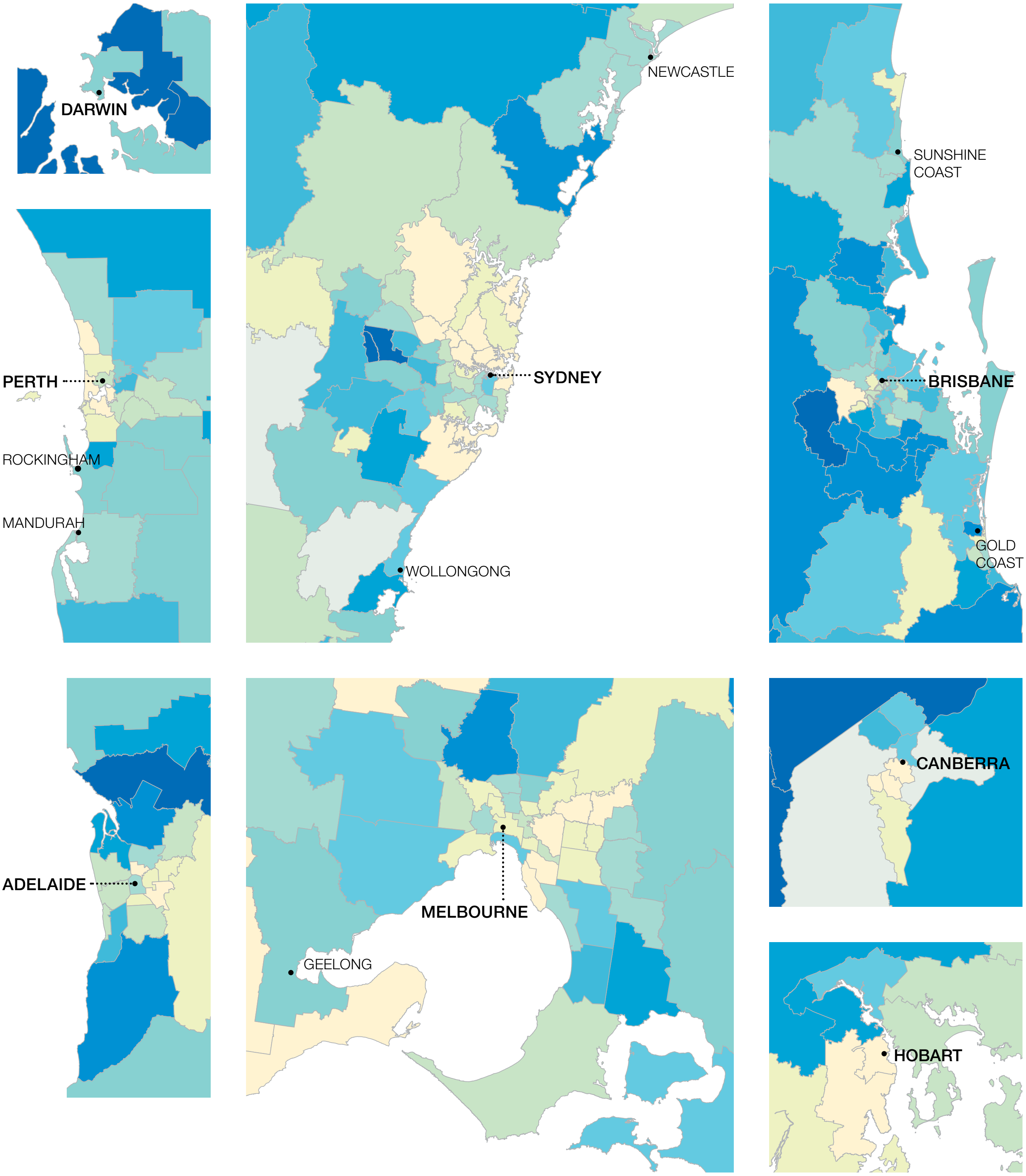
Asthma and chronic obstructive pulmonary disease hospital admissions 45 years and over

Figure 128: Number of asthma and COPD admissions to hospital per 100,000 people aged 45 years and over, age standardised, by local area, 2012–13



Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of asthma and COPD admissions to hospital across 325 local areas (SA3s) ranged from 201 to 3,893 per 100,000 people aged 45 years and over. The number of admissions was **19.4 times higher** in the area with the highest rate compared to the area with the lowest rate.

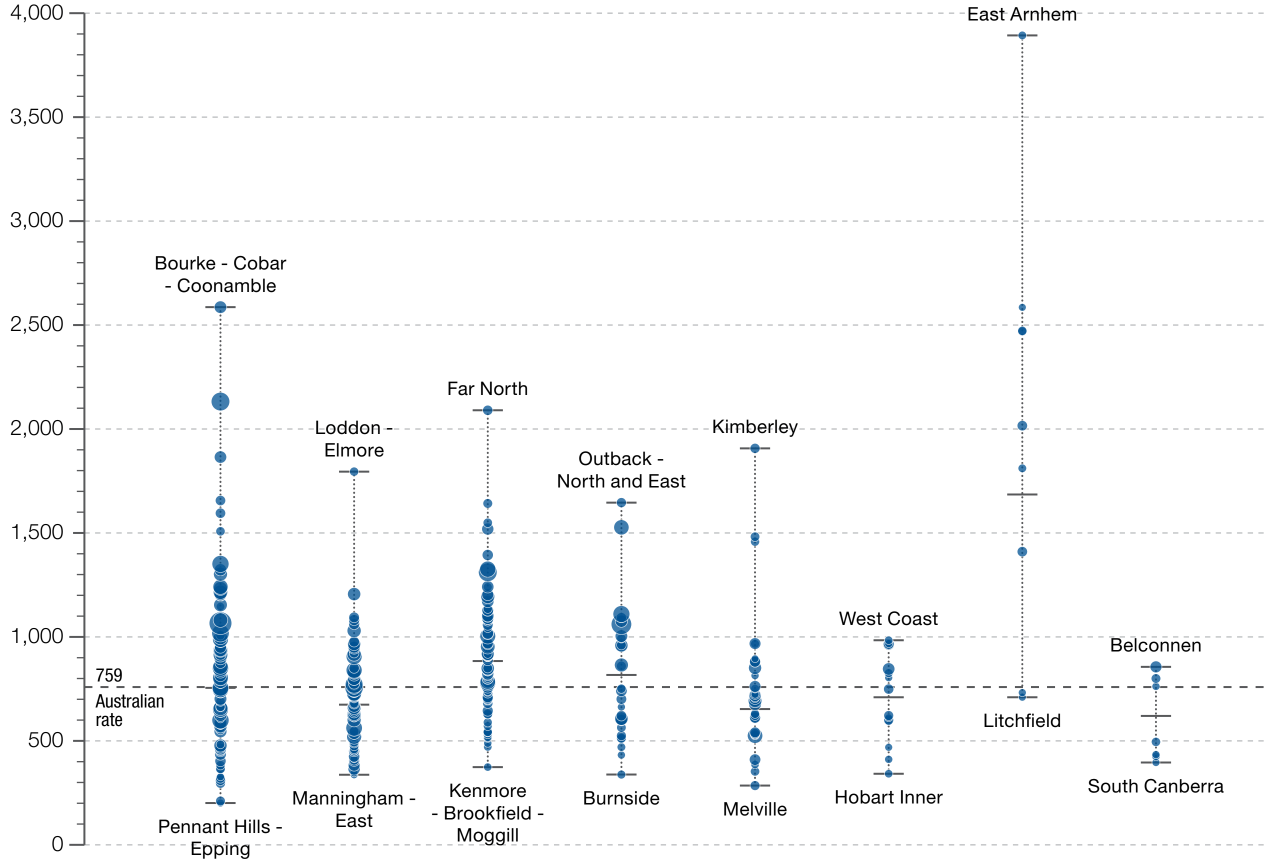


Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma and chronic obstructive pulmonary disease hospital admissions 45 years and over

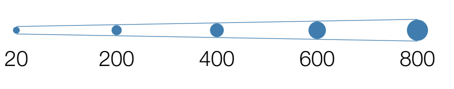
Figure 129: Number of asthma and COPD admissions to hospital per 100,000 people aged 45 years and over, age standardised, by local area, state and territory, 2012–13

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	2,586	1,795	2,090	1,646	1,907	984	3,893	856
State/territory	755	674	884	817	653	710	1,685	620
Lowest rate	201	337	374	338	285	342	710	396
No. admissions	23,655	15,897	15,665	6,336	5,856	1,702	885	758



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

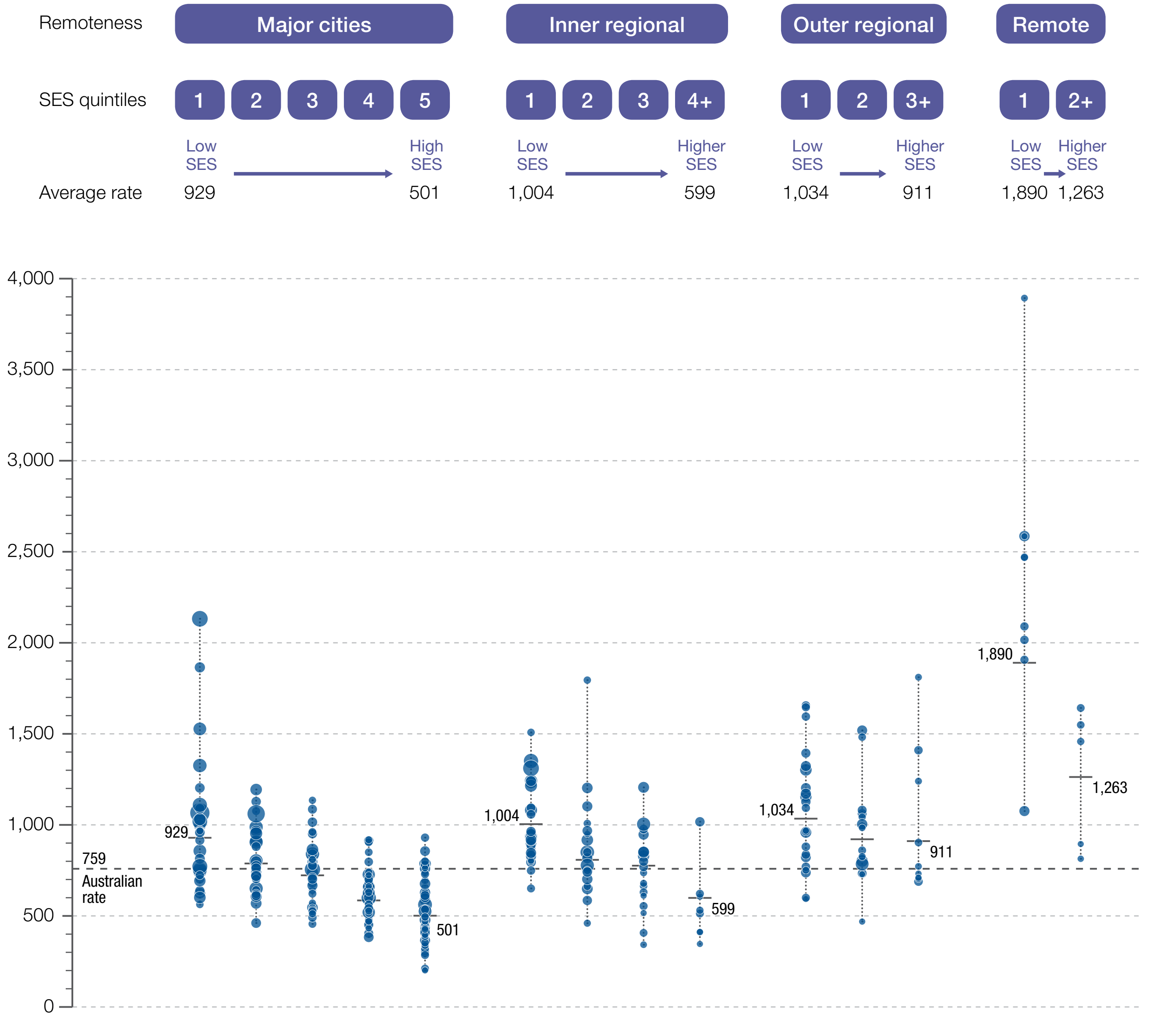
The size of each circle represents the number of admissions in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 130: Number of asthma and COPD admissions to hospital per 100,000 people aged 45 years and over, age standardised, by local area, remoteness and socioeconomic status (SES), 2012–13



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of admissions in each local area

20 200 400 600 800

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of admissions and people in Australia.
Average rates are based on the total number of admissions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Asthma and chronic obstructive pulmonary disease hospital admissions 45 years and over

Resources

- Australian Institute of Health and Welfare. *Geographic distribution of asthma and chronic obstructive pulmonary disease hospitalisations in Australia*. 2013. Available at: www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129542788.

- Australian Centre for Asthma Monitoring, Australian Institute of Health and Welfare. *Asthma in Australia*. Asthma series no. 4. Cat. no. ACM 22. 201. Available at: www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=601295446771

- Lung Foundation Australia and the Thoracic Society of Australia and New Zealand. *The COPD-X plan Australian and New Zealand guidelines for the management of chronic obstructive pulmonary disease*. 2014. Available at: www.copdx.org.au/.

1 Australian Institute of Health and Welfare. Geographic distribution of asthma and chronic obstructive pulmonary disease hospitalisations in Australia, 2007–08 to 2009–10. Cat. no. ACM 26. Canberra: AIHW,2013
2 Global Initiative for Chronic Obstructive Lung Disease. Global strategy for the diagnosis, management and prevention of COPD. GOLD, 2015.
3 The Australian Lung Foundation. The Australian Lung Foundation position paper use of COPD screening devices in the community. Milton: The Australian Lung Foundation, 2011.
4 Australian Institute of Health and Welfare. Coronary heart disease and chronic obstructive pulmonary disease in Indigenous Australians. Cat. no. AIHW 126. Canberra: AIHW, 2014.

6.7 Heart failure hospital admissions 40 years and over

Context

This data item examines hospital admission rates for heart failure for people 40 years and over. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set. This includes both public and private hospitals. Rates are described as the number of admissions per 100,000 people. Repeat admissions for one person and transfers to other hospitals are both counted as separate admissions.

Heart failure refers to a clinical syndrome caused by underlying cardiac disease. The most common types of cardiac disease include coronary heart disease, hypertension, cardiomyopathy and valvular heart disease. Of these, coronary heart disease (usually accompanied by a history of heart attacks) is the most common.

A typical symptom of heart failure is shortness of breath, which may be associated with signs of congestion (fluid in the lungs, legs or abdomen). This is usually the result of abnormal functioning of the left ventricle, the heart's main pumping chamber.

Accurate diagnosis and early detection are important. The management of patients with heart failure aims to relieve symptoms and slow disease progression. This can reduce exacerbations, decrease hospitalisation and prolong survival.

Heart failure patients are at a particularly high risk of being readmitted to hospital. Coordinated management programs aim to reduce admission rates.

Effective management of heart failure involves multidisciplinary care across the acute and primary care sectors, and involves a combination of strategies including:

- non-pharmacological approaches (for example, physical activity programs and dietary or fluid management protocols)
- pharmacotherapy (for example, taking diuretics, angiotensin-converting enzyme inhibitors and beta blockers)
- surgical procedures and supportive devices (for example, coronary artery bypass graft surgery or cardiac resynchronisation therapy with or without insertion of an implantable cardiac defibrillator)

Heart failure hospital admissions 40 years and over

- community heart failure management programs (for example, home- or clinic-based multidisciplinary interventions)
- palliative care (for example, advanced care directives specifying withdrawing defibrillator therapy at the end of life).

Magnitude of variation

In 2012–13, there were 50,983 heart failure admissions to hospital, representing 432 admissions per 100,000 people aged 40 years and over (the Australian rate).

The number of heart failure admissions to hospital across 322* local areas (SA3s) ranged from 192 to 1,397 per 100,000 people aged 40 years and over. The number of admissions was **7.3 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of admissions varied across states and territories, from 347 per 100,000 people aged 40 years and over in the Australian Capital Territory, to 705 in the Northern Territory.

After excluding the highest and lowest results, the heart failure hospital admission rate across the 300 remaining local areas was **2.7 times higher** in one local area compared to another.

Hospital admission rates were markedly higher in remote areas. Admission rates were also higher in outer regional areas than in inner regional areas and major cities, and were highest in areas of low socioeconomic status.

Interpretation

Potential reasons for the variation include differences in:

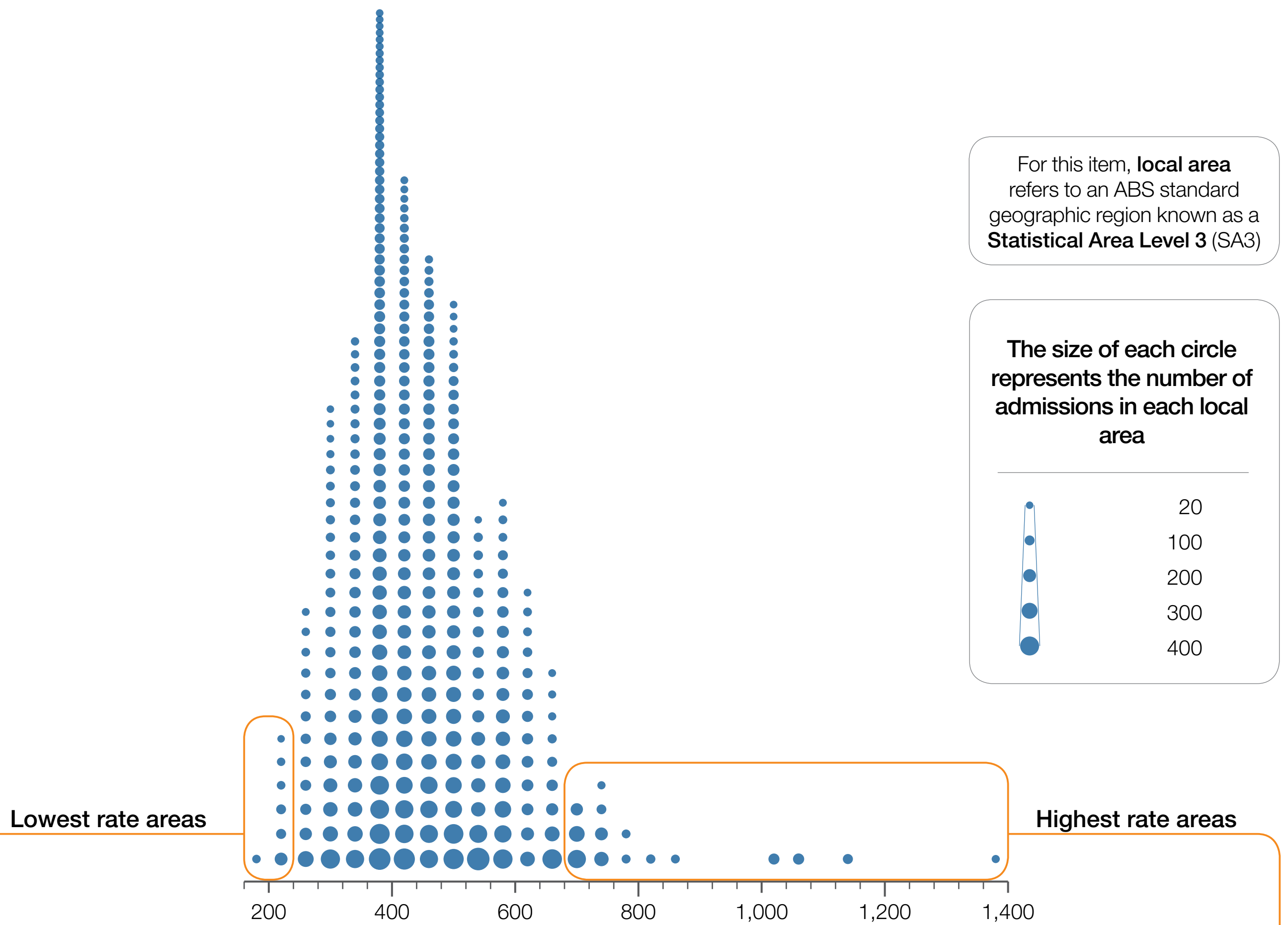
- hospital readmission rates, as readmission is common among heart failure patients. The quality of both hospital and community care has a significant impact on health outcomes and can be affected by sub-optimal communication between clinicians, and poor medicine adherence. The data do not distinguish between first admission and readmissions, because individual patient identifiers were not used in the analysis
- the distribution of Aboriginal and Torres Strait Islander peoples, who are 1.7 times more likely to have heart failure[1] and three or more times more likely than non-Indigenous people to be admitted to hospital for heart failure[1]
- socioeconomic status as heart failure appears to be more prevalent among people living in lower socioeconomic areas and in rural and remote areas[2]
- access to evidence-based multidisciplinary heart failure services, which has been shown to reduce heart failure hospitalisations.[3] Only some regions in Australia have effective chronic heart failure services and fewer are available in rural locations.[4,5]

To explore this variation, further analysis could focus on:

- using linked data to differentiate between first and subsequent admissions for patients with heart failure, and include data for all causes of readmission, not only those where heart failure was the reason for admission, as this significantly under-represents actual readmissions. The total readmission rate is a more appropriate marker of the overall quality of patient care
- identifying heart failure admission rates in two age cohorts – for example, those aged 40 to 60 and those over 60 years. A New Zealand study found heart failure hospitalisation rates for Maori people were up to five times higher than for non-Maori people among those aged 45 to 64 years[6], while hospitalisation rates for Maori people were twice the rate of non-Maori people among those aged over 65.[7] This may lead to improved health outcomes for Indigenous people.

*There are 333 SA3s. For this item, data were suppressed for 11 SA3s. This is because of confidentiality requirements given the small numbers of admissions in these areas.

Figure 131: Number of heart failure admissions to hospital per 100,000 people aged 40 years and over, age standardised, by local area, 2012–13



Heart failure hospital admissions 40 years and over, by local area (each circle represents an area)

Lowest rate areas

Local area	State	Rate	Admissions
Pennant Hills - Epping	NSW	192	55
North Sydney - Mosman	NSW	205	105
Ku-ring-gai	NSW	221	196
Manly	NSW	227	51
South Perth	WA	228	58
Adelaide City	SA	233	21
Pittwater	NSW	236	98

Highest rate areas

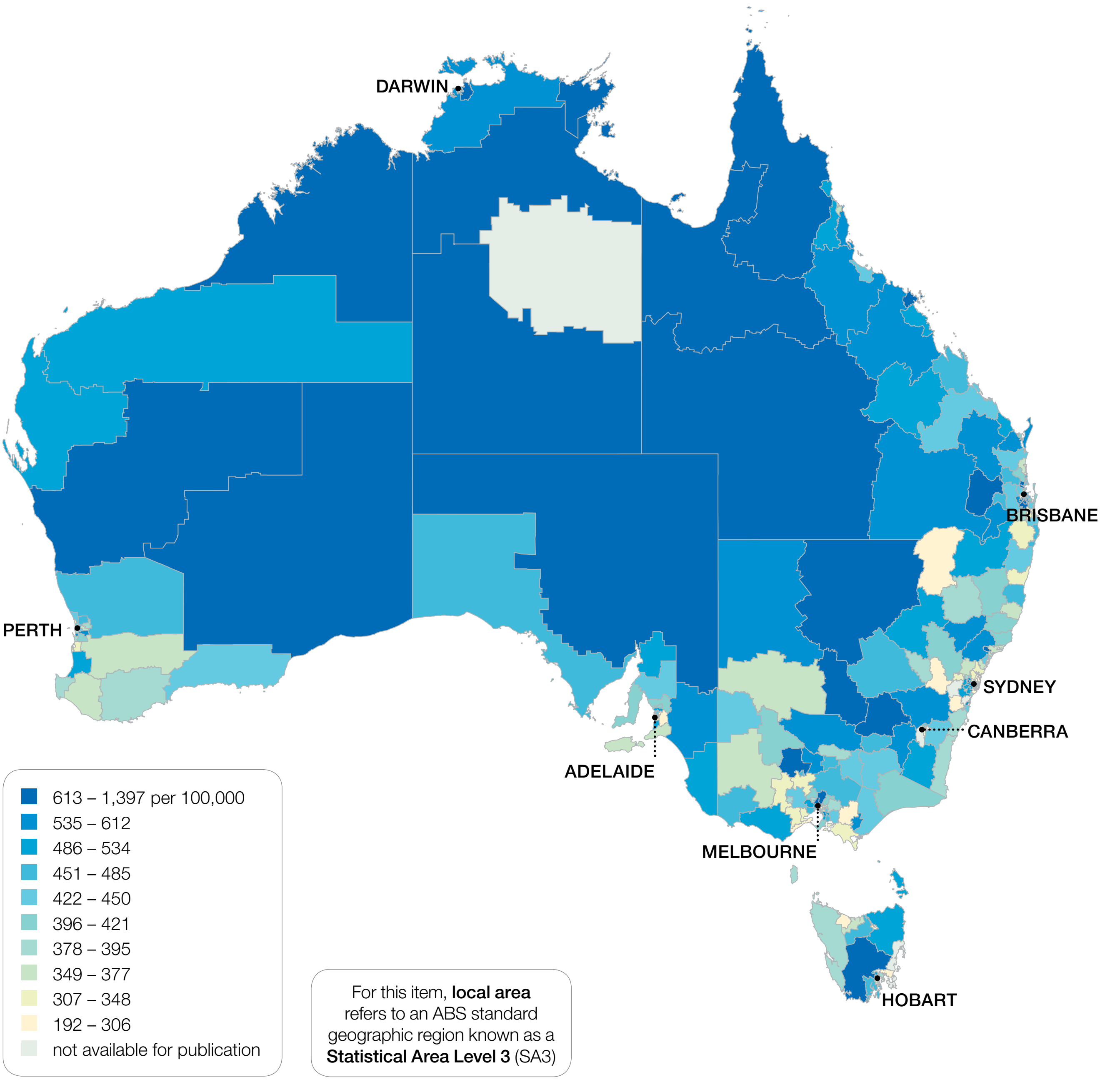
Local area	State	Rate	Admissions
East Arnhem	NT	1,397	41
Outback - North	Qld	1,123	105
Alice Springs	NT	1,071	142
Bourke - Cobar - Coonamble	NSW	1,009	137
Jimboomba	Qld	876	66
Kimberley	WA	807	80
Loddon - Elmore	Vic	779	65
Far North	Qld	763	69
Outback - North and East	SA	755	96
Griffith - Murrumbidgee (West)	NSW	743	197
Katherine	NT	739	43
Mount Druitt	NSW	726	247
Tullamarine - Broadmeadows	Vic	714	292
Wagga Wagga	NSW	704	376
Caboolture	Qld	699	179

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
Includes all public hospitals, private hospitals and day hospital facilities.
There is variation in administrative practices as to whether patients who attend emergency departments are admitted. This may influence the results for this item.
For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Heart failure hospital admissions 40 years and over

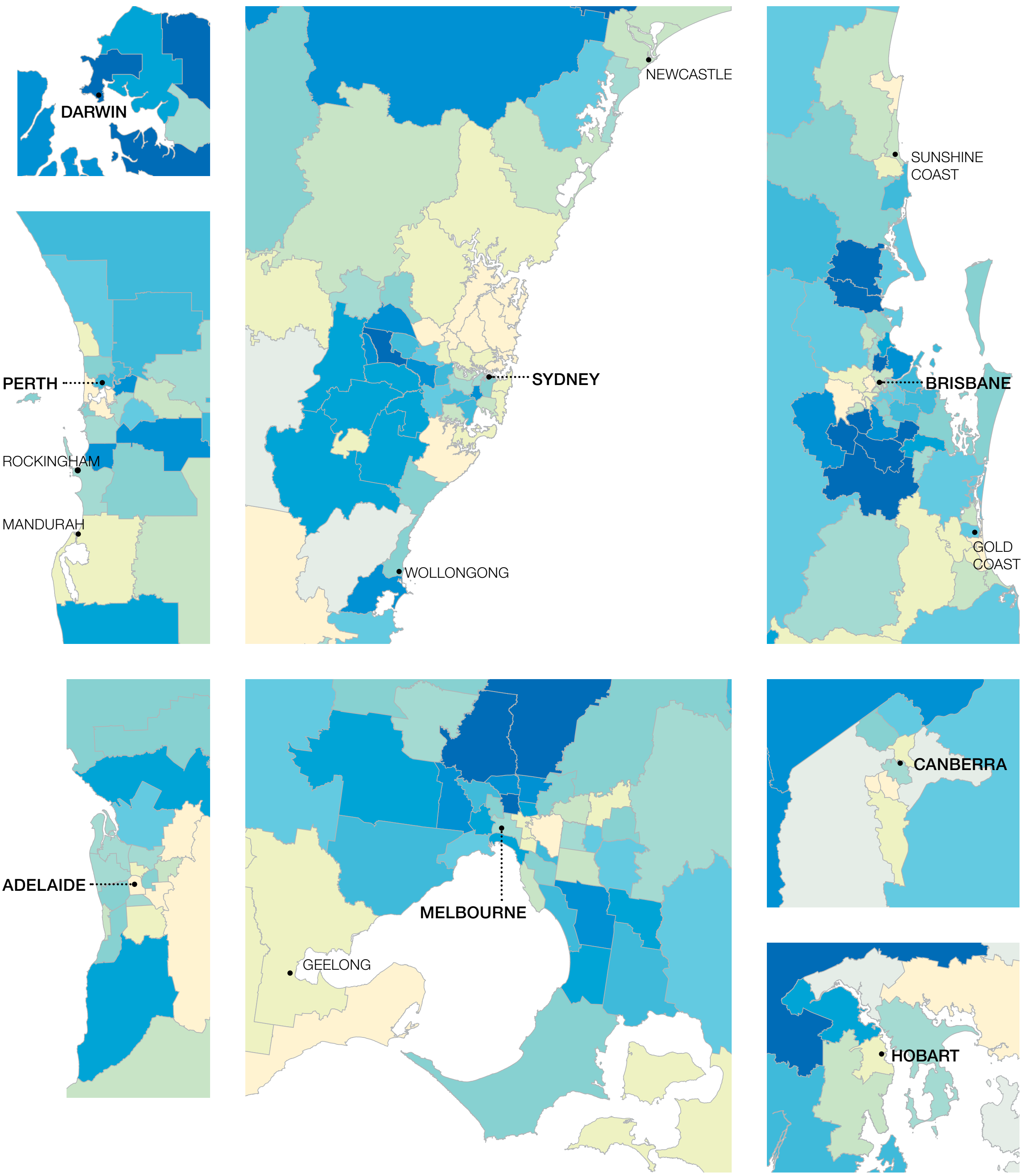
Figure 132: Number of heart failure admissions to hospital per 100,000 people aged 40 years and over, age standardised, by local area, 2012–13



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of heart failure admissions to hospital across 322 local areas (SA3s) ranged from 192 to 1,397 per 100,000 people aged 40 years and over. The number of admissions was **7.3 times higher** in the area with the highest rate compared to the area with the lowest rate.

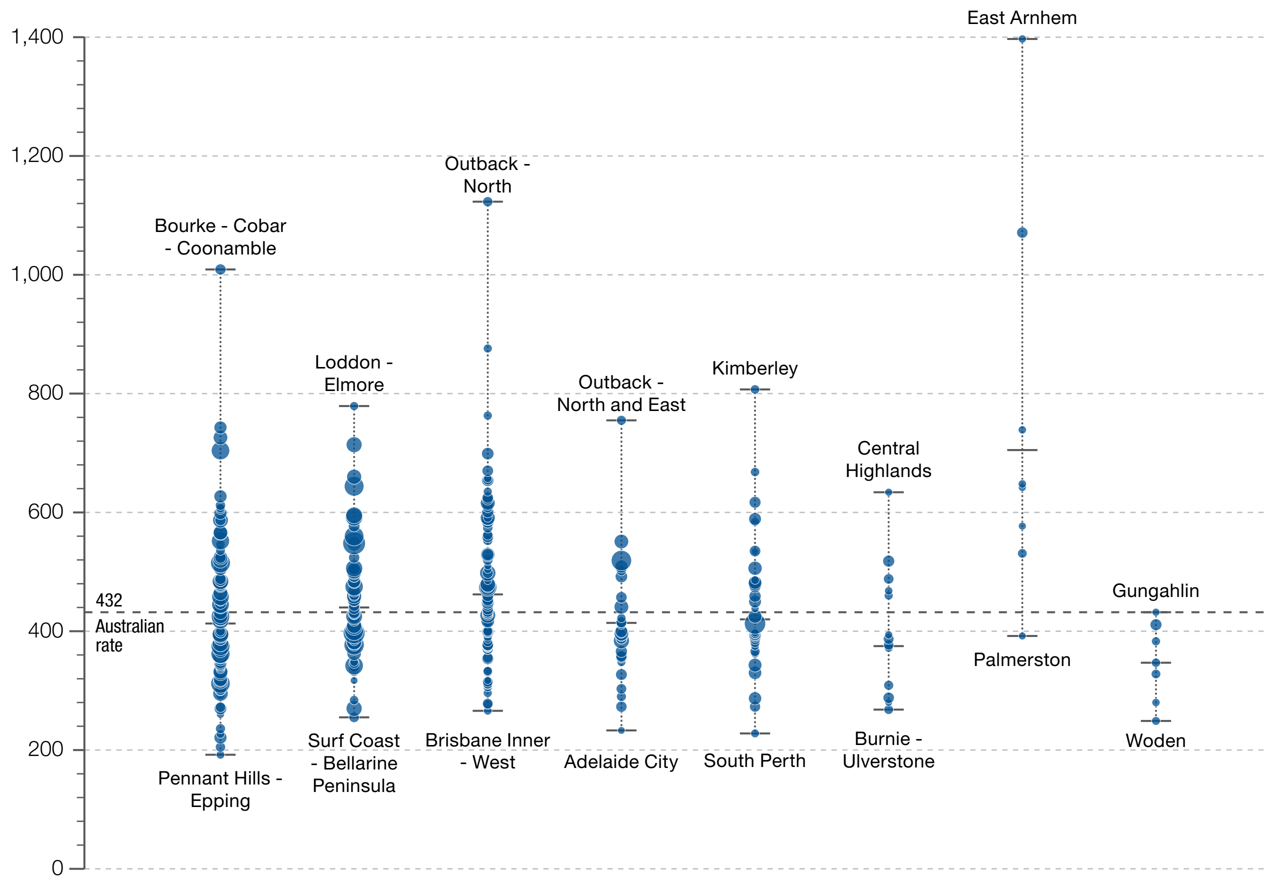


Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Heart failure hospital admissions 40 years and over

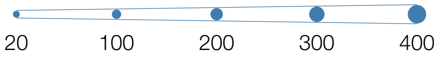
Figure 133: Number of heart failure admissions to hospital per 100,000 people aged 40 years and over, age standardised, by local area, state and territory, 2012–13

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	1,009	779	1,123	755	807	634	1,397	432
State/territory	413	440	462	414	420	375	705	347
Lowest rate	192	255	266	233	228	268	392	249
No. admissions	16,560	13,341	10,025	4,220	4,620	1,125	460	523



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

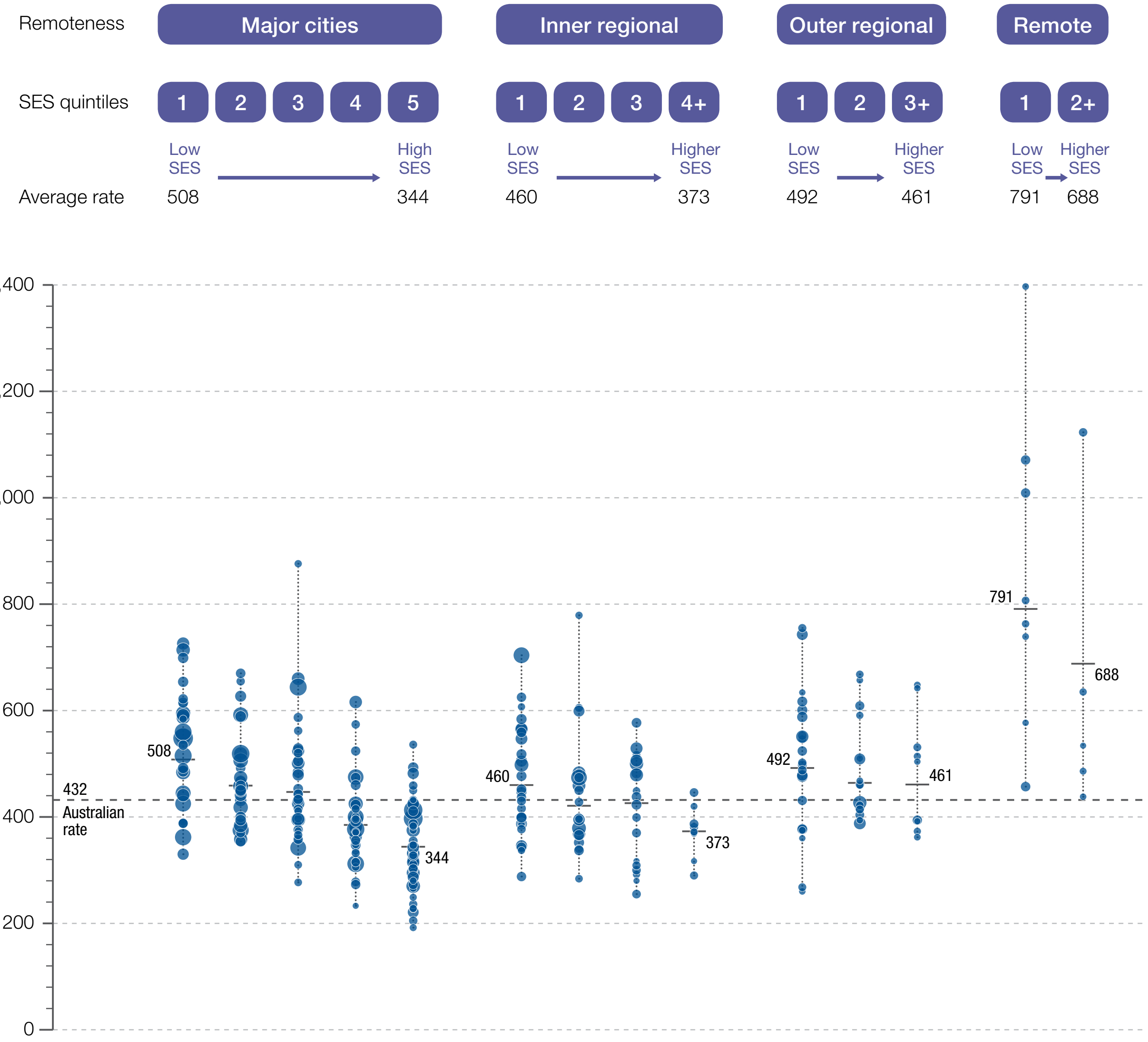
The size of each circle represents the number of admissions in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 134: Number of heart failure admissions to hospital per 100,000 people aged 40 years and over, age standardised, by local area, remoteness and socioeconomic status (SES), 2012–13



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of admissions in each local area

20 100 200 300 400

Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of admissions and people in Australia.
Average rates are based on the total number of admissions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Heart failure hospital admissions 40 years and over

Resources

- National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand (Chronic Heart Failure Guidelines Expert Writing Panel). *Guidelines for the prevention, detection and management of chronic heart failure in Australia*. 2011. Available at: www.heartfoundation.org.au/SiteCollectionDocuments/Chronic_Heart_Failure_Guidelines_2011.pdf.

- Krum H, Jelinek MV, Stewart S, Sindone A, Atherton JJ. Hawkes AL. *Guidelines for the prevention, detection and management of people with chronic heart failure in Australia*. MJA. 2006;185(10), 549. Available at: www.citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.151.5125&rep=rep1&type=pdf.

- Stewart S. Financial aspects of heart failure programs of care. *European Journal of Heart Failure*. 2005;7(3):423–8. Available at: www.onlinelibrary.wiley.com/doi/10.1016/j.ejheart.2005.01.001/epdf.

1 Woods JA, Katzenellenbogen JM, Davidson PM, Thompson SC. Heart failure among Indigenous Australians: a systematic review. BMC cardiovascular disorders 2012;12: 99.
2 Australian Bureau of Statistics. Australian Health Survey: First Results, 2011–12. Cat. No. 4364.0.55.001. Canberra: ABS, 2013.
3 McAlister FA, Stewart S, Ferrua S, McMurray JJ. Multidisciplinary strategies for the management of heart failure patients at high risk for admission: a systematic review of randomized trials. J Am Coll Cardiol 2004;44(4):810–819.
4 National Heart Foundation of Australia. A systematic approach to chronic heart failure care: a consensus statement. Melbourne: National Heart Foundation of Australia, 2013.
5 Driscoll A, Worrall-Carter L, Hare DL, Davidson PM, Riegel B, Tonkin A et al. Evidence-based chronic heart-failure management programmes: reality or myth? BMJ Qual Saf 2011;20:31–7.
6 Wall R, Bell A, Devlin G, Lawrenson R. Diagnosis and treatment of heart failure in Māori and New Zealand Europeans at the Waikato Hospital. NZMJ 2013;126(1368):35-44.
7 Ministry of Health. Tatau Kura Tangata: Health of older Māori Chart Book. Wellington, New Zealand: MOH, 2011.

6.8 Diabetes-related lower limb amputation hospital admissions 18 years and over

Context

This data item examines hospital admission rates for diabetes-related lower limb amputations for people aged 18 years and over. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set, includes both public and private hospitals and relate to the number of admissions per 100,000 people. Repeat admissions for one person and transfers between hospitals are both counted as separate admissions.

Diabetes is the fastest-growing chronic disease in Australia. It is a condition where healthy glucose levels are not maintained in the blood. In people with diabetes, the body no longer produces insulin or it produces insufficient amounts, resulting in high blood glucose levels.

The three main types of diabetes are type one, type two and gestational diabetes. All types of diabetes are increasing in prevalence in Australia. Aboriginal and Torres Strait Islander peoples are about three times more likely to have diabetes[1], 10 times more likely to be admitted for diabetic foot complications[2] and about 30 times more likely to have diabetes-related lower limb amputations than non-Indigenous people.[2]

If any type of diabetes is not well managed, patients risk developing diabetic foot disease. This occurs in people who have peripheral vascular disease (a decreased blood supply) and peripheral neuropathy (nerve damage causing insensitivity). Both are caused by diabetes and can be exacerbated by smoking, hypertension and obesity. Ulceration and infection in limbs can occur. In the most severe cases, this can lead to amputation of the affected toes, foot or lower leg. Diabetic foot problems require urgent attention. A delay in diagnosis and management increases morbidity and mortality, and the likelihood and severity of amputations.[3]

The data presented here report total diabetes-related lower limb amputations per resident adult population, and include both minor amputations (procedures below the ankle) as well as major amputations (procedures above the ankle). Minor and major amputation procedures are often done for different reasons – minor amputations may be undertaken as a ‘prophylactic’ procedure to prevent progression of foot disease leading to a major amputation. Rates of initial or first amputations may reflect the effectiveness of primary prevention, with recurrent amputations reflecting treatment and secondary prevention approaches.[4]

Diabetes-related lower limb amputation hospital admissions 18 years and over

High-risk patients need regular preventive foot care from a podiatrist with an interest in diabetes, and early assessment and intensive intervention to treat foot ulcers. Evidence-based prevention strategies include foot care education, podiatry involvement and wearing appropriate footwear.[5]

Best-practice management of diabetes-related foot ulceration requires coordinated multidisciplinary input, including access to a podiatrist, orthopaedic surgeon, vascular surgeon and endocrinologist.

Five-year survival rates for those who have had a limb amputation, as compared to a toe amputation, are poor, with mortality rates ranging from 39 to 80 per cent.[6] Diabetes-related foot complications are more prevalent in those with a longer duration of diabetes.

Magnitude of variation

In 2012–13, there were 4,402 diabetes-related lower limb amputation admissions to hospital, representing 23 admissions per 100,000 people aged 18 years and over (the Australian rate).

The number of diabetes-related lower limb amputation admissions to hospital across 80* local areas (SA4s) ranged from 8 to 91 per 100,000 people aged 18 years and over. The number of admissions was **11.4 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of admissions varied across states and territories, from 19 per 100,000 people aged 18 years and over in Tasmania, to 65 in the Northern Territory.

After excluding the highest and lowest results, the diabetes-related lower limb amputation hospital admission rate across the 70 remaining local areas was **2.5 times higher** in one local area compared to another.

Interpretation

Diabetes-related lower limb amputation numbers were small, so chance fluctuations and repeat procedures in some individuals could have influenced the geographic patterns seen. Other potential reasons for the variation include differences in:

- risk factors for diabetes-related amputations of the lower limb, including the Indigenous population, socioeconomic status[7] and geographical remoteness
- accuracy of coding, for example, at episode level if diabetes was included as a diagnosis for the admission for the amputation procedure
- the distribution of Indigenous people, who are about three times more likely to have diabetes,[1] 10 times more likely to be admitted for diabetic foot complications[2] and about 30 times more likely than non-Indigenous people to have diabetes-related lower limb amputations
- smoking rates, with smoking being a risk factor in developing diabetic foot disease and a known predictor for foot ulceration and amputation[8]
- access to appropriate primary, secondary and tertiary services, particularly:
  - multidisciplinary foot clinics[9]
  - vascular, endocrine and orthopaedic specialists[10]
  - high-risk foot clinics, particularly in public hospitals[1]
- timing of presentation for care as earlier intervention in foot disease has better outcomes
- quality of diabetes care.

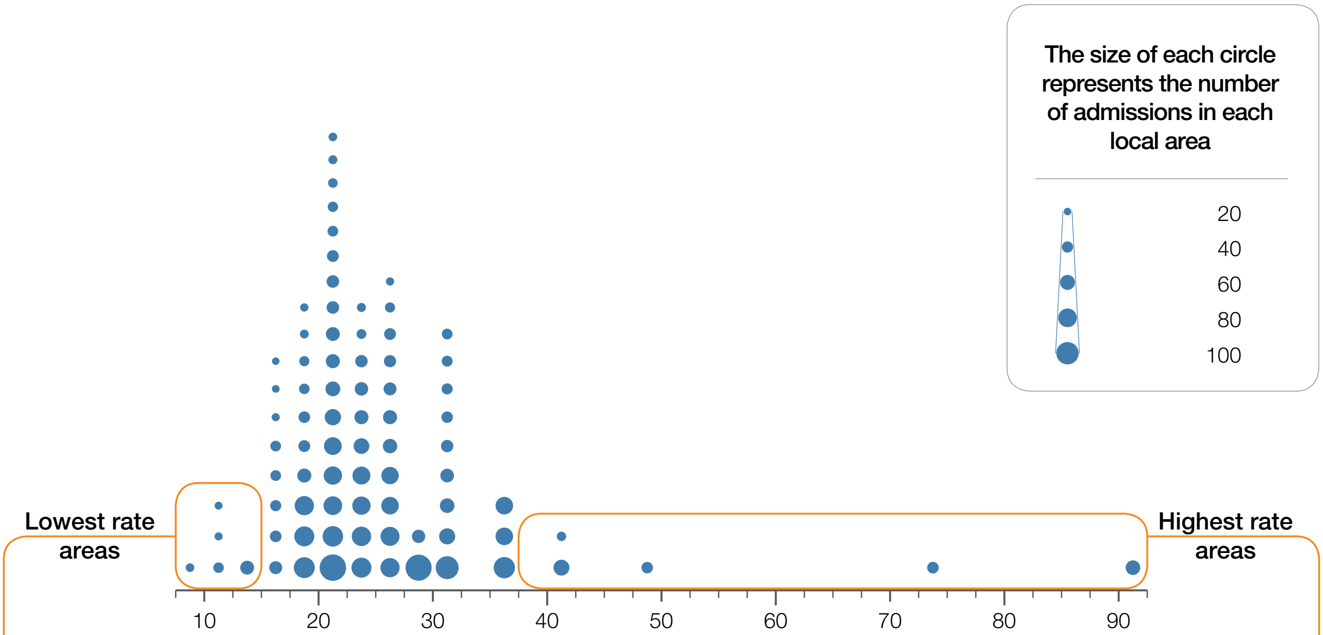
To explore this variation, further analysis could focus on:

- differentiating between toe, foot and leg amputations to determine whether the variation indicates unequal quality of care and timing of presentation for diabetic patients
- exploring and monitoring the diabetes-related lower-limb amputation hospital admissions data for the diabetic population 18 years and over.

*There are 88 SA4s. For this item, data were suppressed for 8 SA4s. This is because of confidentiality requirements given the small numbers of admissions in these areas.

Figure 135: Number of diabetes-related lower limb amputation admissions to hospital per 100,000 people aged 18 years and over, age standardised, by local area, 2012–13

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 4** (SA4)



Diabetes-related lower limb amputation hospital admissions 18 years and over, by local area (each circle represents an area)

Local area	State	Rate	Admissions
Sydney - North Sydney and Hornsby	NSW	8	26
Sunshine Coast	Qld	11	36
Brisbane - East	Qld	11	23
Sydney - Baulkham Hills and Hawkesbury	NSW	12	22
Melbourne - Inner East	Vic	14	54

Local area	State	Rate	Admissions
Northern Territory - Outback	NT	91	58
Queensland - Outback	Qld	73	42
Darwin	NT	48	41
South Australia - Outback	SA	40	30
Western Australia - Outback	WA	40	65

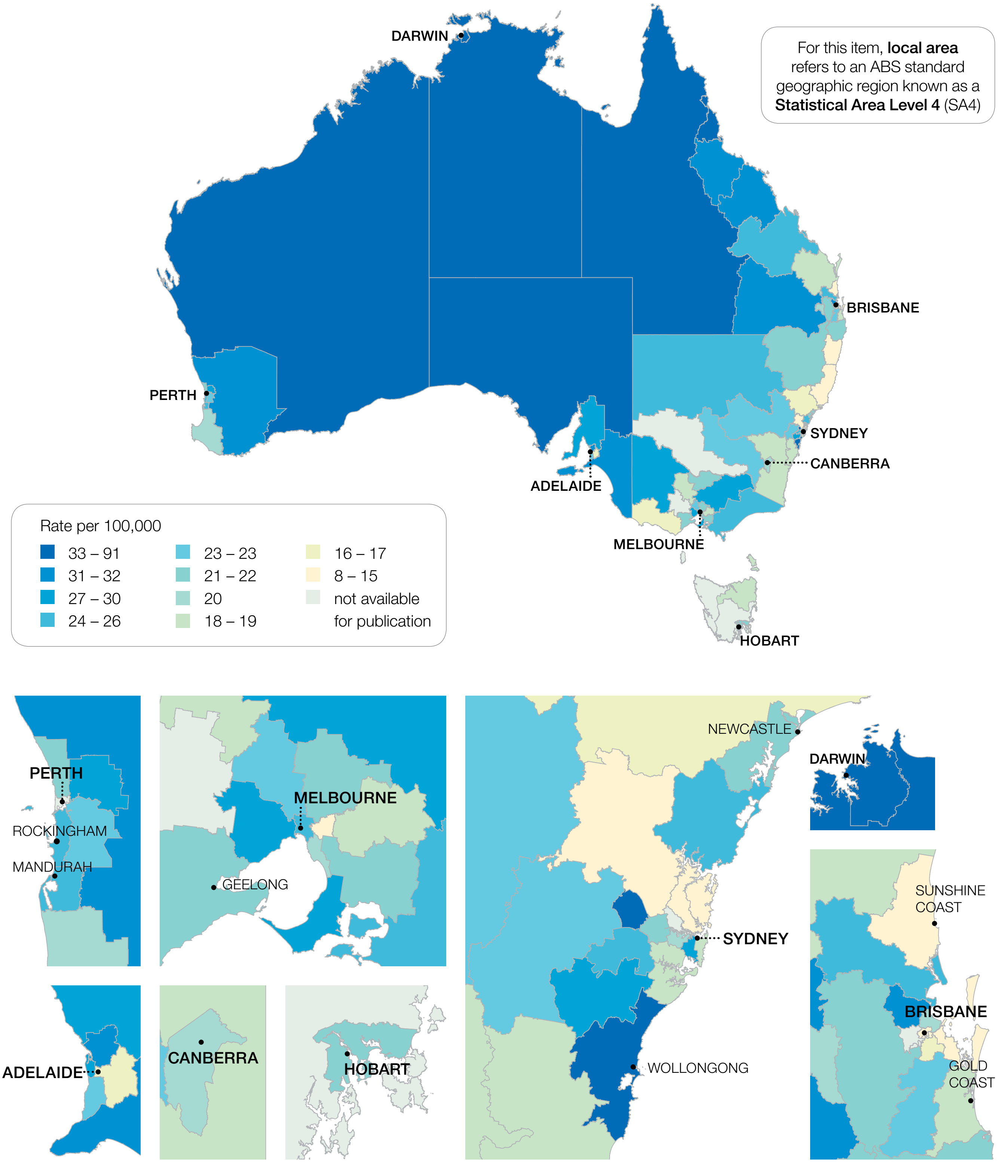
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 4 (SA4).
Includes all public hospitals, private hospitals and day hospital facilities.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Diabetes-related lower limb amputation hospital admissions 18 years and over

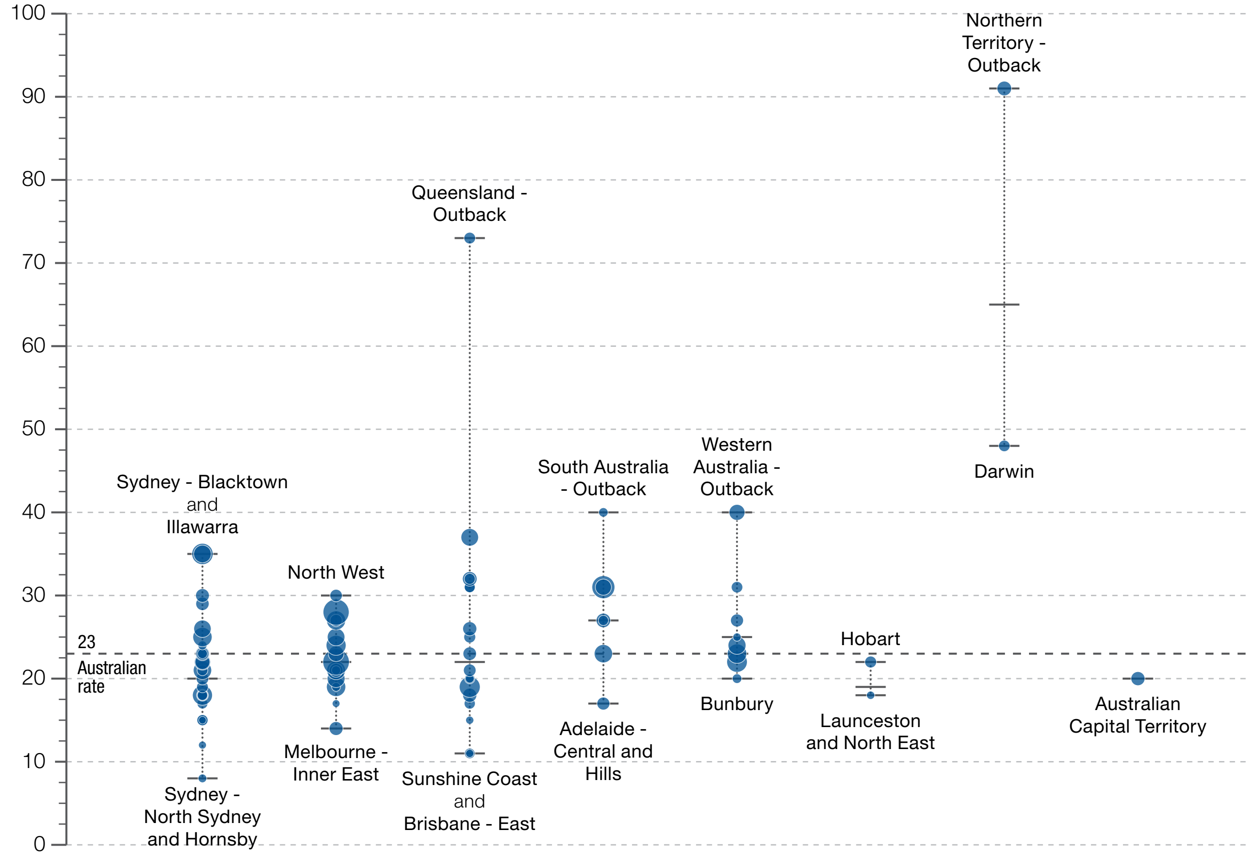
Figure 136: Number of diabetes-related lower limb amputation admissions to hospital per 100,000 people aged 18 years and over, age standardised, by local area, 2012–13



Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

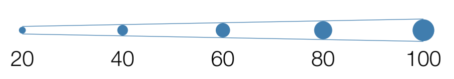
Figure 137: Number of diabetes-related lower limb amputation admissions to hospital per 100,000 people aged 18 years and over, age standardised, by local area, state and territory, 2012–13

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	35	30	73	40	40	22	91	–
State/territory	20	22	22	27	25	19	65	20
Lowest rate	8	14	11	17	20	18	48	–
No. admissions	1,331	1,081	834	417	480	88	99	55



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 4** (SA4)

The size of each circle represents the number of admissions in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of admissions and people in the geographic area.

Sources: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Diabetes-related lower limb amputation hospital admissions 18 years and over

Resources

- National Health and Medical Research Council. *National evidence-based guideline on prevention, identification and management of foot complications in diabetes* (part of the guidelines on management of type 2 diabetes). 2011. Available at: www.nhmrc.gov.au/_files_nhmrc/publications/attachments/diabetes_foot_full_guideline_23062011.pdf.

- National Institute for Health and Clinical Excellence. *Diabetic foot problems: prevention and management*. 2015. Available at: www.nice.org.uk/guidance/ng19.

- International Working Group on the Diabetic Foot and International Diabetes Federation. *Diabetes and Foot Care: Time to Act*. 2005. Available at: www.idf.org/webdata/docs/T2A_Introduction.pdf.

- NSW Agency for Clinical Innovation (ACI). *Standards for High Risk Foot Services in NSW*. 2014. Available at: www.aci.health.nsw.gov.au/__data/assets/pdf_file/0004/248323/ACI_Standards_for_High_Risk_Foot_Services.pdf.

- Diabetes Australia. *Foot Care*. Available at: www.diabetesaustralia.com.au/foot-care.

1 Australian Institute of Health and Welfare. Diabetes: Australian facts 2008. Diabetes series no. 8. Cat. no. CVD 40. Canberra: AIHW, 2008.
2 Norman PE, Schoen DE, Gurr JM, Kolybaba ML. High rates of amputation among Indigenous people in Western Australia. MJA 2010;192(7):421.
3 Ramsey SD, Newton K, Blough D, McCulloch DK, Sandhu N, Reiber GE et al. Incidence, outcomes, and cost of foot ulcers in patients with diabetes. Diabetes care 1999;22(3):382–7.
4 Kurowski JR, Nedkoff L, Schoen DE, Knuiman M, Norman PE, Briffa TG. Temporal trends in initial and recurrent lower extremity amputations in people with and without diabetes in Western Australia from 2000 to 2010. Diabetes Res Clin Pract. 2015 May;108(2):280–7.
5 National Health and Medical Research Council. National evidence-based guideline on prevention, identification and management of foot complications in diabetes (part of the guidelines on management of type 2 diabetes). Melbourne: NHMRC, 2011.
6 Moulik PK, Mtonga R, Gill GV. Amputation and mortality in new-onset diabetic foot ulcers stratified by etiology. Diabetes care 2003;26(2):491–4.
7 Bergin SM, Brand CA, Colman PG and Campbell DA. The impact of socio-economic disadvantage on rates of hospital separations for diabetes-related foot disease in Victoria, Australia. Journal of Foot and Ankle Research 2011;4:17.
8 Moss SE, Klein R, Klein BE. The prevalence and incidence of lower extremity amputation in a diabetic population. Archives of internal medicine 1992;152(3):610–6.
9 Quinlivan E, Jones S, Causby R, Brown D. Reduction of amputation rates in multidisciplinary foot clinics – a systematic review (online). Wound Practice & Research: Journal of the Australian Wound Management Association 2014;22(3):155–62.
10 Eskelinen E, Eskelinen A, Alback A, Lepantalo M. Major amputation incidence decreases both in non-diabetic and in diabetic patients in Helsinki. SJS 2006;95(3):185-9.

6.9 Stroke average length of stay in hospital by peer group – 65 years and over

Context

This data item examines the acute average length of stay in hospital for people aged 65 years and over with a stroke. Hospital admission data are sourced from the Admitted Patient Care National Minimum Data Set, include both public and private hospitals and relate to the number of admissions per 100,000 people. Repeat admissions for one person and transfers between hospitals are both counted as separate admissions.

Length of stay in hospital is one marker of the quality and organisation of care in stroke management. It can be challenging to measure length of stay consistently around Australia due to differences in hospital administrative admission practices.

Strokes occur when the brain's blood supply is suddenly interrupted. This may result in part of the brain dying, leading to a sudden impairment that can affect activities such as communication, swallowing, thinking and moving.[1] In about 80 per cent of people who have a stroke, an artery supplying blood to the brain suddenly becomes blocked (known as an ischaemic stroke). In the remaining 20 per cent, an artery begins to bleed (known as a haemorrhagic stroke).[1] Haemorrhagic strokes tend to occur in younger people.

In Australia, strokes are the second leading cause of death and a major cause of disability.[2] Prevalence of stroke is higher among Aboriginal and Torres Strait Islander people than among non-Indigenous people, and prevalence is higher among people from lower socioeconomic areas than among people from higher socioeconomic areas.[1]

Receiving appropriate care can significantly improve a person's chance of surviving a stroke and recovering to lead an independent life. The Commission's Acute Stroke Clinical Care Standard aims to ensure that patients with stroke receive optimal treatment during the acute phase of management.[3]

Eighty-nine per cent of stroke hospitalisations are managed in public hospitals.[1] Only data from major and large public hospitals are included in this item.

Stroke average length of stay in hospital by peer group – 65 years and over

Magnitude of variation

In 2012–13, there were 14,554 admissions for stroke patients aged 65 years and over in major and large public hospitals. This includes hospital admissions in 114* of the 120 major and large public hospitals across Australia.

The average length of stay for stroke in major and large public hospitals for patients aged 65 years and over ranged from 4.2 to 17.5 days. This was **4.2 times higher** in the hospital with the longest average length of stay compared to the hospital with the shortest.

After excluding the highest and lowest results, the average length of stay across the 108 remaining public hospitals was **2.4 times higher** in one hospital compared to another.

Across all hospital peer groups (major and large metropolitan, and major and large regional), the acute average length of stay for strokes between the hospitals with the longest and shortest stays varied more than two-fold.

The acute average length of stay for strokes varied across states and territories, with the longest in South Australia, the Northern Territory and Tasmania, and the shortest in the Australian Capital Territory.

Interpretation

Analysing average length of stay for stroke has limitations. The acute average length of stay for stroke admissions tended to be longer in major metropolitan hospitals than in large metropolitan and major and large regional hospitals. Patient transfers to hospitals with stroke units may influence these patterns. It has been estimated in previous studies that about one-quarter of hospitalised stroke patients are transferred to another hospital for acute care.[1]

The variation in the acute average length of stay across states and territories is not well explained by geographical factors or hospital type. Potential reasons for the variation include differences in:

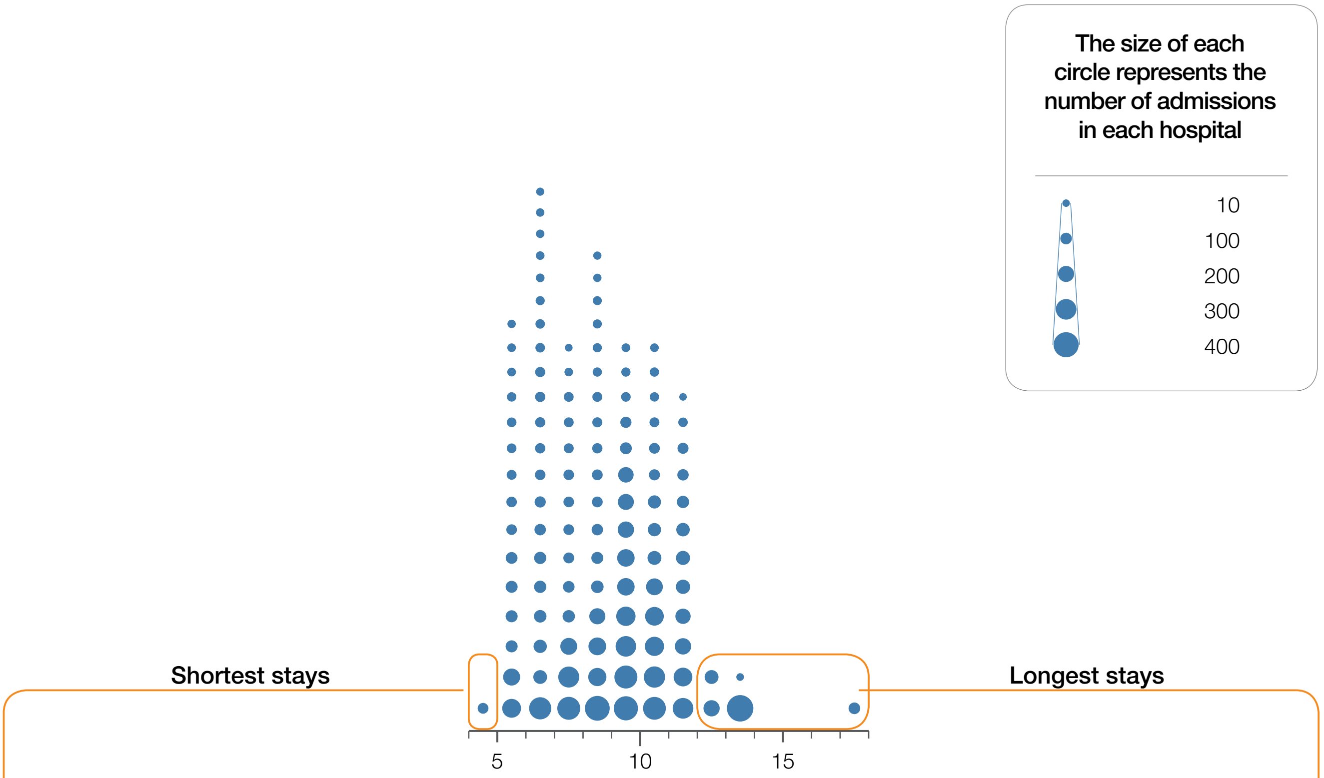
- in-hospital medical complications. Complications such as pneumonia, falls and urinary tract infections are associated with a longer stay[4]
- patient ages and comorbidities, such as obesity and cardiovascular disease
- models of care, in particular access to stroke unit care, rehabilitation and other subacute services
- referral biases, with more complex strokes more likely to be transferred to major metropolitan centres
- practices in recording administrative data where the episode classification is changed from acute to subacute (for example, rehabilitation, palliative care or geriatric evaluation and management)
- chance fluctuations, which could contribute to the variability seen between hospitals and states and territories
- small admission numbers at some hospitals, and few public hospitals defined as major or large in some states and territories.

To explore this variation, further analysis could focus on:

- combining acute and subacute care to ascertain patients' total length of stay
- analysing linked data for individual patients to examine variation in length of stay for strokes in relation to hospital transfers and changes from acute to subacute care
- length of stay between patients admitted to a hospital with a stroke unit compared to hospitals without.

*For this item, data were suppressed for 6 hospitals. This is because of confidentiality requirements given the small numbers of admissions in these hospitals.

Figure 138: Average length of stay for stroke patients aged 65 years and over, major and large public hospitals, 2012–13



Average length of stay for stroke 65 years and over, by hospital (each circle represents a hospital)

Hospital	State	Average length of stay (days)	Admissions
Rockingham	WA	4.2	83

Hospital	State	Average length of stay (days)	Admissions
Launceston	Tas	17.5	102
Royal Adelaide	SA	13.2	430
Alice Springs	NT	13.1	14
Bankstown	NSW	12.1	151
Prince of Wales	NSW	12.0	203

Notes:
Analysis is restricted to hospitals with at least 10 admissions.

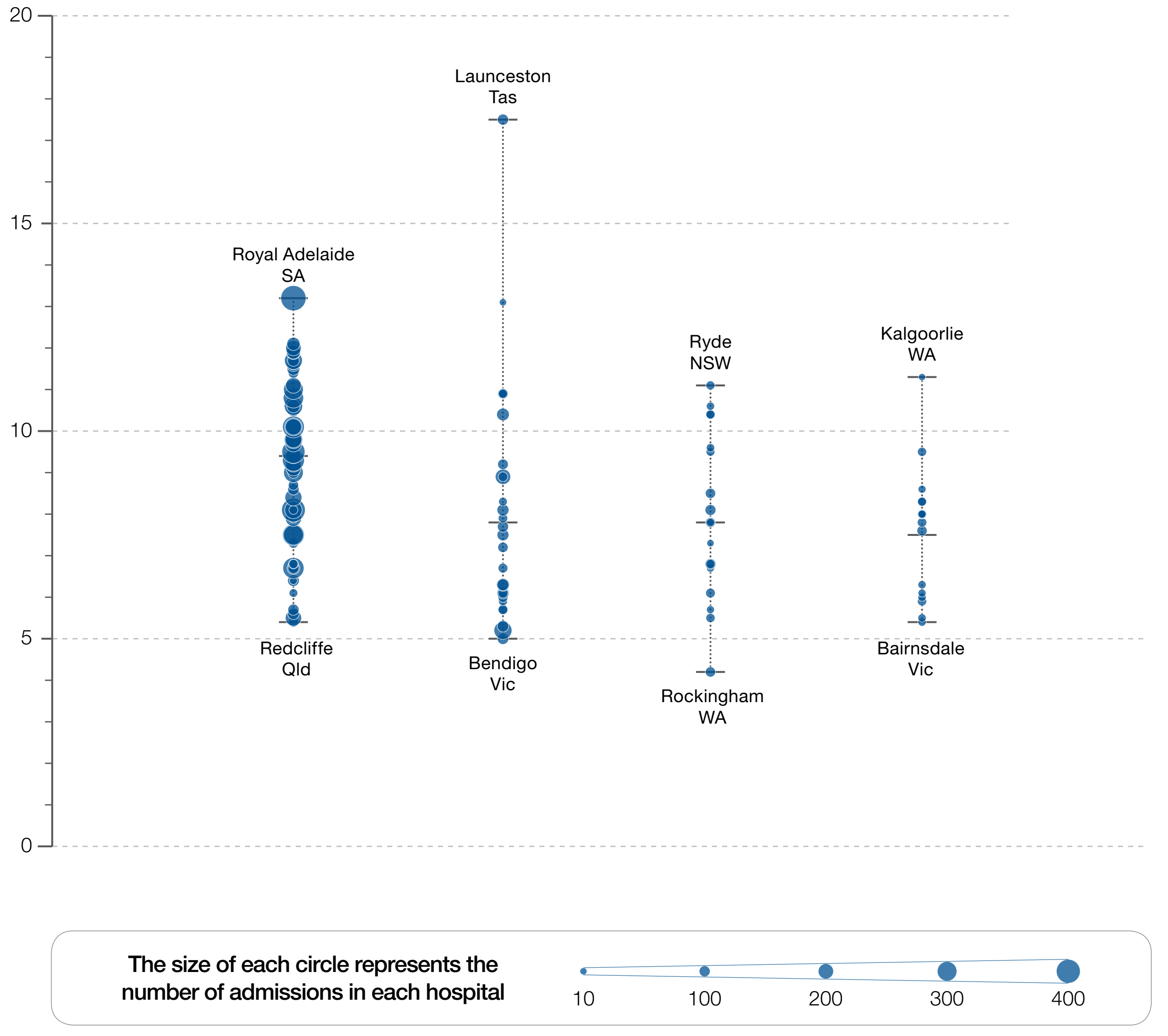
For more technical information please refer to the Technical Supplement.

Source: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014).

Stroke average length of stay in hospital by peer group – 65 years and over

Figure 139: Average length of stay for stroke patients aged 65 years and over, major and large public hospitals, by peer group, 2012–13

Average length of stay (days)	Major metropolitan	Major regional	Large metropolitan	Large regional
Longest	13.2	17.5	11.1	11.3
Peer average	9.4	7.8	7.8	7.5
Shortest	5.4	5.0	4.2	5.4
No. admissions	10,166	2,645	1,016	727

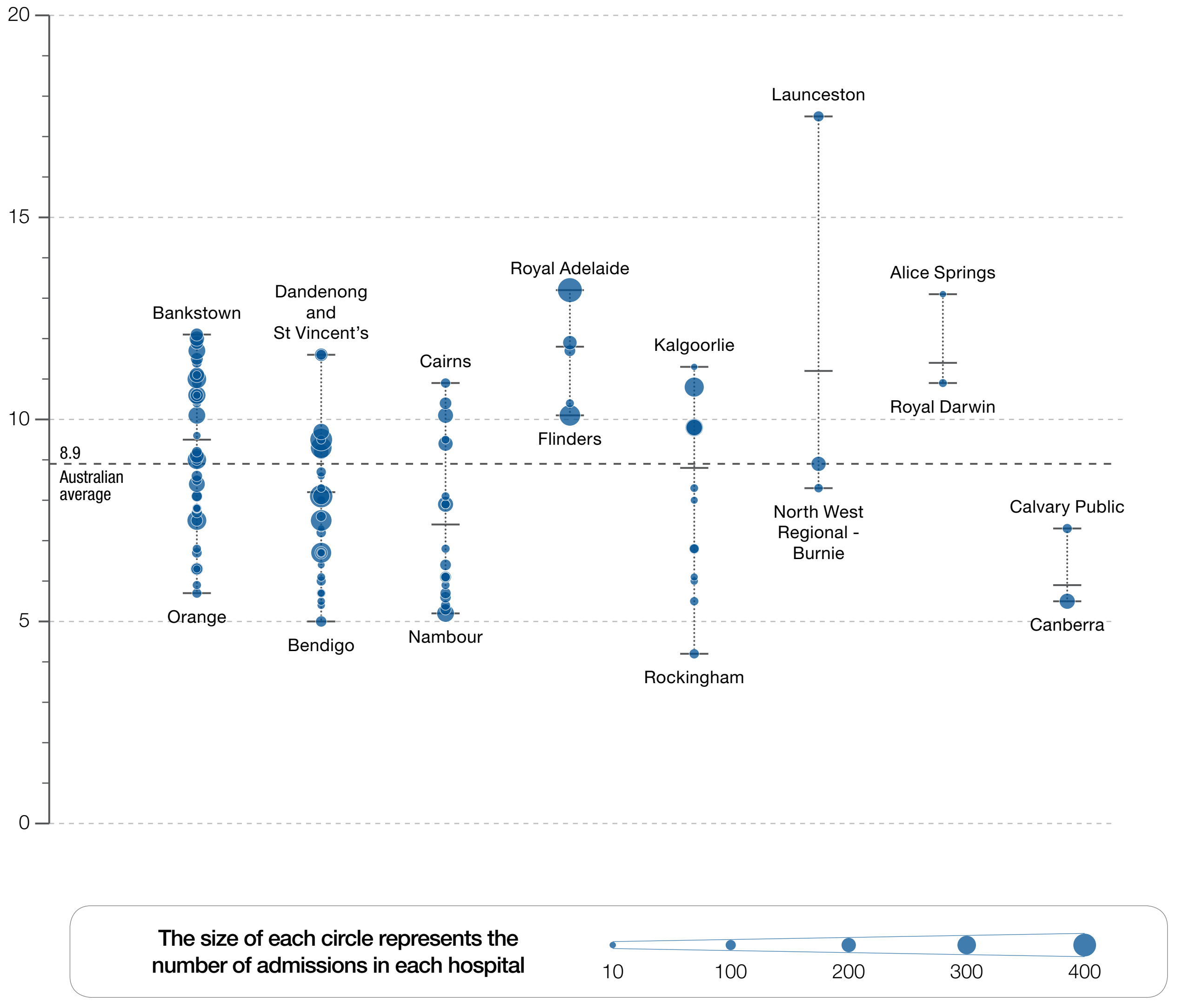


Notes:
The peer average is based on the total number of admissions in public hospitals within that peer group, restricted to hospitals with at least 10 admissions.

Source: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014).

Figure 140: Average length of stay for stroke patients aged 65 years and over, major and large public hospitals, by state and territory, 2012–13

Average length of stay (days)	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Longest	12.1	11.6	10.9	13.2	11.3	17.5	13.1	7.3
State/territory	9.5	8.2	7.4	11.8	8.8	11.2	11.4	5.9
Shortest	5.7	5.0	5.2	10.1	4.2	8.3	10.9	5.5
No. admissions	5,283	3,921	2,217	1,128	1,276	365	64	300



Notes:
The state/territory and national results are based on the total number of admissions in major and large public hospitals located within each geographic area, restricted to hospitals with at least 10 admissions.

Source: National Health Performance Authority analysis of Admitted Patient Care National Minimum Data Set 2012–13 (data supplied 09/04/2014).

Stroke average length of stay in hospital by peer group – 65 years and over

Resources

- Australian Commission on Safety and Quality in Health Care. *Acute Stroke Clinical Care Standard*. 2015. Available at: www.safetyandquality.gov.au/wp-content/uploads/2015/07/Acute-Stroke-Clinical-Care-Standard.pdf.

- National Stroke Foundation. *Clinical guidelines for stroke management*. 2010. Available at: https://strokefoundation.com.au/~/media/strokewebsite/resources/treatment/clinical-guidelines-acute-rehab-management-2010-interactive.ashx?la=en.

- National Stroke Foundation. *Acute stroke services framework*. 2011. Available at: https://strokefoundation.com.au/~/media/strokewebsite/resources/treatment/acute_stroke_framework_services_2011.ashx?la=en.

- National Stroke Foundation. *Rehabilitation Stroke Services Framework*. 2013. Available at: https://strokefoundation.com.au/~/media/strokewebsite/resources/treatment/nsf826_rehabilitationstrokeservicesframework2013v2.ashx?la=en.

1 Australian Institute of Health and Welfare. Stroke and its management in Australia: an update. Cardiovascular disease series no. 37. Cat. no. CVD 61. Canberra: AIHW, 2013.
2 Australian Institute of Health and Welfare. Chronic diseases. 2015. (Accessed 6 October 2015 at: http://www.aihw.gov.au/chronic-diseases).
3 Australian Commission on Safety and Quality in Health Care. Acute Stroke Clinical Care Standard. Sydney: ACSQHC, 2015
4 Ingeman A, Andersen G, Hundborg H, Svendsen M, Johnsen S. In-hospital medical complications, length of stay, and mortality among stroke unit patients. Stroke 2011;42:3214–8.

6.10 Anticholinesterase medicines dispensing 65 years and over

Context

This data item examines dispensing rates of anticholinesterase medicines for people aged 65 and over. The data are sourced from the PBS and relate to the number of prescriptions filled per 100,000 people.

Anticholinesterase medicines are used to treat conditions such as Alzheimer's disease. These medicines can slow the rate of symptom progression but do not modify or treat the disease. They may also offer some relief from the symptoms of Alzheimer's disease for some people for a limited time.

The effect of these medicines varies; some people do not notice any effect, some find their symptoms improve slightly, while others find their symptoms stay the same when they would have expected them to worsen. The areas in which some people with Alzheimer's disease may find improvement are:

- ability to think clearly
- memory
- function in daily activities
- behavioural and psychological symptoms.[1]

Trials indicate that on average, cholinesterase inhibitors delay the progression of symptoms for between nine and 12 months. Some people with dementia report benefits for longer periods, and recent research has shown that benefits may be sustained for up to five years.[1]

Anticholinesterase medicines dispensing 65 years and over

Magnitude of variation

In 2013–14, there were 427,211 PBS prescriptions dispensed for anticholinesterase medicines, representing 12,650 prescriptions per 100,000 people aged 65 years and over (the Australian rate).

The number of PBS prescriptions dispensed for anticholinesterase medicines across 323* local areas (SA3s) ranged from 1,843 to 28,261 per 100,000 people aged 65 years and over. The number of prescriptions was **15.3 times higher** in the area with the highest rate compared to the area with the lowest rate. The average number of prescriptions dispensed varied across states and territories, from 5,478 per 100,000 people aged 65 years and over in Tasmania, to 16,483 in the Australian Capital Territory.

After excluding the highest and lowest results, the anticholinesterase medicine prescription rate across the 298 remaining local areas was **3.7 times higher** in one local area compared to another.

Dispensing rates were higher in major cities than in regional and remote areas. There was an association between dispensing rates and socioeconomic status in major cities: dispensing rates were lowest in areas of low socioeconomic status, and highest in areas of higher socioeconomic status. This socioeconomic influence was less evident outside the major cities.

Interpretation

Potential reasons for the variations include differences in:

- density of aged-care facilities
- prescribing practices, training, knowledge and attitudes of clinicians
- the prescribing culture among people with dementia, general practitioners and specialists
- multiple repeat dispensing, which could influence recorded dispensing rates in local areas
- access to timely specialist services, particularly in rural and remote areas.

It is also important to note that the dispensing of anticholinesterase medicines in remote areas by some Aboriginal Health Services is not captured in the PBS database.

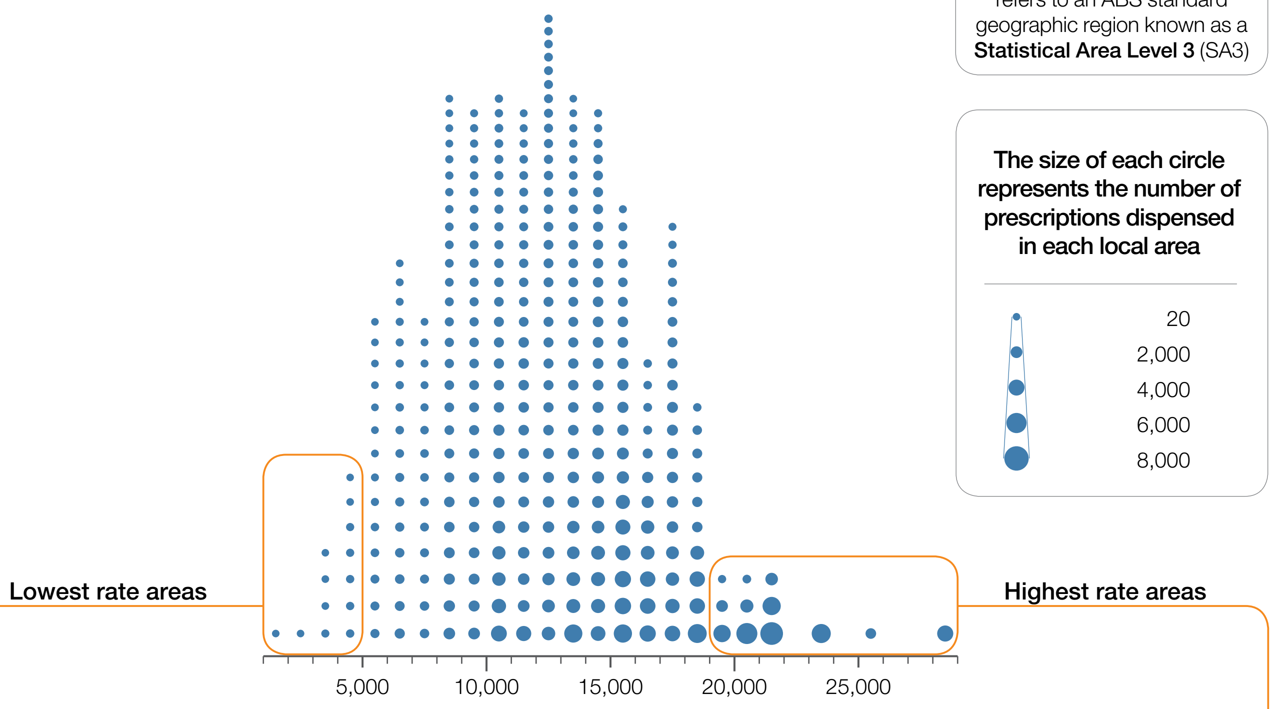
To explore this variation, further analysis could focus on:

- investigating the individual- and system-level factors that influence variations in anticholinesterase medicine prescription rates
- identifying variations in prescription rates for older people living in aged-care facilities compared with older people living in the community
- connections between various datasets to better understand treatment patterns for older people with dementia, and outcomes such as ongoing care needs and admission to residential care.

*There are 333 SA3s. For this item, data were suppressed for 10 SA3s. This is because of confidentiality requirements given the small numbers of prescriptions dispensed in these areas.

Figure 141: Number of PBS prescriptions dispensed for anticholinesterase medicines per 100,000 people aged 65 years and over, age standardised, by local area, 2013–14

For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)



Anticholinesterase medicines dispensing 65 years and over, by local area (each circle represents an area)

Local area	State	Rate	Prescriptions
Gascoyne	WA	1,843	30
Kimberley	WA	2,020	36
Burnie - Ulverstone	Tas	3,244	300
Goldfields	WA	3,287	74
West Coast	Tas	3,656	92
Pilbara	WA	3,834	28
Central Highlands	Tas	4,008	58
Devonport	Tas	4,193	340
Hobart - North West	Tas	4,489	427
Mount Druitt	NSW	4,529	390
Daly - Tiwi - West Arnhem	NT	4,612	21
Granite Belt	Qld	4,967	382
North East	Tas	4,996	322

Local area	State	Rate	Prescriptions
Sutherland - Menai - Heathcote	NSW	28,261	4,070
Nillumbik - Kinglake	Vic	25,905	1,461
Cronulla - Miranda - Caringbah	NSW	23,391	5,482
Geelong	Vic	21,407	7,190
Charles Sturt	SA	21,369	5,077
Pittwater	NSW	21,062	2,388
Surf Coast - Bellarine Peninsula	Vic	20,709	2,667
Boroondara	Vic	20,602	6,394
Darwin Suburbs	NT	20,093	570
Port Adelaide - West	SA	19,923	2,000
Gungahlin	ACT	19,146	356
Lake Macquarie - East	NSW	19,092	4,655

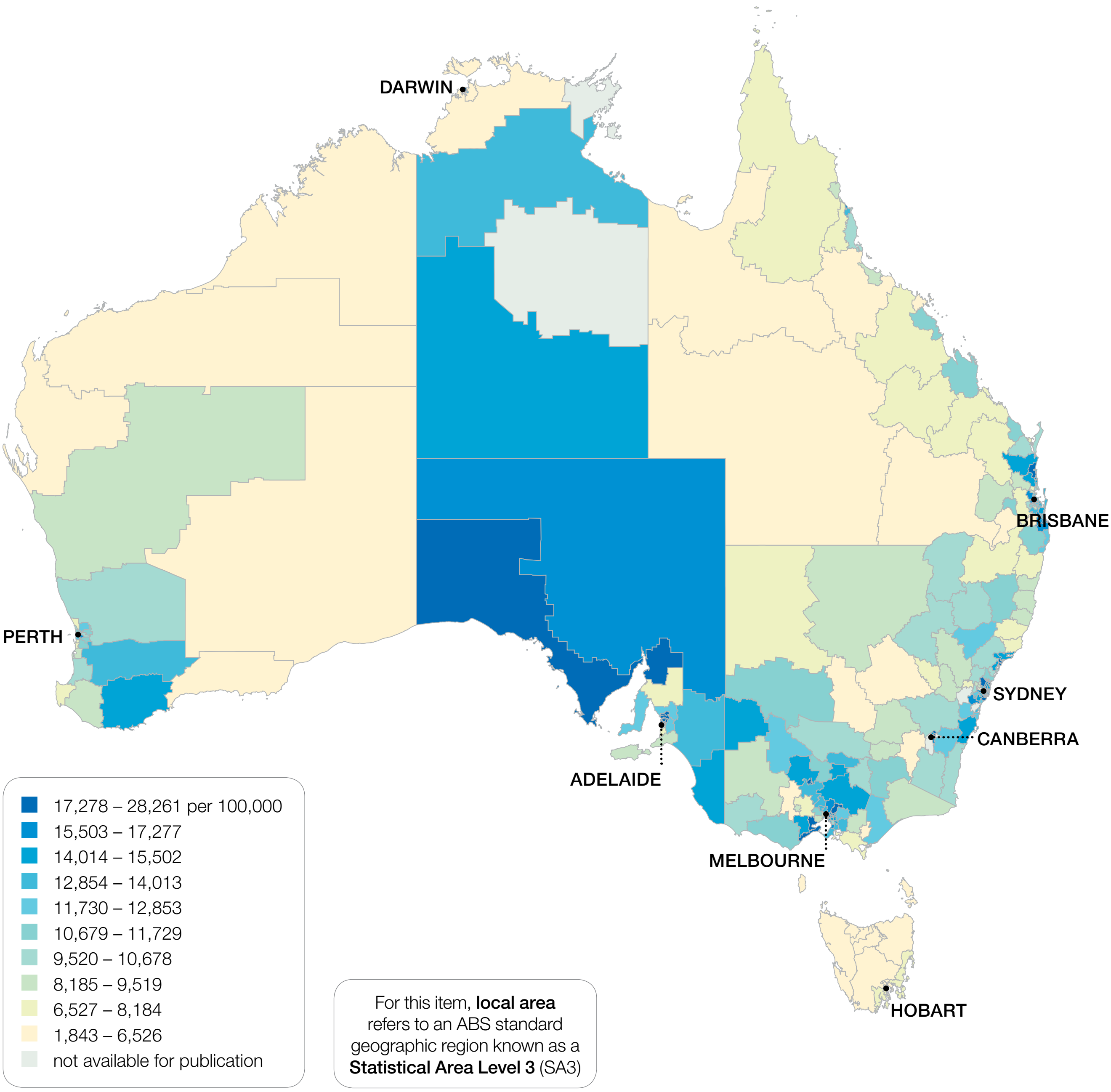
Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.
The term local area refers to an ABS standard geographic region known as a Statistical Area Level 3 (SA3).
PBS prescriptions include all medicines dispensed under the PBS or RPBS, including medicines that do not receive a Commonwealth subsidy. They exclude a large proportion of public hospital drug usage, direct supply to remote Aboriginal Health Services, over-the-counter purchases and private prescriptions. SA3 analysis excludes approximately 2,230 prescriptions from GPO postcodes 2001, 2124, 3001, 4001, 5001, 6843 but these data are included in state/territory and national level analysis.

For more technical information please refer to the Technical Supplement.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 19/03/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

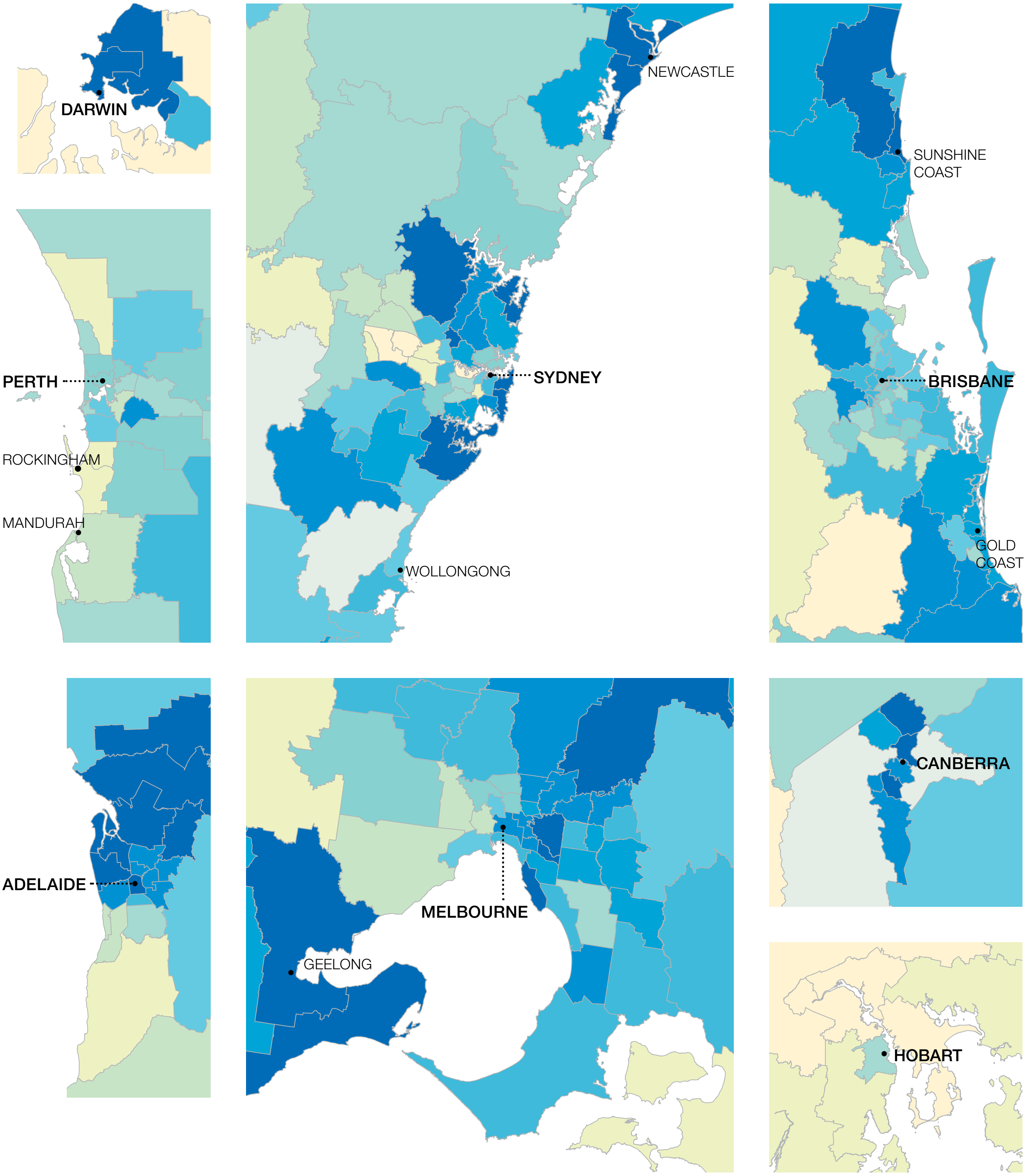
Anticholinesterase medicines dispensing 65 years and over

Figure 142: **Number of PBS prescriptions dispensed for anticholinesterase medicines per 100,000 people aged 65 years and over, age standardised, by local area, 2013–14**



Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 19/03/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

The number of PBS prescriptions dispensed for anticholinesterase medicines across 323 local areas (SA3s) ranged from 1,843 to 28,261 per 100,000 people aged 65 years and over. The number of prescriptions was **15.3 times higher** in the area with the highest rate compared to the area with the lowest rate.

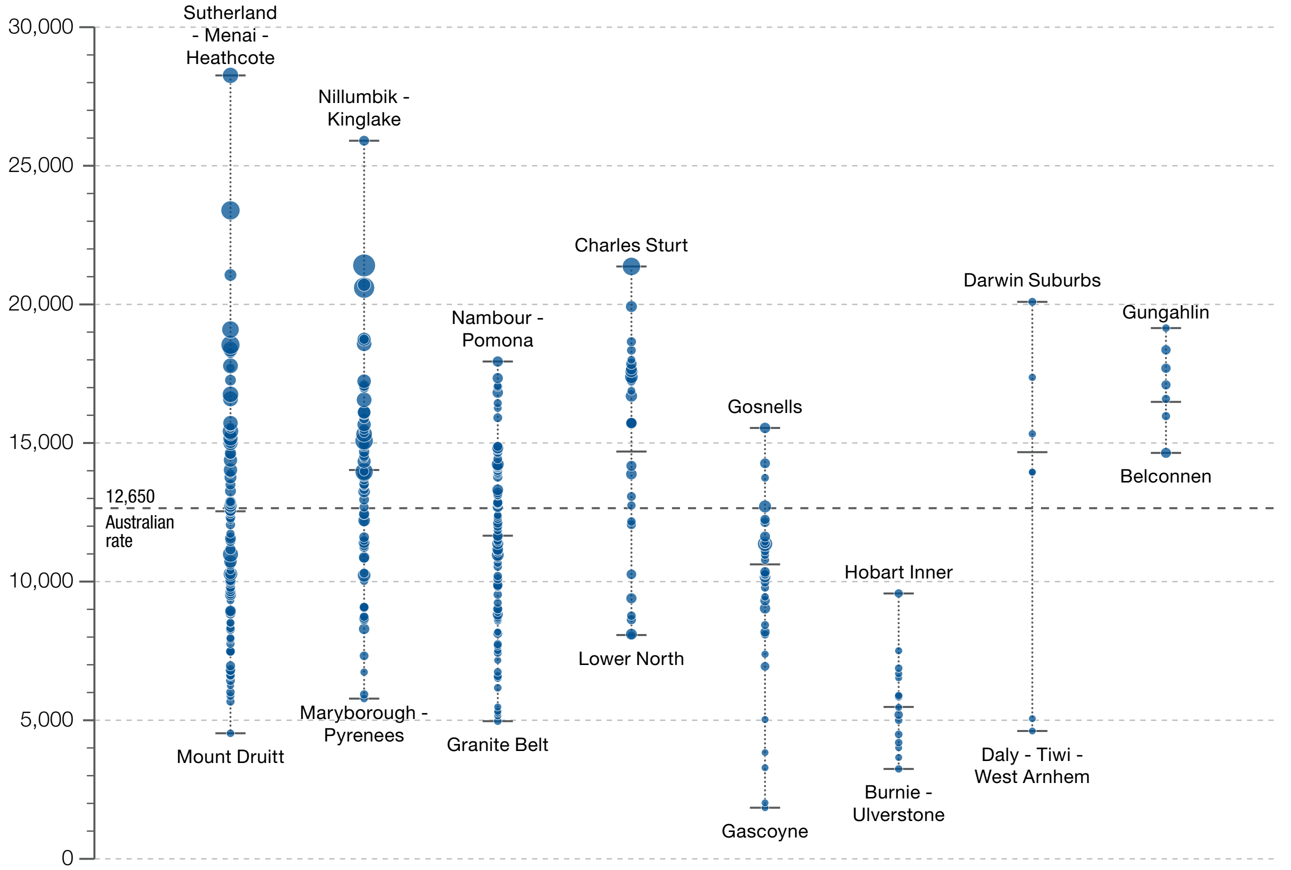


Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 19/03/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Anticholinesterase medicines dispensing 65 years and over

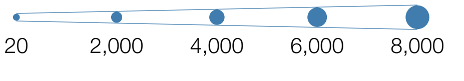
Figure 143: Number of PBS prescriptions dispensed for anticholinesterase medicines per 100,000 people aged 65 years and over, age standardised, by local area, state and territory, 2013–14

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Highest rate	28,261	25,905	17,939	21,369	15,544	9,573	20,093	19,146
State/territory	12,538	14,027	11,655	14,693	10,623	5,478	14,671	16,483
Lowest rate	4,529	5,780	4,967	8,072	1,843	3,244	4,612	14,644
No. prescriptions	144,908	122,708	70,675	43,399	32,440	4,740	1,361	6,921



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

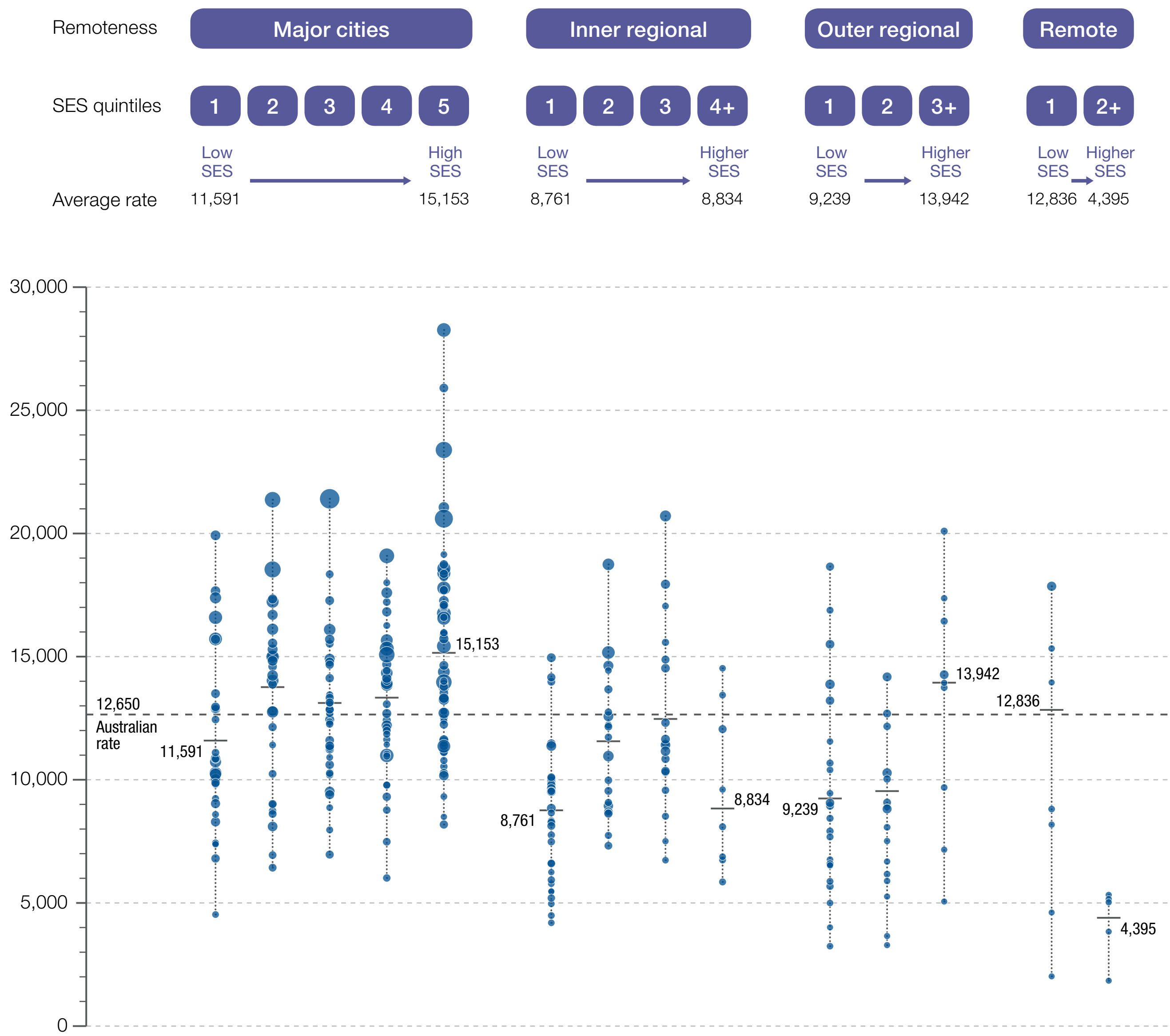
The size of each circle represents the number of prescriptions dispensed in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
State/territory and national rates are based on the total number of prescriptions and people in the geographic area.

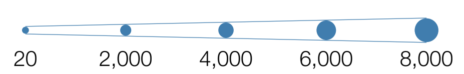
Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 19/03/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Figure 144: Number of PBS prescriptions dispensed for anticholinesterase medicines per 100,000 people aged 65 years and over, age standardised, by local area, remoteness and socioeconomic status (SES), 2013–14



For this item, **local area** refers to an ABS standard geographic region known as a **Statistical Area Level 3** (SA3)

The size of each circle represents the number of prescriptions dispensed in each local area



Notes:
Rates are standardised based on the age structure of the Australian population in 2001.
The national rate is based on the total number of prescriptions and people in Australia.
Average rates are based on the total number of prescriptions and people in the local areas within each group.

Sources: National Health Performance Authority analysis of Pharmaceutical Benefits Scheme (PBS) statistics 2013–14 (data supplied 19/03/2015) and Australian Bureau of Statistics Estimated Resident Population 30 June 2013.

Anticholinesterase medicines dispensing 65 years and over

Resources

- NPS MedicineWise. *Drugs for Alzheimer's disease – PBS criteria no longer include referral to a specialist*. NPS Radar July 2012. Available at: www.nps.org.au/publications/health-professional/nps-radar/2011/november-2011/brief-item-alzheimers-change-listing.
- GP notebook. *NICE guidance – cholinesterase inhibitors (donepezil, galantamine, rivastigmine) and memantine for the treatment of Alzheimer's disease*. 2013. Available at: www.gpnotebook.co.uk/simplepage.cfm?ID=1577451585.
- McKay R, Casey J, Stevenson J, McGowan H. *Psychiatry services for older people: A report on current issues and evidence to inform the development of services and the revision of RANZCP Position Statement 22*. Royal Australian and New Zealand College of Psychiatrists. 2015. Available from: www.ranzcp.org/Files/Resources/College_Statements/Position_Statements/RPT-FPOA-Psychiatry-services-for-older-people-revi.aspx
- Le Couteur DG, Robinson M, Leverton A, Creasey H, Waite L, Atkins K et al. *Adherence, persistence and continuation with cholinesterase inhibitors in Alzheimer's disease*. Australas J Ageing 2012;31:164–9.
- The Pharmaceutical Benefits Scheme. *Australian Statistics on Medicines*. 2015. Available at: www.pbs.gov.au/info/browse/statistics.
- Australian Commission on Safety and Quality in Health Care. *A better way to care: Safe and high-quality care for patients with cognitive impairment (dementia and delirium) in hospital*. 2014. Available at: www.safetyandquality.gov.au/our-work/cognitive-impairment/better-way-to-care/.

1 Alzheimer's Australia. Drug treatments for Alzheimer's disease – Cholinesterase inhibitors Help Sheet. Canberra: Alzheimer's Australia, 2013.

Technical Supplement

Introduction

In the Australian Atlas of Healthcare Variation (the atlas), a number of health items have been selected to identify the variation in utilisation of healthcare services across Australia. To capture a broad spectrum of common healthcare service utilisation, statistics have been compiled on services attracting benefits under the Medicare Benefits Schedule (MBS) and the Pharmaceutical Benefits Scheme (PBS), and on patients who are admitted to hospital from the Admitted Patient Care National Minimum Data Set (APC NMDS).

Statistics in the atlas are presented in the form of maps, graphs and tables. To enable comparisons across regions, utilisation rates per 100,000 of population have been presented by local areas using the Australian Bureau of Statistics (ABS) Statistical Area Level 3 (SA3) or Statistical Area Level 4 (SA4) geography, at the state or territory and national levels. Local areas are grouped by state or territory, remoteness and socioeconomic status to assist comparisons between local areas.

The National Health Performance Authority (NHPA) developed the analytical methods and performed the data extraction, analysis and presentation of data in maps and graphs. The methods used to calculate the data in the report are described in this technical supplement.
The specifications for each data item were prepared by NHPA and can be found on the Australian Institute for Health and Welfare's (AIHW) Metadata Online Registry (METeOR)

Three data sources were used in the atlas:

1. Admitted Patient Care National Minimum Data Set (APC NMDS)
2. Medicare Benefits Schedule (MBS)
3. Pharmaceutical Benefits Scheme (PBS).

Technical Supplement

1. Admitted Patient Care National Minimum Data Set

Data for most of the admissions to hospital items in the atlas were sourced from the APC NMDS for the financial year 2012–13. The APC NMDS was provided by the AIHW to NHPA in April 2014.

For some items[1] where the number of admissions to hospital was small, three financial years of data (2010–11, 2011–12 and 2012–13) were combined and the average of the three years was calculated and used as the result.

The APC NMDS includes episodes of care for admitted patients in all public and private acute and psychiatric hospitals, freestanding day hospital facilities, and alcohol and drug treatment centres in Australia. Episodes of care for admitted patients in hospitals operated by the Australian Defence Force and corrections authorities, and in Australia's offshore territories may also be included. Furthermore, episodes of care for admitted patients in hospitals specialising in dental, ophthalmic aids and other specialised acute medical or surgical care are also included. The APC NMDS excludes episodes of non-admitted patient care provided in outpatient clinics or emergency departments. Furthermore, for all APC NMDS items in the atlas admissions with a care-type of '7.3 Newborn care', '9 Organ procurement – posthumous' and '10 Hospital boarder' were excluded from the analysis.

Data are collected at each hospital from patient administrative and clinical record systems. Hospitals regularly forward data to the relevant state or territory health authority. State and territory health authorities provide the data to the AIHW for national collation annually. These data are also provided to the Independent Hospital Pricing Authority for the Commonwealth contribution to funding public hospital services under activity based funding.

The counting unit for the APC NMDS is the 'separation'. Separation refers to the episode of admitted patient care, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending in a change of type of care (for example from acute care to rehabilitation). As a record is included for each separation, not for each patient, patients hospitalised more than once in the financial year will be counted more than once in the admission rates.

In the atlas, the word 'admission' has the same meaning as 'separation'.

Administrative practices around admitting patients who attend emergency departments varies. For some of the admitted patient care items[2] in the atlas, this variation in administrative practices may influence the results and has been marked with a footnote.

For more information on the 2012–13 APC NMDS, see the Data Set Specifications on METeOR at: **http://meteor.aihw.gov.au/content/index.phtml/itemId/466132**.

Confidential results

Results for geographic locations were suppressed if the number of admissions was less than five.

1 These items included 'Asthma and other respiratory admissions 3–19 years', 'Asthma and other respiratory admissions 20–44 years' and 'Lumbar spine surgery admissions 18+ years'.
2 These items included 'Asthma and related respiratory hospital admissions 3–19 years', 'Asthma hospital admissions 20–44 years', 'Asthma and chronic obstructive pulmonary disease hospital admissions 45 years and over' and 'Heart failure hospital admissions 40 years and over'.

2. Medicare Benefits Schedule

The MBS statistics were derived from administrative information on services that qualified for a Medicare benefit under the *Health Insurance Act 1973* and for which a claim was processed by the Australian Government Department of Human Services in the 12 months ending 30 June 2014.

The MBS statistics included in the atlas relate to hospital and non-hospital MBS services. Each MBS item is associated with a claim, resulting in the payment of a Medicare benefit being counted as a service.

MBS statistics do not include:

- services provided free of charge to public patients in hospitals
- services provided to the Department of Veterans' Affairs beneficiaries
- services provided under the *Dental Benefits Act 2008*
- services that are the subject of compensation payments (but services attracting interim benefits are included)
- services provided through other publicly funded programs.

Some Australian residents may access medical services through other arrangements, such as salaried doctor arrangements. As a result, MBS statistics may underestimate the rate of use of health services by some members of the community.

Under Medicare, 'eligible persons' are persons who reside permanently in Australia. This includes New Zealand citizens and holders of permanent residence visas. Applicants for permanent residency may also be eligible, depending on circumstances. In addition, persons from countries with which Australia has reciprocal health care agreements might also be entitled to benefits under MBS arrangements.

Year of processing

Statistics in the atlas were prepared based on year of processing. Year of processing has regard to when the Australian Government Department of Human Services processed the claim. All claims processed in the 12 months ending 30 June 2014 were taken into account. This is instead of using year of service, which has regard to when the services were actually rendered or received. Year of service statistics are not as timely as year of processing statistics, due to delays in lodgement of claims and can be subject to ongoing revision for this reason. Using year of processing statistics is consistent with the way the Department of Health and the Department of Human Services publish Medicare statistics.

Confidential results

Geographic areas containing results that could lead to the identification of individuals have been suppressed and their values marked as not available for publication. The confidentially process followed was set out by the Department of Health. Results were regarded as confidential by patient enrolment region if:

- the number of services was less than six, or
- the number of services was equal to or greater than six, but: two patients received more than 90 per cent of services, or one patient received more than 85 per cent of services; or two providers provided more than 90 per cent of services or one provider provided more than 85 per cent of services.

This method of confidentiality was applied when producing both crude and age-standardised results.

Interpretation of MBS statistics

Several factors should be considered in interpreting MBS statistics by region and in comparing service utilisation between regions.

These statistics relate to the region the patient lives in as identified on their Medicare enrolment, as opposed to the region in which the services were provided. Many patients receive services in a region other than the region recorded as their Medicare enrolment address postcode.

3. Pharmaceutical Benefits Scheme

The PBS statistics were derived from administrative information on services for pharmaceutical items listed on the PBS:

- that were eligible for a pharmaceutical benefit under the *National Health Act 1953* and for which a claim was processed by the Australian Government Department of Human Services in the 12 months ending 30 June 2014
- that may have been eligible for a pharmaceutical benefit under the *National Health Act 1953*, but were under the co-payment threshold.

The PBS statistics relate to PBS prescriptions dispensed for selected medicines where under the Australian Government Department of Human Services paid a benefit, as well as prescriptions dispensed that were priced below the general co-payment level (called under co-payment prescriptions). The statistics include all PBS prescriptions dispensed by approved suppliers, including community pharmacies (section 90 approved), public and private hospital pharmacies (section 94 approved) and dispensing doctors (section 92 approved). For more information about these sections, refer to the *National Health Act 1953*.

The statistics also included prescriptions subsidised under the Repatriation Schedule of Pharmaceutical Benefits (RPBS). The RPBS is available for veterans who have a Department of Veterans' Affairs White, Gold or Orange Card.

The PBS statistics excluded a large proportion of public hospital drug usage, medicines dispensed off a private prescription, and over-the-counter purchases. They also excluded medicines supplied by Aboriginal Health Services under Section 100 of the *National Health Act 1953*.

If patients had repeat scripts dispensed within the year, they were counted more than once in the rates. No consideration was made for increased quantity supplied from an authority or Regulation 24 prescription; in these circumstances the supply was counted as one.

The PBS is available to all Australian residents who hold a current Medicare card. Overseas visitors from countries with which Australia has a reciprocal health care agreement are also eligible to access the PBS.

Confidential results

Results for geographic locations were suppressed if the number of prescriptions dispensed was less than five.

Geography levels

For all items in the atlas other than the two length of hospital stay items, the geography of the counts for the rates is based on the patient's place of residence rather than where they received the service; however the source of the patient's address varies. For MBS and PBS items, the rates are determined by the person's Medicare enrolment postcode. For APC NMDS items, the rates are determined by the residential postcode the person gave the hospital on admission.

Postcodes were then allocated to regions (either SA3 or SA4) and to a state or territory, with utilisation rates presented per 100,000 of population.

Several technical methodological decisions were required to produce results for the atlas. These are described below.

Where postcodes overlapped SA3 or SA4 boundaries, MBS services, PBS prescriptions dispensed and hospital admissions were attributed to a SA3 or SA4 using concordance files from ABS showing the percentage of the population of each postcode in each SA3 or SA4.

In the SA3 and SA4 tables and maps, a small number of postcodes that did not map to SA3s or SA4s have been omitted from the statistics.

For items using MBS data, the postcode used in compiling statistics was based on the last processed MBS record (of any type) for each patient during 2013–14 (financial year of processing).

For items using PBS data, the postcode used in compiling statistics was based on their Medicare enrolment postcode on the date the prescription was dispensed.

Post office boxes

For items using MBS and PBS data, analysis at the local area level (SA3 or SA4) excluded six post office box postcodes. It is not easy to determine whether an individual's post office box address is in the region where they reside; hence a decision was made to remove this activity from local level analysis to avoid misrepresenting the results in these areas. However, these post office box postcodes were included in state, territory and national level results.

The following post office box postcodes were excluded:

- 2001 Sydney
- 2124 Parramatta
- 3001 Melbourne
- 4001 Brisbane
- 5001 Adelaide
- 6843 Perth.

Hospital-level reporting of average length of stay

Two items in the atlas are reported by hospital rather than by the patient's place of residence. These items are:

- stroke average length of stay in hospital by peer group – 65 years and over
- hip fracture average length of stay in hospital by peer group – 65 years and over.

Only hospitals in the major and large peer groups were included in the analysis. They are then further split into metropolitan and regional groups using the Australian Standard Geographical Classification (ASGC) Remoteness Area, 2006. These peer groups have been defined by NHPA. The atlas glossary includes definitions of these hospital peer groups.

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The following episodes of care were excluded when calculating the average (mean) length of stay:

- same day episodes, i.e. patients admitted and discharged on the same day
- episodes for non-acute care (only patients with a care-type of '1 – Acute care' were included. Patients with other care types (for example, '2 – Rehabilitation care' and '3 – Palliative care' were excluded from the analysis)
- episodes where the patient died
- episodes where the patient transferred to another facility within two days.

Hospitals with less than 10 separations were excluded from the analysis. Episodes determined to be long-stay outliers were also removed. These filters were applied after all other exclusion criteria had been applied.

The method selected took into account that the data are not normally distributed and used inter-quartile ranges as the guide for outlier exclusion. The method for detecting extreme outliers (mEO) was as follows:

$$mEO = Q_3 + k^*(Q_3 - Q_1)$$

Where

Q_1 equals the 25th percentile value

Q_3 equals the 75th percentile value

k equals a non-negative value of a constant.

Sensitivity analysis was conducted to identify k, based on the marginal reduction of coefficient of variation, and resulted in selecting k=10.

Socioeconomic and remoteness analysis

Local areas (SA3s and SA4s) were grouped into remoteness categories and socioeconomic quintiles based on the ABS' 2011 Australian Statistical Geography Standard (ASGS) and the 2011 Index of Relative Socioeconomic Disadvantage (IRSD), at the SA1 level.

The ASGS has five remoteness categories. The percentage of population in each remoteness category was calculated for each SA3. The remoteness category with the highest percentage of population was then selected. There were not enough SA3s in remote and very remote areas, so these remoteness categories were combined to make four remoteness categories in the atlas. The ABS has published Socio-Economic Indexes for Areas (SEIFA) quintiles for each SA1. For each SA3, the number of SA1s in each quintile was calculated and the quintile with the largest number of SA1s was selected.

When remoteness categories and socioeconomic quintiles were combined, there were 25 possible combinations that SA3s could be assigned to. Only 14 of these combinations were published to ensure each combination contained a sufficient number of SA3s for comparison purposes. The following three tables show how the remoteness and socioeconomic categories were determined.

Table 1: Number of SA3s by ASGS remoteness categories and SEIFA IRSD quintiles

	Quintiles of SEIFA IRSD				
ASGS Remoteness	1 (low)	2	3	4	5 (high)
Major Cities	30	27	33	37	61
Inner Regional	31	20	18	6	3
Outer Regional	23	16	4	2	3
Remote	5	1	2		1
Very Remote	5	2	1		

Table 2: Number of SA3s by ASGS remoteness categories and SEIFA IRSD quintiles (remote and very remote combined)

ASGS Remoteness	Quintiles of SEIFA IRSD 1 (low)	2	3	4	5 (high)
Major Cities	30	27	33	37	61
Inner Regional	31	20	18	6	3
Outer Regional	23	16	4	2	3
Remote & Very Remote	10	3	3		1

A minimum number of six SA3s were determined for comparison purposes, with smaller SEIFA quintiles combined until this threshold was reached.

Table 3: Number of SA3s by ASGS remoteness categories and SEIFA IRSD quintiles (final categories as seen in the publication)

ASGS Remoteness	Quintiles of SEIFA IRSD 1 (low)	2	3	4	5 (high)
Major Cities	30	27	33	37	61
Inner Regional	31	20	18	9	
Outer Regional	23	16	9		
Remote & Very Remote	10	7			

There were 14 groups that remained. Only Major Cities had five SEIFA quintiles, with Inner Regional having four SEIFA quintiles, Outer Regional having three SEIFA quintiles, and Remote and Very Remote having two SEIFA quintiles.

Age standardisation

The atlas presents both crude numbers and age-standardised rates per 100,000 population.

Where the age for an individual patient was clearly invalid, it was classified as a data error and excluded in performing the age-standardisation process. For MBS data items, age and gender were taken from the last item processed for each individual. For PBS and APC NMDS data items, age and gender were the age and gender of the person at the time the service was rendered.

Age-standardised rates are hypothetical rates that would have been observed if the populations being studied had the same age distribution as the standard population, while all other factors remained unchanged. Age-standardised rates were derived by calculating crude rates by age range. Crude rates per 100,000 population were calculated as the total number of admissions, MBS services or prescriptions dispensed divided by the total estimated resident population (ERP) as at June 2013 multiplied by 100,000. These rates were then given a weight that reflected the age composition of the standard population, in this case the ABS ERP as at 30 June 2001, which is the currently agreed national standard population.

The age standardisation formula used by NHPA is available at: **http://meteor.aihw.gov.au/content/index.phtml/itemId/327276**.

In undertaking age standardisation, a different approach was taken for items relating to one gender (for example prostate biopsies) or involving persons above a certain age (for example cataract surgery), as opposed to measures applying across all age groups (for example general practitioner mental health plans).

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For items applying across all age groups and both genders, data for regions were suppressed if one or more of the following conditions were met:

- total ERP for the region was less than 2,500
- ERP for one or more age groups for the region was less than 30
- total services or prescriptions dispensed were less than 20 (unrounded data). For items with small numbers of services or prescriptions dispensed such as asthma medicines, this number was reduced to less than 10.

For items applying to one gender or mainly to persons in certain age groups, data for regions were suppressed if one or more of the following conditions were met:

- total ERP for the region was less than 2,500
- ERP for the region for the gender/age groups in question was less than 200
- ERP for each age group for the region and the gender/age groups (to be published) in question (the denominator) was less than 30
- total services or prescriptions dispensed (the numerator) were less than 20. For items with small numbers of services or prescription dispensed such as asthma medicines, this number was reduced to less than 10.

Based on total ERP data, eight SA3s have been excluded from all items in the atlas.

Two SA3s were identified as having population sizes below 30 for either one or two age groups. The sensitivity of the results for these SA3s to these smaller age group population sizes was tested and the results were determined to be fit for purpose.

For items counting the number of hospital admissions, results for SA3s with less than 20 admissions were suppressed and are indicated as not available for publication, as were SA3s with a total population less than 2,500.

Identification of highest and lowest rate areas

Local areas with the highest and lowest rates have been identified for each item. Having regard to the overall distribution of the results, local areas were selected using an automated process. Selection was made from the histogram column by column with the aim of identifying at least the 10 highest and lowest rate areas for SA3s and the five highest and lowest areas for SA4s. For some items, less than 10 (or five for SA4s) local areas are listed. This is because inclusion of the next column would have resulted in a list of local areas too long for publication.

NHPA used an element of discretion to maintain a balance between statistical interpretation and visual presentation.

Glossary

Age standardisation	The removal of the influence of age when comparing rates between populations with different age structures. The current standard population is the Australian Estimated Resident Population as at 30 June 2001 (ABS 2012). Rates in the atlas are expressed per 100,000 people.[1]
Carer	A person who provides unpaid care and support to a family member or friend who has a disability, mental illness, chronic condition, terminal illness or general frailty. Includes parents and guardians caring for children.
Casemix-adjusted	Casemix is the mix of types of patients a hospital treats. In the atlas, casemix-adjustment is a statistical adjustment made for the average complexity of patients when grouping hospitals to hospital peer groups. In the atlas, this occurred for the length of stay items only.
Clinician	A healthcare provider trained as a health professional. Includes registered and non-registered practitioners, and teams of health professionals who spend most of their time providing direct clinical care.
Consumer	Patient, potential patient, carer or organisation representing consumer interests.
Episode of care	A period of care in a hospital. This can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending in a change of type of care (for example, from acute care to rehabilitation).
Hospital	All public, private, acute and psychiatric hospitals, freestanding day hospital facilities and alcohol and drug treatment centres. Includes hospitals specialising in dentistry, ophthalmology and other acute medical or surgical care. May also include hospitals run by the Australian Defence Force and corrections authorities, and those in Australia's offshore territories. Excludes outpatient clinics and emergency departments.

1 See the Technical Supplement for more information on the methodology used.

Glossary

Hospital admission	The administrative process of becoming a patient in a hospital.[2]
Hospital peer group	Grouping according to similarity to enable fair comparisons of performance across hospitals. A peer group can consist of hospitals of a similar size (major, large, medium-sized or small) or geographical location. Hospital size is determined by the number of admissions and in some cases the number of emergency department presentations annually. Hospitals within peer groups may change each year due to changes in their activity. See definitions for major metropolitan hospitals, major regional hospitals, large metropolitan hospitals and large regional hospitals.
Large metropolitan hospitals	Metropolitan acute hospitals treating greater than 10,000 acute casemix-adjusted separations and greater than 20,000 emergency department presentations annually.
Large regional hospitals	Regional acute hospitals treating greater than 8,000 acute casemix-adjusted separations and greater than 20,000 emergency department presentations annually.
Length of stay	Also known as 'average length of stay' within the atlas. The average (mean) number of days spent in hospital for each stay (episode of care) for patients who stay at least one night.
Local health networks	States and territories each have different descriptions of the governance structure providing health services. These include local health networks, local hospital networks, local health districts, boards or area health services. Where the term 'local health network' is used, it refers to the description of any of these terms as relevant to states and territories.
Major metropolitan hospitals	Metropolitan hospitals with greater than 20,000 acute casemix-adjusted separations and greater than 20,000 emergency department presentations annually. Excludes specialist women's and children's hospitals.
Major regional hospitals	Regional hospitals with greater than 16,000 acute casemix-adjusted separations and greater than 20,000 emergency department presentations annually. Excludes specialist women's and children's hospitals.
Medicare Benefits Schedule (MBS)	A listing of the Medicare services that the Australian Government subsidises.[3]
Pharmaceutical Benefits Scheme (PBS)	An Australian Government program that subsidises medicines.[4]

2 National Health Performance Authority. Glossary. 2015. (Accessed 13 October at www.myhealthycommunities.gov.au/glossary).
3 Australian Government Department of Health. MBS Online. 2013. (Accessed 14 October 2015 at www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/Home).
4 Pharmaceutical Benefits Scheme. PBS Frequently Asked Questions. 2015. (Accessed 12 October 2015 at www.pbs.gov.au/info/general/faq).

Population	The atlas uses two population estimates based on the Australian Bureau of Statistics (ABS) Estimated Resident Population at 30 June 2013, and age-standardised rates are calculated as at 30 June 2001 and are based on the 2001 Census results.
Primary care	Relates to the treatment of non-admitted patients in the community. It is usually the first point of contact people have with the health system.[5]
Primary health networks (PHNs)	Primary health networks began to operate on 1 July 2015 to replace Medicare locals.[6] PHNs connect health services across local communities so that patients, particularly those needing coordinated care, have the best access to a range of health care providers, including practitioners, community health services and hospitals. PHNs work directly with general practitioners, other primary care providers, secondary care providers and hospitals.
Regulation 24 prescription	A PBS prescription that, in certain circumstances, allows a pharmacy to supply all repeats simultaneously.
Remoteness Areas	Categories of geographical remoteness based on the ABS 2006 Census of Population and Housing.[7]
Same-day hospitalisation	Occurs when a patient is admitted and separated from hospital on the same date.
Separation	An episode of admitted patient care, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending in a change of type of care (for example, from acute care to rehabilitation). In the atlas, 'separation' usually refers to a hospital admission.
Socioeconomic status	Local areas are grouped into socioeconomic quintiles based on the 2011 Index of Relative Socio-Economic Disadvantage (IRSD) at the SA1 level. The IRSD is derived from Census variables relating to disadvantage, such as low income, low educational attainment, unemployment and dwellings without motor vehicles. Information from the ABS Socio-Economic Indexes for Areas (SEIFA) – Index of Relative Socio-Economic Disadvantage was used to calculate the socioeconomic status at the SA3 and SA4 levels in the atlas. SEIFA includes four summary measures created from 2006 Census information. The indexes can be used to explore different aspects of socioeconomic conditions by geographic areas. For each index, every geographic area in Australia is given a SEIFA number that shows how disadvantaged that area is compared with other areas. Each index summarises a different aspect of the socioeconomic conditions of people living in an area. For example, they provide more general measures of socioeconomic status than is given by measuring income or unemployment alone.[8]

5 Department of Health. Primary care. 2015. (Accessed 12 October 2015 at www.health.gov.au/internet/main/publishing.nsf/content/primarycare).
6 Medicare Locals planned and funded health services in communities across Australia from 2011 to 2015. In 2015, Medicare Locals were replaced by Primary Health Networks (PHNs). Also see Primary Health Network.
7 For information on the categories used in the atlas, see the ABS' *Statistical Geography Volume 1 – Australian Standard Geographical Classification (ASGC)*, July 2006, cat. no. 1216.0.
8 For further information, see the ABS' *Information Paper: An Introduction to Socio-Economic Indexes for Areas (SEIFA), 2006*, ABS cat. no. 2039.0.

Glossary

Statistical Areas Level 3 (SA3)	These are geographic areas defined in the ABS Australian Statistical Geography Standard (ASGS). The aim of SA3s is to create a standard framework for the analysis of ABS data at the regional level through clustering groups that have similar regional characteristics. There are 333 spatial SA3s covering the whole of Australia without gaps or overlaps. SA3s usually have a population of between 30,000 and 130,000 people. At 30 June 2011, about 50 had fewer than 30,000 people and 35 had more than 130,000 people. In the major cities, SA3s represent areas serviced by major transport and commercial hubs. They often closely align with large urban local government areas (for example, Parramatta and Geelong). In regional areas, they represent areas serviced by regional cities with populations of more than 20,000 people. In outer regional and remote areas, they represent areas that are widely recognised as having a distinct identity and similar social and economic characteristics (for example, the Macedon Ranges in Victoria and the Southern Highlands in NSW). There are a few 'zero SA3s', which have a very small or zero population and are mainly very large national parks close to the outskirts of major cities.[9]
Statistical Areas Level 4 (SA4)	These are geographic areas defined in the ABS Australian Statistical Geography Standard (ASGS). The aim of SA4s is to reflect the labour markets within each state and territory. SA4s provide the best sub-state and socioeconomic breakdown in the ASGS. There are 88 spatial SA4s covering the whole of Australia without gaps or overlaps. They are designed to provide a regional breakdown of Australia. Most SA4s have a minimum of 100,000 people. In regional areas, SA4s tend to have populations closer to the minimum (100,000–300,000 people). In metropolitan areas, SA4s tend to have larger populations of 300,000–500,000 people.[10]

9 For further information, see the ABS' *Australian Statistical Geography Standard (ASGS): Volume 1 – Main Structure and Greater Capital City Statistical Areas, July 2011*, cat. no. 1270.0.55.001.

10 For further information, see the ABS' *Australian Statistical Geography Standard (ASGS): Volume 1 – Main Structure and Greater Capital City Statistical Areas, July 2011*, cat. no. 1270.0.55.001.

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Australian Commission on Safety and Quality in Health Care

Level 5, 255 Elizabeth Street, Sydney NSW 2000
GPO Box 5480, Sydney NSW 2001

Telephone: (02) 9126 3600 (international +61 2 9126 3600)
Fax: (02) 9126 3613 (international +61 2 9126 3613)
mail@safetyandquality.gov.au
www.safetyandquality.gov.au/atlas