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Perils of Place

Identifying hotspots of health inequality

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Overview

When people end up in hospital for diabetes, tooth decay, or other conditions that should be treatable or manageable out of hospital, it's a warning sign of system failure. Australia's health system is consistently failing some communities. Places such as Mount Isa and Palm Island in Queensland, and Broadmeadows and Frankston in Victoria, have had appalling rates of potentially preventable hospital admissions for at least a decade.

Using data that were available for two states, this report identifies 38 places in Queensland and 25 in Victoria that have had potentially preventable hospitalisation rates at least 50 per cent higher than the state average in every year for a decade. This is unacceptable place-based inequality.

Australia is not a uniform country and a one-size-fits-all response will not work. Disadvantaged areas are more likely to experience health inequalities, but just because an area is disadvantaged does not make it likely that it will have persistently high rates of potentially preventable hospitalisations. No uniform pattern in any area exists. Local, tailored policy responses are required.

Primary Health Networks have a responsibility to identify and address health needs in their regions. This report introduces a useful tool for this purpose: a methodology for identifying small areas with a *persistent* but reducible problem. These are the places where health inequalities are already entrenched and, without intervention, are most likely to endure.

The role of place in shaping people's health and opportunity is well-established. Yet there is only limited evidence of what works in reducing health inequalities. Government should therefore invest in trials to reduce health inequalities in priority places.

We recommend a three- to five-year intervention trial in a small number of areas. Place-based interventions should be developed locally, with the support of Primary Health Networks and the relevant communities, and must be rigorously evaluated.

If potentially preventable hospitalisations in priority places were reduced to average levels in the two states we studied, we estimate direct savings to be at least $10 to $15 million a year. Indirect savings should be significantly larger. The cost-effectiveness of interventions must be established on a small scale before they are rolled out to further areas.

Government and Primary Health Networks must ensure that all communities get a fair go. Improving the health of people in these priority places will, in the long-run, improve well-being and opportunity, social cohesion and inclusion, workforce participation and productivity, and reduce health system costs. We propose options for specific responses in priority places.

Persistent hotspots are rare, so targeting hotspots alone will not substantially reduce the overall burden of potentially preventable hospitalisations in Australia. But it's an important first step.

As Primary Health Networks get more sophisticated in identifying the people most in need, and as the evidence from trials builds, efforts to reduce health inequalities should be strengthened and expanded beyond the priority places identified here.

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1 A fair go in health

Health inequalities abound in the land of the fair go.

This report defines these inequalities as unnecessary, avoidable and unfair health differences between identifiable populations.[1]

Tackling the root causes of health inequalities is one of the main international development goals.[2] But there are many different determinants of health inequalities and different forms of disadvantage can compound each other.[3]

One of Australia's most stark and disturbing health inequalities is the difference in life expectancy between Indigenous and non-Indigenous Australians.[4]

Where you live also matters to your chances of a long and healthy life, as does your profession, income and education (to name only a few).[5]

Not all health disparities represent inequality though. Some health differences are biological: younger populations tend to be healthier than older ones, for example. Some health problems affect only men or only women. These differences are neither unfair nor avoidable and are not considered health inequalities.[6]

Equity in health is an ethical obligation and a human rights principle.[7] The Constitution of the World Health Organisation

Box 1: A quick guide to this report

This report identifies geographic hotspots of health inequalities and provides recommendations on how to address them.

In Chapters 1 and 2 we define health inequalities, introduce our outcome measure – potentially preventable hospitalisations – and explain why we chose a geographic lens for identifying health inequalities.

In Chapters 3 and 4 we provide an overview of our methodology for identifying and prioritising hotspots of health inequalities. The methodological supplement to this report provides further detail.

In Chapter 5 we present specific options for reducing potentially preventable hospitalisations in the priority places identified in this report and propose recommendations to address health inequalities in priority places and beyond.

Chapter 6 provides a summary of the report's conclusions and recommendations.

[1] Populations might be defined socially, economically, demographically or geographically (Whitehead (1992); Braveman and Gruskin (2003); World Health Organisation (WHO) (2016a))
[2] Commission on Social Determinants of Health (CSDH) (2008)
[3] Carter-Pokras and Baquet (2002); Braveman and Gruskin (2003); Ansari, *et al.* (2006); McLachlan, *et al.* (2013)
[4] Productivity Commission (2015)
[5] Turrell, *et al.* (2006)
[6] Braveman and Gruskin (2003)
[7] Ibid.

states that everyone has the right to *"the highest attainable standard of health"*.[8]

This standard can be interpreted as the biologically attainable health levels of a given society and measured as the health levels enjoyed by the most privileged groups in that society.[9]

Lifting the health levels of all groups to this standard brings many benefits. It improves well-being and opportunity, social cohesion and inclusion, workforce participation and productivity, and helps to overcome other forms of disadvantage. Improving the health and well-being of disadvantaged groups will reduce health system costs in the long run, and in some cases immediately.[10]

Universal healthcare, which Australia enjoys, is a fundamental platform for achieving health equity because it enables people to access healthcare regardless of ability to pay. Yet financial barriers to access still exist – about 18 per cent of all general practice consultations are not bulk billed, and the rate of out-of-pocket costs is higher in rural and regional areas.[11]

Other barriers deprive some populations of timely access to healthcare. Delay can lead to much worse patient outcomes and higher costs to the health system. Such barriers include educational and language barriers, health and service information gaps, service distribution gaps, and accessibility for those with physical or mental disabilities.

Yet universal healthcare, while critical, does not guarantee equal opportunity to be healthy. Universal solutions (aimed at the entire population) can be very effective in improving average health, but do not necessarily alter underlying health disparities.[12]

Targeted solutions are needed to specifically address health inequalities. The Close the Gap campaign, for example, seeks to close the health and life expectancy gap between Indigenous and non-Indigenous Australians. It calls for targeted health services (through the model of Aboriginal Community Controlled Health Services), as well as *"particular focus on regions with relatively poor health and inadequate levels of service"*.[13]

Health authorities, such as Primary Health Networks and district health services, should identify and address health inequalities. Geography offers a platform for doing this in a more targeted way, not least because health services are administered geographically.[14]

This report looks at how to identify and address geographic health inequalities (see Box 1). It does not look at wider system reform, such as fostering an equity-oriented healthcare sector.[15]

[8] WHO (2006)
[9] Braveman and Gruskin (2003)
[10] Brown, *et al.* (2012); McLachlan, *et al.* (2013); Commission on Social Determinants of Health (CSDH) (2008)
[11] Duckett, *et al.* (2014); Duckett, *et al.* (2013)
[12] Turrell, *et al.* (2006) p136
[13] Australian Human Rights Commission (2016)
[14] Koschinsky (2013)
[15] Baum (2016)

1.1 The promise of prevention

Prevention is the place to start tackling health inequality.

The promise of prevention is increasing 'quality years of life' (improving population well-being and productivity) while avoiding or minimising the need for advanced and costly care.

Preventive interventions aim to reduce the risk of disease or injury in the first place, halt or slow the progression of disease, and enable better management of disease in the home or primary care setting.

Over the past century, development of successful preventive interventions such as sanitation, vaccination and workplace health and safety have reduced the burden of infectious diseases and injury.

Preventive health efforts have historically favoured universal over targeted approaches.[16] Australia has a strong track record in universal prevention public policy, including a National Immunisation Program, world-leading tobacco control policies, and health promotion efforts such as the *Slip, Slop, Slap* campaign to reduce the risk of skin cancer.[17]

However some populations are more 'at risk' – more prone to developing preventable problems – than others. For example, men are more likely to commit suicide;[18] people living in rural and remote areas are more likely to smoke, be overweight, and have high blood cholesterol;[19] and people with disabilities are more likely to develop mental health problems and chronic illness, and are also more likely to experience violent crime.[20]

Targeted preventive interventions can be tailored to different needs, problems or causes in different populations and have the potential to be particularly cost-effective if limited resources can be focused where they are most needed.

We first need to identify which problems are preventable (Section 1.2) and the populations most at risk (Section 1.3).

1.2 Which health problems are preventable?

In identifying places representative of extremely poor health outcomes it is important to focus on outcomes that are amenable to action. The worst health outcomes may not be preventable or reducible.

Better targeting of health services to the places most in need requires indicators of preventable illness, unnecessary suffering and gaps in health services.

Some people end up in hospital for conditions like diabetes and tooth decay. These are conditions that should, at least in part, be treatable or manageable in the community (in primary care for example), without the need for admission to hospital. Hospitalisations for these conditions, known in the health system as Ambulatory Care Sensitive Conditions (ACSCs), are therefore

[16] Zulman, *et al.* (2008)
[17] Australian Institute of Health and Welfare (AIHW) (2014b); Australian National Preventive Health Agency (ANPHA) (2013)
[18] Australian Bureau of Statistics (ABS) (2015)
[19] Australian Institute of Health and Welfare (AIHW) (2014a), p187
[20] VicHealth (2012)

potentially preventable. In this report, we use the terms 'ACSCs' and 'potentially preventable hospitalisations' interchangeably (see Box 2 for further information on ACSCs and Table 1 for a full list of conditions).[21]

Australia's National Healthcare Agreement recognises 22 categories of ACSCs.[22] In 2013-14, 6 per cent of all hospitalisations were associated with these 22 conditions.[23] ACSCs represent a significant cost to the taxpayer and have high costs for patients – in terms of health outcomes, time in hospital (2.4 million bed days in 2013-14) and out-of-pocket costs.

We use these potentially preventable hospitalisations as an indicator of serious but reducible health inequality. Hospitalisation is always serious, but hospitalisations in this group of conditions are likely to be reducible. High incidence of one or more ACSCs may offer a canary-in-a-coal-mine indicator of health inequality.

ACSCs were originally developed in the US as 'prevention quality indicators', designed to measure quality of out-of-hospital care at the population level.[24] In both research and public policy, ACSC hospitalisations are often used as a proxy measure of primary care effectiveness and/or access to care.[25]

Box 2: What are Ambulatory Care Sensitive Conditions?

'Ambulatory' means 'related to walking' and 'ambulatory care' is an American term referring to out-of-hospital medical care (i.e. medical care provided to those who can walk in the door). The initial work in this area was developed in the United States, so the labels used are American. Ambulatory Care Sensitive Conditions (ACSCs) are diseases that are expected to be treatable out-of-hospital (in an ambulatory care setting). In essence, Ambulatory Care Sensitive Conditions are those conditions for which the likelihood of hospitalisation is sensitive to (that is, affected by) the quality of ambulatory care.

In theory at least, if the condition is treated and/or managed appropriately in the community (through public health interventions, in general practice or with other community support) the patient is less likely to end up in hospital. Hospitalisations for ACSCs are therefore considered to be potentially preventable.

ACSCs include diabetes complications, dental conditions, skin and other infections, pneumonia, iron deficiency, asthma and chronic obstructive pulmonary disorder (COPD). Reducing hospitalisations for ACSCs might involve vaccination, early diagnosis and treatment, and/or good ongoing control and management in ambulatory care settings. Table 1 lists all 22 ACSCs and example interventions for each.

[21] Council of Australian Governments (COAG) (2015)
[22] Ibid.
[23] National Health Performance Authority (NHPA) (2015)
[24] They were developed (and have since been adapted) through Delphi processes of consensus development among clinicians about what should be preventable (Davies, *et al.* (2011))
[25] Solberg (2015); Rosano, *et al.* (2012). An Australian study tested the validity of ACSCs as a measure of access to healthcare and found that better access correlated with lower ACSC rates even after disease prevalence, disease burden, physician supply, and propensity to seek care were accounted for (Ansari, *et al.* (2006)).

The challenge with using ACSCs as a key performance indicator for health services is that we would not expect all ACSC hospitalisations to be completely preventable. In a recent European study, a group of physicians estimated the preventability of different ACSC categories, and the degree of preventability ranged between 61 per cent for ischaemic heart diseases (Angina) and 94 per cent for dental diseases (average was 75 per cent).[26]

A previous Grattan Institute report, *Chronic Failure*, suggested that some ACSC hospitalisations may be more preventable than others. Primary care interventions may only be effective in preventing lower severity admissions, and these are likely to be the shorter stays in hospital (two days or less).[27]

There is only limited evidence for what works in reducing ACSCs.[28] The Primary Healthcare Research and Information Service (PHCRIS) profiled several interventions to reduce potentially preventable hospitalisations and distilled some lessons.[29] Specialist diabetes outpatient clinics had some success in reducing hospitalisations for diabetes complications, while physiotherapy and rehabilitation clinics significantly reduced hospitalisations for Chronic Obstructive Pulmonary Disease (COPD). Elements of successful programs are largely context and condition specific. Successful interventions tended to be long-term (longer than 6 months) and often involved nurses coordinating input from different health care services in the ongoing management of patients.[30]

ACSC hospitalisations are used as a health outcome indicator in the National Healthcare Agreement and National Strategic Framework for Aboriginal and Torres Strait Islander Health. They are likely to be an important indicator in evaluating the performance of Primary Health Networks (see Section 2.4).[31]

We use ACSCs to identify geographic pockets of health inequality, where there is particular need for additional resources to prevent poor health outcomes.

1.3 Focus prevention on those most at risk

Efforts to reduce potentially preventable hospitalisations should be targeted to the individuals and populations most at risk.

Ideally interventions are provided directly to the people most in need, but since it is often not possible to pinpoint these people precisely, prevention efforts should be focused on high-risk individuals and/or high-risk places.

Prevention pitched to high-risk individuals may focus on reducing behavioural risk factors, such as smoking in people with diabetes. It may offer additional services, such as care coordination and education for patients with chronic health problems or hospital discharge planning to prevent readmission.

[26] Sundmacher, *et al.* (2015)
[27] Swerissen, *et al.* (2016)
[28] Solberg (2015)
[29] Katterl, *et al.* (2012); Erny-Albrecht, *et al.* (2016)
[30] Katterl, *et al.* (2012); Erny-Albrecht, *et al.* (2016)
[31] Department of Health (Commonwealth) (2014b)

Prevention focused on high-risk places usually aims to address structural problems or risk conditions such as low access to social, educational or health services for everyone in a given place.[32]

Individuals may also be targeted within high-risk places, as geography can be an efficient way to get to concentrations of high-risk individuals.

Targeting prevention efforts to individuals requires a good understanding of the people most at risk of preventable injury or disease. For example, age, socio-economic status, ethnicity, family history and comorbidity are widely associated with health outcomes. High-risk individuals can be identified based on specific risk factors; however, the interplay of different risk factors is not always well understood.

In practice, individual targeting is often limited by the availability of information on individuals' health behaviours and risk factors. Records are poor even among patients with a diagnosed chronic disease who go to their regular doctor. For example, only 15 per cent of diabetes patients have three key risk factors recorded: their blood sugar, weight and blood pressure.[33]

Geographic targeting is taking off in the absence of clarity about risk factors and high quality data for individual-level targeting.

High-risk places can be identified based on analysis of disease prevalence at the small area level. The next two chapters demonstrate a methodology for identifying these places.

'Hotspots' – small areas with relatively high risk or incidence of a particular health problem – are being used to target and tailor public health interventions around the world (by the US Centers for Disease Control and Prevention, for example). Use of hotspots has also been proposed in Australia to identify common suicide locations[34] and places at risk of violent crime,[35] to target mental health services[36] and manage potentially preventable hospitalisations,[37] as well as to identify over-servicing and system waste.[38]

Places at high risk of preventable or reducible health problems might also be identified through analysis of healthcare availability, low socio-economic status, remoteness and other indicators of disadvantage. 'Dropping off the Edge 2015' identified locational disadvantage in Victoria using a broad range of disadvantage indicators including rates of family violence, disability and mental illness.[39]

Ultimately, in targeting prevention, initiatives must pass two criteria: firstly, they must be able to identify high-risk individuals or high-risk places, and secondly, it must be more efficient to focus interventions on them than on the population as a whole.[40]

[32] Swerissen and Crisp (2004)
[33] Swerissen, *et al.* (2016)
[34] Department of Health (Commonwealth) (2014a)
[35] NSW Bureau of Crime Statistics and Research (2016)
[36] Department of Health (Commonwealth) (2010)
[37] Ansari, *et al.* (2002); National Health Performance Authority (NHPA) (2015)
[38] Australian Commission on Safety and Quality in Health Care (2015)
[39] Vinson and Rawsthorne (2015)
[40] Burt (1998)

1.4 Who is responsible?

In July 2015, the Federal Government selected and funded 31 Primary Health Networks, replacing the 61 Medicare Locals. The PHNs (and Medicare Locals before them) create a regional framework for primary healthcare management. They also provide an opportunity to target preventive health services to the needs of local communities.

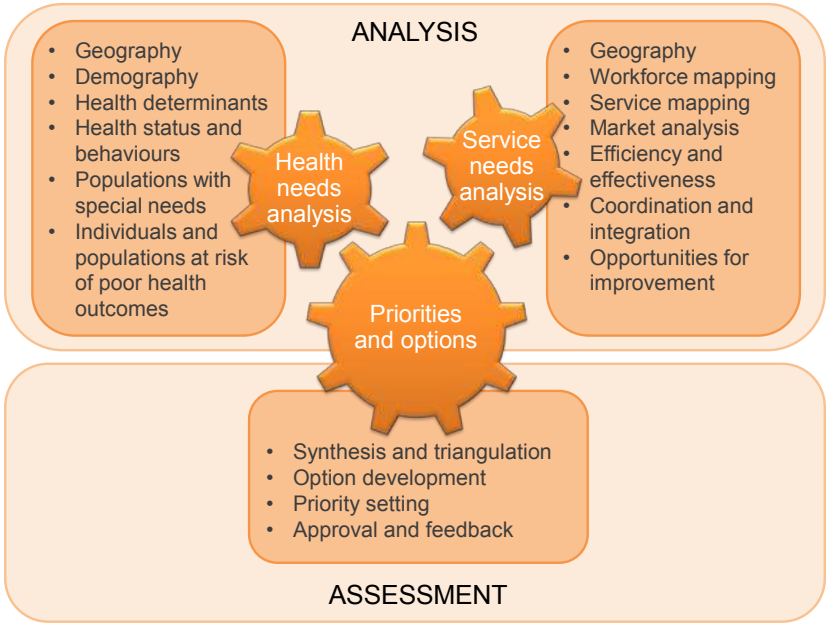
PHNs were established to make medical services more efficient and effective and to improve coordination of care within their region based on *"an understanding of the health care needs of their communities through analysis and planning"*.[41]

PHNs are undertaking needs assessments to identify and set priorities for health needs in their region (see Figure 1). They begin commissioning health services from July 2016 (with ongoing needs assessment).[42]

When setting local priorities, PHNs should consider which health problems are preventable, which interventions are most likely to be effective, and how they will target chosen interventions to those most in need.

This report focuses on *place*-based targeting. The next chapter summarises the evidence on how places affect the health of people living there and how they might be changed to improve health outcomes.

Figure 1: Structure of the PHN Needs Assessment



Source: Reproduced from the PHN Needs Assessment Guide - Department of Health (Commonwealth) (2015)

The following chapters focus on how PHNs (working with other state and local health management bodies) might identify and prioritise places where potentially preventable hospitalisations are particularly high, to reduce place-based health inequalities.

This report builds on earlier work of relevance to PHNs on chronic disease management in primary care.[43]

[41] Department of Health (Commonwealth) (2014b)
[42] Department of Health (Commonwealth) (2015)
[43] Swerissen, *et al.* (2016)

Table 1: There are 22 types of potentially preventable hospitalisations – Australia's 22 Ambulatory Care Sensitive Conditions (ACSCs)

ACSC Category	Description	Proposed prevention strategies (examples)
Angina	Chest pain caused by insufficient blood flow to the heart	Medication; ongoing control and management
Asthma	Chronic disease of the airways, intermittently affecting breathing	Medication; ongoing control and management; tobacco cessation and mitigation of indoor air pollution
Bronchiectasis	Chronic infection resulting in widening of the airways and damage to the lungs	Disease management; tobacco cessation and mitigation of indoor air pollution
Cellulitis	Bacterial infection of the skin	Early diagnosis and treatment (medication); access to primary health care
Congestive cardiac failure (CCF)	A chronic condition where the heart is weakened and may be unable to pump sufficient blood to the body	Behaviour modification and lifestyle change; medication; ongoing control and management
Convulsions and epilepsy	Neurological diseases characterised by seizures	Medication; ongoing control and management
Chronic obstructive pulmonary disease (COPD) – incl. emphysema and chronic bronchitis	Progressive and disabling destruction of lung tissue and narrowing of airways leading to shortness of breath and reduced capacity for activity	Disease management programs; specialist rehabilitation clinics; tobacco cessation and mitigation of indoor air pollution
Dental conditions	Dental caries and other diseases of the oral region	Access to dental care
Diabetes complications	Type 1 and 2 diabetes mellitus can lead to serious complications if not managed, incl. organ damage	Medication; disease management programs; telehealth; specialist diabetes clinics
Ear, nose and throat infections (ENT)	E.g. Tonsillitis, Pharyngitis	Access to primary health care
Eclampsia	Convulsions in pregnant women with high blood pressure threatening health of both mother and baby	Management of blood pressure during pregnancy
Gangrene	Death or decay of body tissue from obstructed circulation or infection, sometimes resulting in amputation	Access to primary health care
Hypertension	Persistently high blood pressure	Behaviour modification and lifestyle change; medication; ongoing control and management
Iron deficiency anaemia	Lack of iron resulting in fewer red blood cells and reduced oxygen in the blood	Dietary changes; iron supplementation; access to primary health care
Nutritional deficiencies	Severe malnutrition, lack of nutrients	Dietary changes; access to primary health care
Other vaccine-preventable conditions	E.g. Chicken pox, Measles, Mumps, Rubella, Diphtheria, Whooping cough, Rotaviral enteritis	Vaccination

ACSC Category	Description	Proposed prevention strategies (examples)
Pelvic inflammatory disease	Bacterial infection and inflammation of the female genital tract	Early diagnosis and treatment; screening; sex education; access to primary health care
Perforated/bleeding ulcer	A serious complication of an untreated stomach ulcer	Early diagnosis and treatment (medication); access to primary health care
Pneumonia and influenza (vaccine-preventable)	Pneumonia is inflammation of the lungs caused by infection; Influenza is a viral infection of the nose, throat, airways, and lungs	Vaccination
Pneumonia (not vaccine-preventable)	Some forms of pneumonia do not yet have a vaccine	Access to primary health care
Rheumatic heart diseases	Heart inflammation, which can result in permanent damage	Medication; ongoing control and management
Urinary tract infections, including pyelonephritis (UTI)	Infection of the urinary system, usually bacterial, that can lead to severe kidney damage if left untreated	Early diagnosis and treatment (medication); access to primary health care

Sources: World Health Organisation (WHO) (2011); Katterl et al. (2012); Council of Australian Governments (COAG) (2015)

2 Why place matters

Where we live affects our health.

'Place' helps to shape people's health experiences through many different physical, social, economic and psychological exposures.[44] Health services are also organised geographically.

The conditions in which people are born, grow, live, work and age ('social determinants of health') are intimately linked to place. The World Health Organisation recognises them as the major causes of unjust and avoidable health differences.[45]

But does a place make people sick or do sick people move there? Spatial patterning in health outcomes can be a result of the characteristics of individuals concentrated there, the opportunity and lifestyle structures of the place itself, and/or the socio-cultural and historical features of communities.[46]

In a review of place effects on health, Macintyre *et al.* (2002) suggest that *"where you live matters for health, although probably not as much as who you are"*. Others argue that the relationship between people and place is inextricably linked.[47]

Place-based approaches are clearly effective where location is a direct risk factor, for example, in preventing the spread of infectious disease and in reducing environmental health impacts.[48]

The importance of location in the risk of non-communicable disease is less clear, but local area features beyond the physical environment can influence health in a range of ways (see Box 3).[49]

Many preventable hospitalisations are likely to be caused by non-medical factors,[50] some of which may be place-based or spatially concentrated. These include financial problems, lack of social support or access to healthcare. Accordingly, Primary Health Networks have been encouraged to consider place-based prioritisation as part of their community health needs analyses (see Section 2.4).[51]

This report focuses on places with very poor but potentially preventable health outcomes. These places both represent unacceptable health inequality and provide an opportunity to better target health and broader services to those most in need.

[44] Macintyre, *et al.* (2002)
[45] World Health Organisation (WHO) (2016b)
[46] Macintyre, *et al.* (2002)
[47] Cummins, *et al.* (2007)
[48] e.g. Reissman, *et al.* (2001); Bousema, *et al.* (2012); Ferguson, *et al.* (2005)
[49] Macintyre, *et al.* (2002)
[50] Solberg (2015)
[51] Department of Health (Commonwealth) (2015)

Box 3: Five ways in which place can influence health

1. *Physical features of the environment shared by all residents in a locality*. These include the quality of air and water, latitude and climate, and are likely to be shared by neighbourhoods across a wide area.

2. *Availability of healthy environments at home, work and play.* Areas vary in their provision of decent housing, secure and non-hazardous employment, safe play areas for children, and so on. These environments may not affect everyone living in an area; for example, they may affect the employed more than the unemployed or families with children more than elderly people.

3. *Services provided, publicly or privately, to support people in their daily lives*. These include education, transport, street cleaning and lighting, policing, health and welfare services. How these affect people may depend on personal circumstances: public transport may matter more if you do not own a car, for example.

4. *Socio-cultural features of a neighbourhood.* These include the political, economic, ethnic and religious history of a community: norms and values, the degree of community integration, levels of crime, incivilities and other threats to personal safety, and networks of community support.

5. *The reputation of an area.* How areas are perceived, by their residents, by service or amenity planners and providers, by banks and investors, may influence the infrastructure of an area, the self-esteem and morale of residents, and who moves in and out of the area.

Source: Macintyre et al. (2002)

2.1 Geographic variation in preventable health problems

Geographic variation in health among countries, states and at the small-area level is well-documented.[52]

A recent study looked at geographic variability in life expectancy across the US for 741 'commuting zones' and found differences among zones of more than a decade in average life expectancy. Longer life expectancy is known to be associated with higher income, and there is geographic variation in income too. Yet the authors found that even within an income group, life expectancy varied by up to five years among zones. Differences in life expectancy correlated with health behaviours (smoking, obesity and exercise, for example) and with local area characteristics. It all emphasises the role of place in shaping health.[53]

Studies have also found substantial geographic variation in potentially preventable hospitalisations around the world[54] and in Australia.[55]

In Victoria, studies have shown wide geographic variation in rates of potentially preventable hospitalisations, particularly diabetes complications and Chronic Obstructive Pulmonary Disease (COPD). This variation has been linked to socio-economic status, smoking rates and remoteness.[56] A study showing geographic variation in rates of potentially preventable hospitalisations in

[52] Diez Roux and Mair (2010); Pickett and Pearl (2001); Riva, *et al.* (2007)
[53] Chetty, *et al.* (2016)
[54] e.g. Berlin, *et al.* (2014); Ibañez-Beroiz, *et al.* (2014); Will, *et al.* (2014)
[55] National Health Performance Authority (NHPA) (2015); Butler, *et al.* (2013); Harrold, *et al.* (2014); Ansari, *et al.* (2005); Ansari, *et al.* (2007)
[56] Ansari, *et al.* (2002); Ansari, *et al.* (2005); Ansari, *et al.* (2007)

young children also demonstrated area-level associations with social exclusion and deprivation.[57]

In NSW, rates of potentially preventable hospitalisations are more than twice as high in Indigenous people compared to non-Indigenous people of the same age, sex and location.[58] Geographic variation has been observed in potentially preventable hospitalisation rates for Indigenous people, as well as in the *disparity* in rates between Indigenous and non-Indigenous. The largest disparities are for diabetes complications, COPD and rheumatic heart disease.[59]

2.2 Evidence for place-based intervention

While there is good evidence that place-based factors affect health, there is unfortunately much less evidence of the effectiveness of place-based interventions designed to reduce health inequalities.[60]

Place-based initiatives aimed at addressing health inequalities have been introduced around the world, but often without monitoring progress and outcomes.[61]

There are some exceptions, though. A large community-based, randomised controlled trial in New Zealand assessed the health impacts of insulating existing homes, and targeted vulnerable populations with the aim of reducing health inequalities. Insulated homes were warmer and drier after the intervention and occupants reported feeling better, taking fewer sick days, and making fewer visits to general practitioners.[62]

In 2001 the Victorian Government introduced a Neighbourhood Renewal program that focused on disadvantaged communities with high concentrations of public housing. The program combined community empowerment, place-based management and integration of services such as housing and crime prevention to address six action areas, one of which was 'promoting health and wellbeing'.[63] A 2010 evaluation found that the program had improved the self-reported health and life satisfaction of residents in intervention areas relative to control areas. Yet it could not unpick specifically how and why the change had occurred.[64] Internal evaluation of other action areas found reduced crime, reduced unemployment and perceived improvement in housing conditions.[65] An independent evaluation demonstrated that growth in house prices in some Neighbourhood Renewal areas was higher than in the immediate surrounds and were more than twice as large as government investment in the program.[66]

Two recent reports have reviewed lessons from Australian place-based initiatives tackling disadvantage in health and beyond and both reports agree that:

[57] Butler, *et al.* (2013)
[58] Harrold, *et al.* (2014)
[59] Ibid.
[60] O'Dwyer, *et al.* (2007)
[61] Matheson, *et al.* (2009)
[62] Howden-Chapman, *et al.* (2007)
[63] Department of Human Services (Victoria) (2005)
[64] Kelaher, *et al.* (2010)
[65] Internal evaluations conducted by the Victorian Department of Human Services, reported in Wood and Cigdem (2012)
[66] Ibid.

> *"the evidence base of what works and how it works is patchy"*[67]
>
> *"the causality and cost-effectiveness of programs were rarely evaluated"*[68]

A recent review sought to identify approaches to reduce social determinants of health inequalities across 12 different types of settings (including cities, neighbourhoods, workplaces, healthcare settings and online settings). The review did identify some successful approaches (and others that show promise) but on the whole it found that many interventions were focused on individual behaviour change within settings rather than on approaches that change the setting itself.[69]

A systematic review of the evidence of the effectiveness of place-based interventions in reducing health inequalities found only 24 relevant evaluations internationally (including some overlap in the intervention programs evaluated). The review found some evidence that changes to a place can reduce health inequalities but was unable to form a firm view, given the lack of rigorous evaluations.[70]

Most interventions reviewed involved a combination of approaches in a single place, making attribution of cause and effect more difficult, and generalisation inappropriate.[71] Many factors that are specific to a place create inequalities, so multi-pronged and tailored approaches are often required.

One simpler intervention, the construction of a new supermarket offering fruit and vegetables at affordable prices, produced a modest but positive improvement in people's nutrition. The largest improvements were seen in those with the poorest diets before the intervention and those who lived closest to the supermarket.[72]

In an extreme intervention, the US 'Moving to Opportunity' experiment, relocated very poor households to wealthier neighbourhoods. Mental health and well-being, particularly among children, improved relative to control groups.[73]

The review authors argue that the challenge is to use rigorous evaluation to build the evidence for or against the effectiveness of place-based interventions. Others say it is just as important to understand *how* place-based interventions improve health, because long-term futures will always be uncertain.[74]

The role of place in shaping people's health and opportunity is well-established but there is only limited evidence for what works in reducing place-based health inequalities.

[67] Wilks, *et al.* (2015); Brotherhood of St Laurence (BSL) (2015)
[68] Wilks, *et al.* (2015)
[69] Newman, *et al.* (2015)
[70] O'Dwyer, *et al.* (2007)
[71] Ibid.
[72] Wrigley, *et al.* (2003)
[73] Leventhal and Brooks-Gunn (2003)
[74] Matheson, *et al.* (2009)

3 Identifying hotspots

We analysed potentially preventable hospitalisations across Queensland and Victoria, the two states where adequate data were available, to see whether we could find particularly high-risk places[75] that might be candidates for place-based prevention.[76]

Traditional spatial methods define a hotspot as a statistically significant spatial *clustering* of a given variable, compared to its surroundings. In spatial analysis using small area data, a cluster is a group of neighbouring areas in which the rate of a given variable is higher than expected by chance alone. Cluster analysis effectively aggregates small area data to eliminate random variation and discontinuity at area borders, and to point to broader areas where the spatial distribution of observed rates is unlikely to have occurred by chance.

We sought to conduct our analysis at a more granular scale than allowed for through cluster analysis. Our goal was to enable identification of small areas (generally suburb-size) as candidates for targeted place-based prevention.

This chapter provides an overview of our methodology, including how we control for random variation in small area rates. A more detailed view is provided in the methodological supplement to this report.

3.1 What defines a hotspot?

Hotspots of potentially preventable hospitalisations must be: one, hot enough (evidence of substantial disparity from societal norms), two, persistently hot, three, likely to stay hot and four, high impact. By these terms we mean:

- *Hot enough*. The area must have a sufficiently high rate of one or more potentially preventable conditions, relative to an appropriate benchmark, to warrant intervention. We use as our benchmark the state-wide rate for each potentially preventable condition (Ambulatory Care Sensitive Condition) in each year.[77] We use age-sex adjusted rates, and define "hot" as a rate of at least 50 per cent above the state average.[78]

[75] The area unit was SA2 of patient residence in Queensland and postcode of patient residence in Victoria. SA2s and postcodes are similar in average size but postcodes are more variable and are not statistically standardised. Postcode population in Victoria in 2013 ranged between zero and 90,000 with a mean of 8,600 (median 2,700) while SA2 population in Queensland in 2013 ranged between zero and 30,500 with a mean of 8,800 (median 8,100).

[76] Our analysis focuses on Queensland and Victoria – two of the three large states. Data for this study was also requested from two other states – NSW and South Australia – and also nationally. We received approval to use South Australian data but did not have the resources to do so. The process to obtain NSW and national data took too long.

[77] The state-wide rate, or state average, provides a point of comparison and is equal to the total number of hospitalisations in the state for a particular ACSC and year, divided by the total population of the state in the same year.

[78] But other thresholds might be appropriate. For example, raising the threshold to twice the state average more than halves the number of candidate areas, enabling authorities to focus on fewer areas with more extreme disparity. Alternatively, if the ambition is for all places to achieve the highest attainable standard of health, then the health levels enjoyed by the most privileged groups

- *Persistently hot*. A hotspot should be persistently (rather than intermittently) hot to be worth allocating resources to. High rates can be caused by chance so enduring disparities should get top priority.

Hotspots are areas that are both hot and persistent, but this alone does not justify intervention. Two further conditions make a hotspot amenable to action:

- *Likely to stay hot* (predictable): Health interventions take time to develop, and seeing results can take even longer. To invest in a place-based intervention today, we need to be reasonably sure the place will still be a hotspot when the intervention takes effect. Prediction is related to persistence, but it is forward-looking. We can only assess areas with the information we have today, so we need to be able to predict future hotspots accurately based on area characteristics that we know today. We expect it to take at least three to five years for an intervention to be developed, rolled-out and to begin to take effect.

- *High impact*. Hotspots must have a big enough health and/or financial impact to warrant action. The potential impact of taking action depends on several factors: absolute numbers of individuals affected, severity of the condition, efficiency gains through targeting high concentrations of individuals at risk, and equity gains through addressing entrenched place-based problems. These must all be balanced against the costs involved before grounds for intervention can be established.

is a more appropriate threshold (e.g. half the state average). See Methodological Supplement for discussion of the impact of different targeting approaches.

3.2 Persistence is key

With rare events such as avoidable hospitalisation, high rates can be caused by chance. Persistence is a meaningful way of distinguishing entrenched area-based discrepancies from random, accidental or intermittently high rates that later revert to the mean.

We calculated age-sex adjusted rates for nine high-volume ACSCs and a tenth combined measure of Chronic ACSCs[79] over a decade[80] for all areas with a population of at least 1000 people.

We present each area's rate in terms of the state-wide rate for a particular condition, in other words, an area with a rate of 1 has a rate equal to the state-wide rate (or state average), while an area with a rate of 1.5 has a rate 50 per cent higher, and qualifies as 'hot' under our definition.[81]

The distribution of small area rates in Queensland and Victoria are shown in Figure 2. In Victoria each year, about 5 per cent of areas had no potentially preventable hospitalisations for a given disease,[82] while the top 5 per cent of areas had rates of more

[79] The Chronic ACSCs measure combines all ACSC admissions for Angina, Asthma, CCF, COPD, Diabetes and Hypertension
[80] 2004-05 to 2013-14 in Victoria; 2005-06 to 2014-15 in Queensland
[81] The rate for each area is effectively a 'location quotient', signifying how concentrated a particular potentially preventable condition is for a specific area compared to the state as a whole.
[82] Many of the areas with rates of zero are small Victorian postcodes. The area unit used in Queensland (SA2) has a much more even distribution of population

than 2 (twice the state average). In Queensland, the top 5 per cent of areas had rates of 2.3 or more.

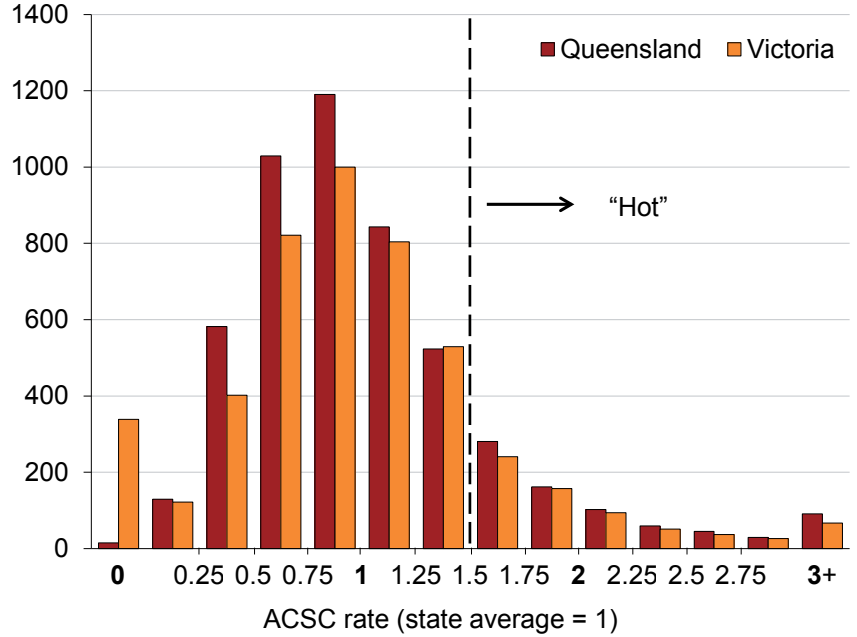
In both states, about 15 per cent of areas were 'hot' each year (in other words, had a rate of at least 1.5, or 50 per cent above the state average)[83]. Yet only about 5 per cent of areas were hot for any three consecutive years in the decade of analysis (6 per cent in Queensland, 4 per cent in Victoria).

If three consecutive years of high rates only occurred by random chance, then we would expect to observe this in less than half a per cent of areas.[84] The actual incidence of persistence was about ten times higher indicating that persistent heat is not driven by chance.

Persistence is not the norm. Only about half the areas that were hot in one year stayed hot in the next (55 per cent in Queensland, 45 per cent in Victoria). However, the more years an area is hot, the more likely it is to stay hot (Figure 3).

Places that have been hot for at least three to five years have a 70 per cent or better chance of staying hot into the future, as Figure 3 shows. Past heat is a good predictor of future heat.

Figure 2: Our definition of "hot" is at least 50% above state average
Frequency distribution of small area rates



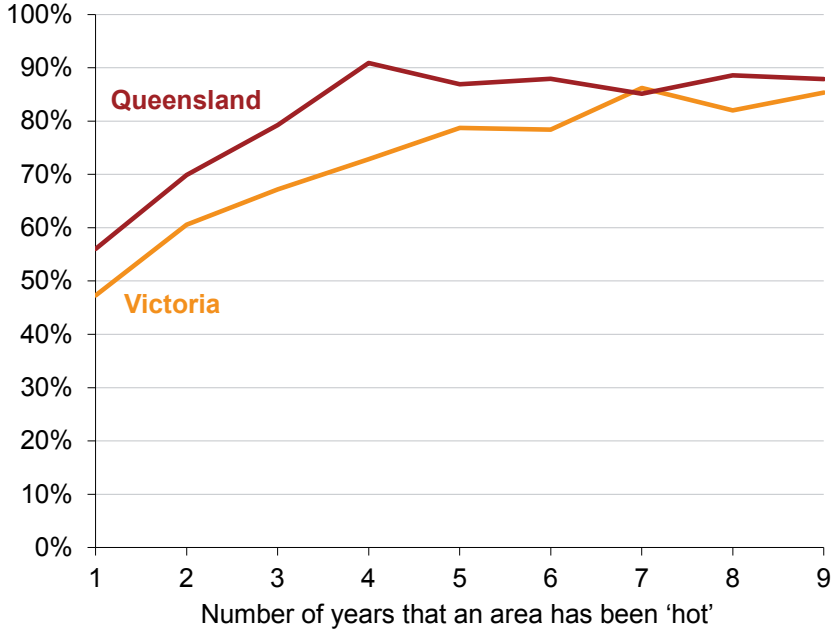
Notes: An area with a rate of 1 has a rate equal to the state-wide rate (or state average) for a particular ACSC, while an area with a rate of 1.5 has a rate 50 per cent higher, and qualifies as 'hot' under our definition. Rates are displayed for 10 different ACSCs in 469 postcodes in Victoria and 508 SA2s in Queensland. Rates are displayed for only the latest year of data (2013-14 for Victoria, 2014-15 for Queensland) but had similar distributions in each year. Sources: Grattan Institute analysis of QHAPDC and VAED.

than the unit for Victoria (postcode) so there were fewer zero-rate areas in Queensland.

[83] Note the top 15 per cent of areas had rates at least three times higher than the bottom 15 per cent of areas.

[84] 15 per cent chance in one year, so 0.15^3 = 0.34 per cent. This probability varies by disease and state, ranging between 0.1 per cent random chance for hotspots of Urinary Tract Infections (UTI) in Victoria to a maximum of 0.8 per cent random chance for hotspots of Cellulitis in Victoria.

Figure 3: The longer an area is hot, the more likely it is to stay hot
Proportion of places that stay hot as a percentage of the previous year

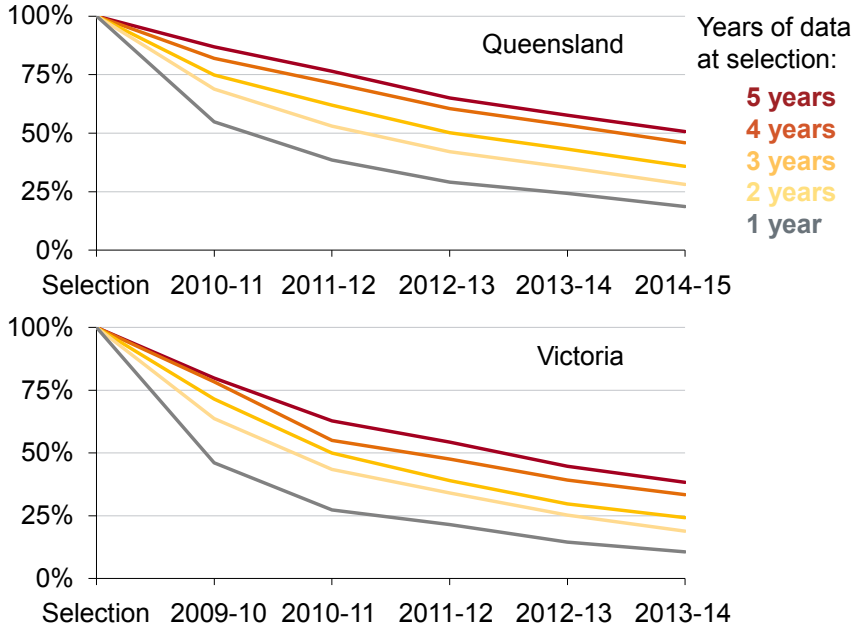


Notes: 'Hot' refers to rates at least 50% higher than state average for one or more ACSCs. Figure represents all ACSCs. Sources: Grattan Institute analysis of QHAPDC and VAED

Using persistent past heat to predict future hotspots, Figure 4 shows that shorter forecasts and longer datasets (more years of past data) improve the predictability of future hotspots.

The key questions are therefore how much past data are available and how far into the future do you need to be able to predict? The forecast window depends on how long it takes to intervene and how long the intervention lasts.

Figure 4: Predictability of future hotspots improves with more years of data but declines the longer the forecast
Proportion of areas correctly predicted to stay hot



Notes: Figure represents all ACSCs, predictability varies by disease. This analysis is based on a selection of hotspots chosen in 2009-10 (Qld) or 2008-09 (Vic) based on 1-5 years of heat. The grey line represents areas that were hot in the selection year. The red line represents areas that had been hot for 5 years at the time of selection. The curves illustrate the proportion of areas that stay hot over the next five years under each selection scenario. Sources: Grattan Institute analysis of QHAPDC and VAED

One year of data is not enough for identifying hotspots. In Figure 4, the grey line represents all areas that were hot in the selection year and illustrates the proportion of areas that stay hot over time. After three years, only 30 per cent of places in Queensland were still hot and after five years only 20 per cent of places were still

hot. The proportion of areas that stayed hot was even lower for Victoria. For comparison, the red line represents a selection of areas that have been hot for five years at the time of selection, and shows that three years later, 65 per cent were still hot in Queensland and 50 per cent were still hot five years later.

Before deciding where to intervene, it is important to ensure that current hotspots are likely to be future hotspots. The longer an area has been hot, the more likely it is to stay hot. If, for example, an intervention is cost-effective only for areas that have at least a 60 per cent chance of remaining hot, then one year of data will be insufficient for identifying future hotspots. More data will improve the targeting process.

Evaluating interventions in areas selected based on just one year of 'heat' is likely to be quite difficult because of the year-to-year volatility in ACSC hospitalisation rates. These affect both intervention and control areas.

By contrast, choosing areas for intervention based on three or more years of data (places that have been hot for the last three or more years) approximately doubles prediction success (Figure 4).

Unfortunately many hotspot studies draw conclusions from a single year of data. The latest National Health Performance Authority report on potentially preventable hospitalisations recommends using its one-year analysis as a baseline for assessing PHN performance.[85]

[85] National Health Performance Authority (NHPA) (2015)

Hotspot studies using multiple years of data have generally aggregated data across three to 10 years to identify hotspots.[86] More years of aggregate data are more likely to reveal entrenched problems, but also have their own biases. Data aggregated over long time periods can reflect past situations that no longer exist and miss current problems.[87] And naturally, aggregation hides temporal trends.

We recommend analysing at least three (preferably five or more) years of data and avoiding aggregation by measuring persistence in terms of consecutive years of heat. This method enables selection of hotspots that have both a current and a consistent problem, as well as greater likelihood of the problem continuing in the absence of intervention.[88]

3.3 Characteristics of persistent hotspots

In order to better predict future hotspots we want to understand characteristics that persistent hotspots share. We isolated three.

Persistent hotspots tend to be more remote, have populations of lower socio-economic status (SES), and have a higher proportion of Indigenous people. They have these characteristics in common as a group, *on average*, when compared to all other areas.

However, the rates of individual areas can be quite different even when comparing among similar areas. For example, some of the

[86] e.g. Crighton, *et al.* (2015); Harrold, *et al.* (2014); Ibañez-Beroiz, *et al.* (2014); Butler, *et al.* (2013); South, *et al.* (2012)
[87] Ocaña-Riola (2010)
[88] See Methodological Supplement for a more detailed discussion on the impact of selecting hotspots based on aggregation.

hottest areas are low SES, but low SES areas can also be ‘cold’ (have very low rates).

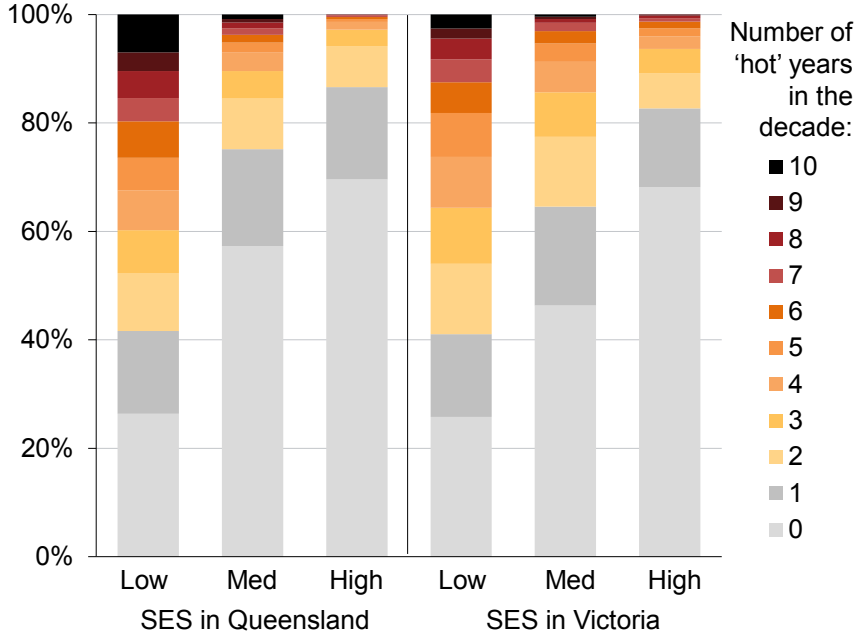
Low SES areas are hotter on average and have more ‘hot’ years (more years with rates at least 50 per cent higher than state average); yet most low SES areas still had three or less hot years in the last decade (Figure 5).[89]

We see a similar pattern for remoteness, where regional areas have had more ‘hot’ years over the past decade than metropolitan areas, but most regional areas have had very few ‘hot’ years (Figure 6).

Low SES, remoteness and a high Indigenous population – individually and combined – make an area more likely to be a hotspot (Figure 7).

In both Queensland and Victoria, low SES areas are two and a half times more likely to be persistent hotspots than are all areas on average, and about 10 times more likely than high SES areas. In Queensland, one in four areas outside Brisbane that are low SES and have a high Indigenous population will be a persistent hotspot (Figure 7).

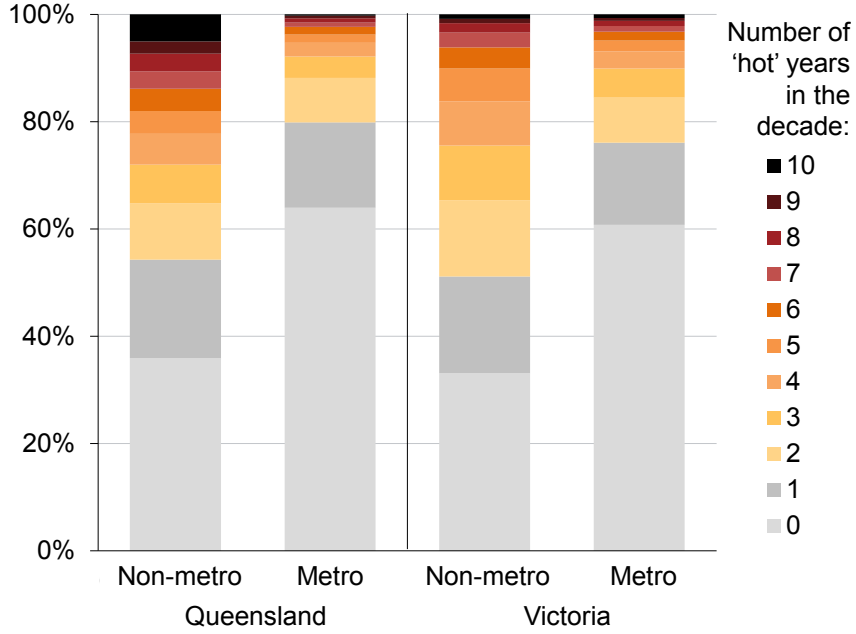
Figure 5: Low SES areas have more ‘hot’ years
Proportion of areas



Notes: ‘Hot’ refers to ACSC rates in each year of at least 50% higher than state average. All ACSCs are included in the analysis. The number of hot years is specific to both an area and an ACSC. Socio-Economic Status (SES) is defined on the ABS Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD). We define High SES as top quartile (IRSAD score >1050), Low SES as bottom quartile (<950) and all areas in between as Medium SES. Sources: Grattan Institute analysis of VAED and ABS Census 2011 data

[89] There is a significant negative linear relationship between an area’s SES score and its ACSC rate - the lower the SES score, the higher the rate and the more years of high rates, but there is high variability too (r-squared = 25 per cent for Queensland and 15 per cent for Victoria).

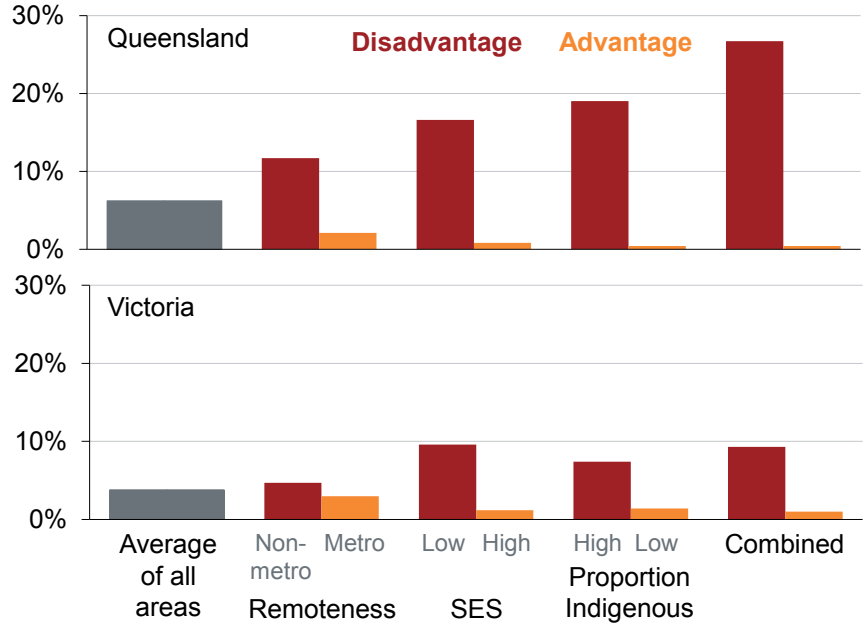
Figure 6: Regional areas have more 'hot' years
Proportion of areas



Notes: 'Hot' refers to ACSC rates in each year of at least 50% higher than state average. All ACSCs are included in the analysis. The number of hot years is specific to both an area and an ACSC. We define 'metro' areas as those with an ABS remoteness classification of Major City, while all other areas are 'regional'.
Sources: Grattan Institute analysis of QHAPDC and ABS Census 2011 data

Disadvantaged areas are more likely to experience high rates of potentially preventable hospitalisations for a sustained period, but not all persistent hotspots are low SES and most low SES areas are not persistent hotspots. Persistently high rates of potentially preventable hospitalisations are not normal for any type of area.

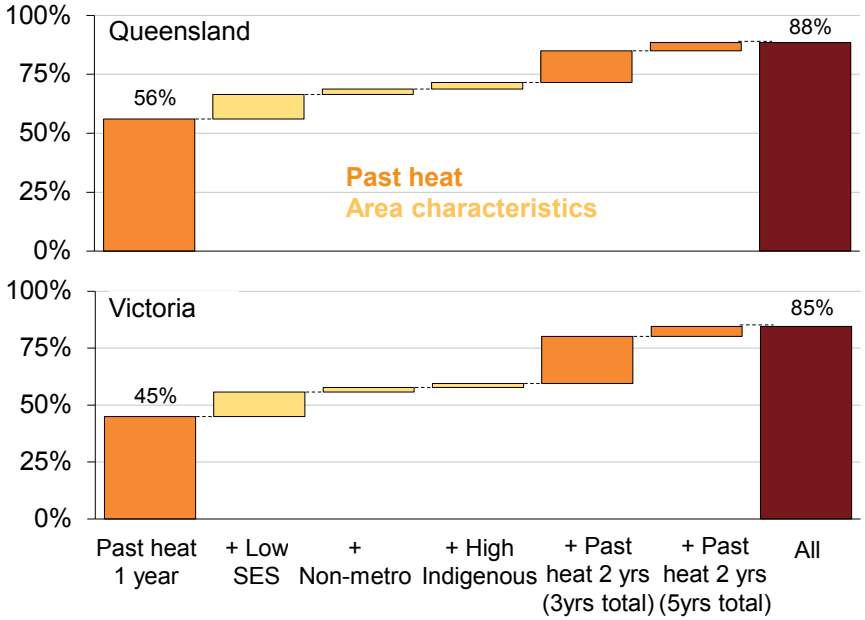
Figure 7: Low SES, regional and Indigenous areas are more likely to be persistent hotspots, particularly in Queensland
Probability of an area being a persistent hotspot, given certain area characteristics



Notes: Probabilities vary by ACSC and are calculated here as an average across ACSCs. 'Persistent hotspot' refers to an ACSC rate at least 50% above the state average for three consecutive years. Socio-Economic Status (SES) is defined on the ABS Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD). We define advantaged SES as top quartile (IRSAD score >1050), and disadvantaged SES as bottom quartile (<950). In terms of remoteness, advantaged areas are those with an ABS remoteness classification of Major City, while disadvantaged areas are all others. We define a high Indigenous population as top quartile for the state and a low Indigenous population as bottom quartile for the state. Sources: VAED, QHAPDC and ABS Census 2011 data.

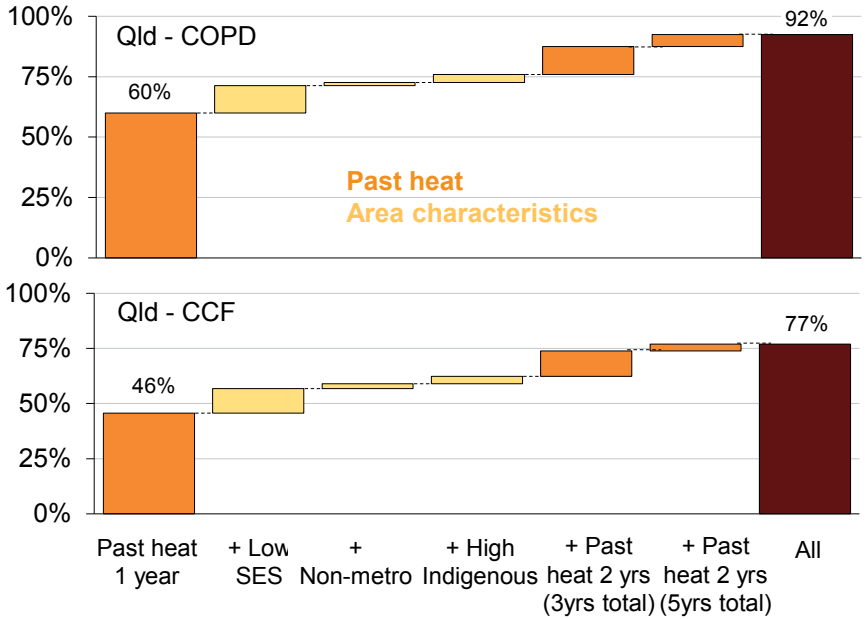
The single best predictor of future hotspots is persistent past heat but selecting areas based on a combination of predictors (such as past heat, low SES, remoteness and a high Indigenous population) improves the likelihood of choosing genuine hotspots – those that stay hot (see Figures 8 and 9).

Figure 8: Past heat is the single best predictor of future hotspots but additional area characteristics enhance prediction
Probability of an area being hot in the next year



Notes: Figure represents all ACSCs; predictability varies by disease (see Figure 9). Probabilities are calculated using a probit model on 10 years of data. SES is defined on the ABS Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD). We define low SES as bottom quartile (an IRSAD score <950). We define "regional" as all areas with an ABS remoteness classification other than Major City. We define "High Indigenous" as top quartile for the state. Sources: Grattan Institute analysis of QHAPDC and VAED.

Figure 9: Some ACSCs are more predictable than others
Probability of an area being hot in the next year



Notes: 'Hot' refers to an ACSC rate at least 50% higher than state average. Probabilities are calculated using a probit model on all 10 years of the data. Socio-Economic Status (SES) is defined on the ABS Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD). We define low SES as bottom quartile (an IRSAD score <950). We define "regional" as all areas with an ABS remoteness classification other than Major City. We define "High Indigenous" as top quartile for the state.
Sources: Grattan Institute analysis of QHAPDC.

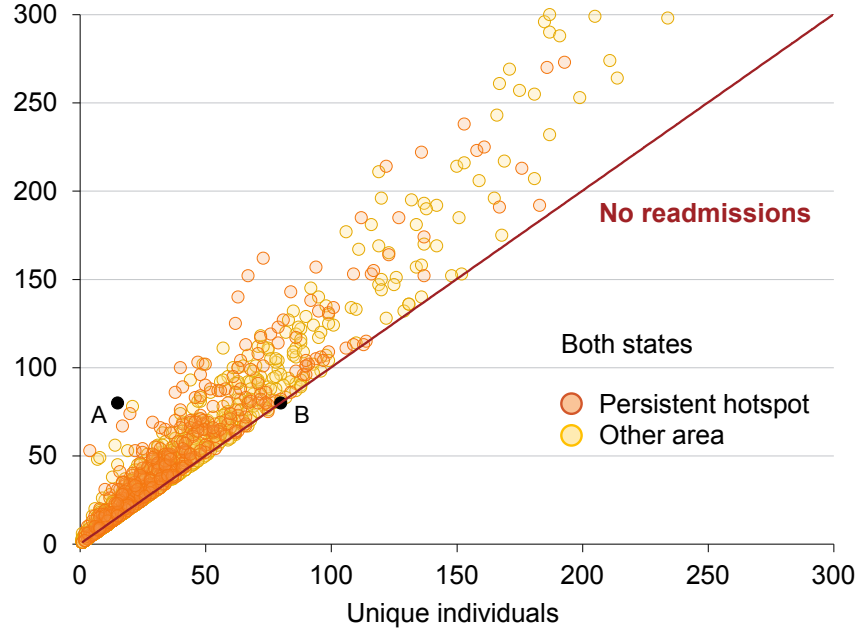
3.4 Characteristics of admissions in persistent hotspots

In some places, just a few people account for many ACSC hospitalisations. In Figure 10, Areas A and B are highlighted to show that the two areas have the same number of admissions, but in Area A only 15 people account for 80 admissions, whereas in Area B 80 people do so. Area A therefore has a high rate of readmissions (patients returning to hospital within the same year), whereas Area B has no readmissions (each admission is a unique patient).

In some persistent hotspots, individuals with three or more admissions in the same year account for more than half the area's total ACSC admissions (Figure 11).

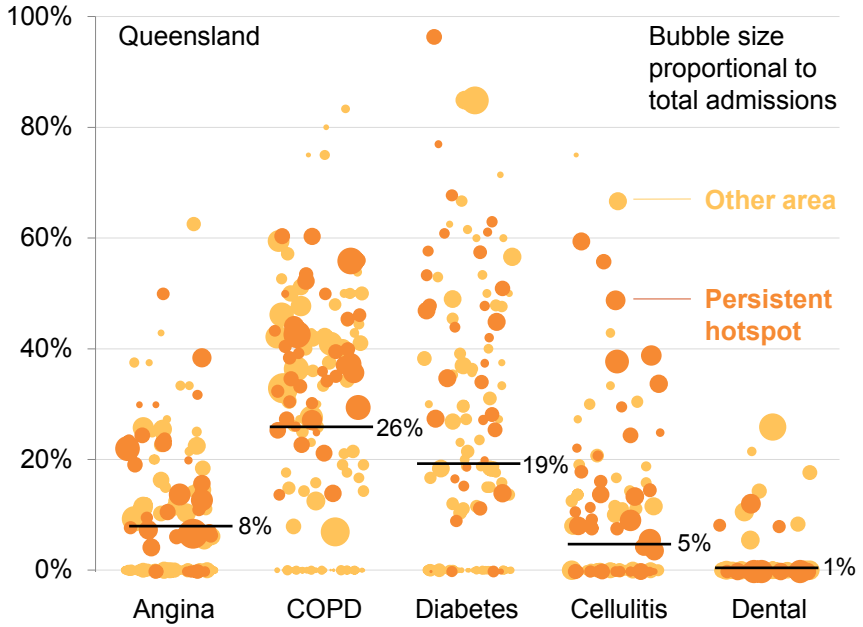
On average, persistent hotspots have a higher proportion of readmissions than non-hotspots, but with huge variability among areas. Strategies to reduce ACSC admissions by targeting readmissions are more appropriate for chronic conditions, particularly Chronic Obstructive Pulmonary Disorder (COPD) and diabetes, but should be considered on an area-by-area basis.

Figure 10: Readmission rates vary substantially between areas, for example, Area A has many readmissions while Area B has none
Total admissions



Note: Both axes are cut-off at 300 to improve readability and a random sample of areas are displayed to reduce congestion. 'Persistent hotspot' refers to all places with rates at least 50% higher than state average in the most recent three years of the data (2011-12 to 2013-14 in Victoria and 2012-13 to 2014-15 in Queensland). Total admissions are illustrated for the first year in this period (2011-12 in Victoria and 2012-13 in Queensland).
Source: Grattan Institute analysis of VAED and QHAPDC

Figure 11: Readmissions make up a larger proportion of chronic ACSC admissions (e.g. Angina, COPD and Diabetes) than for other ACSCs (e.g. Cellulitis and Dental)
Proportion of an area's total admissions attributable to individuals with three or more admissions



Notes: Black line represents the average of all areas by ACSC. Victoria has similar averages to Queensland; the chart for Victoria is presented in the Methods Supplement. 'Persistent hotspot' refers to all places with rates at least 50% higher than state average in the most recent three years of the data (2012-13 to 2014-15). Total admissions are for the year 2012-13. A random sample of 500 other areas in the same time period is displayed to reduce congestion.
Source: Grattan Institute analysis of QHAPDC

We also investigated the distribution of long-stay admissions to understand if there are any systematic differences in the preventability of hospitalisations in persistent hotspots compared to other areas. All ACSC admissions are *potentially* preventable, but we would expect that longer stays in hospital are more serious and therefore less likely to be preventable than shorter stays. We define long-stay admissions as hospitalisations with a length of stay longer than two days.[90]

Our discovery that no significant difference in the proportion of long-stay admissions between hotspots and non-hotspots suggests there are no systematic differences in the preventability of potentially preventable hospitalisations in persistent hotspots compared to other areas.

3.5 Lessons in identifying hotspots

There are many pitfalls in identifying hotspots. We recommend five principles to guide small area hotspot analysis (Box 4). These principles apply not only in identifying ACSC hotspots but also for similar analyses with other health metrics of interest (immunisation rates or cancer screening rates, for example).

The most common pitfall is targeting hotspots using only one year of data. Selection or analysis based on only one year of data could be very misleading given our finding of high year-to-year rate variability among small areas.[91] Half the areas with high ACSC rates in one year have an average or near average rate the following year (regression to the mean).

[90] Swerissen, *et al.* (2016)
[91] Small areas are postcodes in Victoria and Statistical Areas Level 2 (SA2s) in Queensland.

Naturally, small area rates will vary more than rates in larger areas, so consideration of persistence is particularly important in small area analysis.

Persistent past heat is also the best predictor of future heat, and as such we recommend that at least three years of ACSC rates are used in identifying hotspots for intervention. Persistently high rates represent entrenched problems, so are more indicative of health inequality and are more likely to endure without intervention.

In addition to persistent past heat, other area characteristics can improve the predictability of future hotspots. These characteristics – socio-economic status, remoteness and the proportion of the population that identifies as Indigenous – represent other forms of disadvantage that can compound health inequality.

Box 4: Principles for identifying hotspots

We recommend five guiding principles by which place-based interventions should be targeted:

1. 'Preventability' – focus on health outcomes that we can do something about (preventable or reducible)

2. 'Disparity' – identify substantial differences in outcomes in relation to societal norms (in this report we use a threshold of 50 per cent above state average to identify high rate areas, but other standards might also be appropriate)

3. 'Persistence' – give priority to enduring disparities (year to year extreme outcomes can be driven by chance so we recommend at least three years of data, preferably more)

4. 'Predictability' – take action where disparity is likely to persist into the future (interventions take time)

5. 'Impact' – pursue the places and interventions with greatest potential impact (absolute numbers of individuals affected, severity of the problem, efficiency in targeting high-risk individuals, and equity in addressing entrenched health inequalities)

4 Prioritising places

4.1 Priority places have a long-term problem

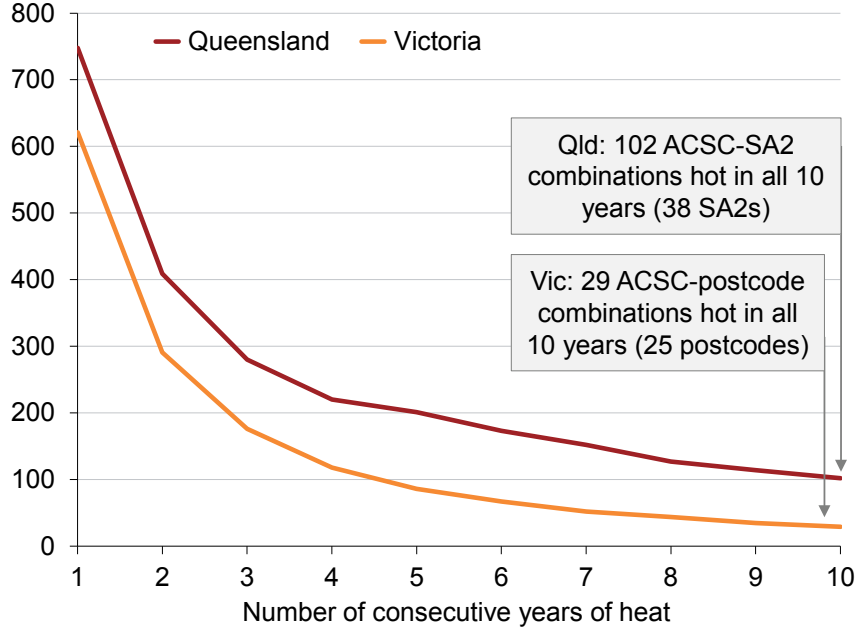
The highest priority places for targeted prevention are areas where health inequalities are already entrenched and are most likely to endure (in the absence of intervention or where existing interventions are not reducing hospitalisation rates sufficiently). This means starting with the places that have high ACSC rates year-in-year-out.

We consider a very conservative selection of 'priority places': areas with high rates in every year for a decade (Figure 12). These places clearly have a long-term problem with potentially preventable hospitalisations that is likely to persist.

In Victoria 25 postcodes were at least 50 per cent above the state average, for one or more ACSCs, every year for the decade 2004-05 to 2013-14 (Figure 13).

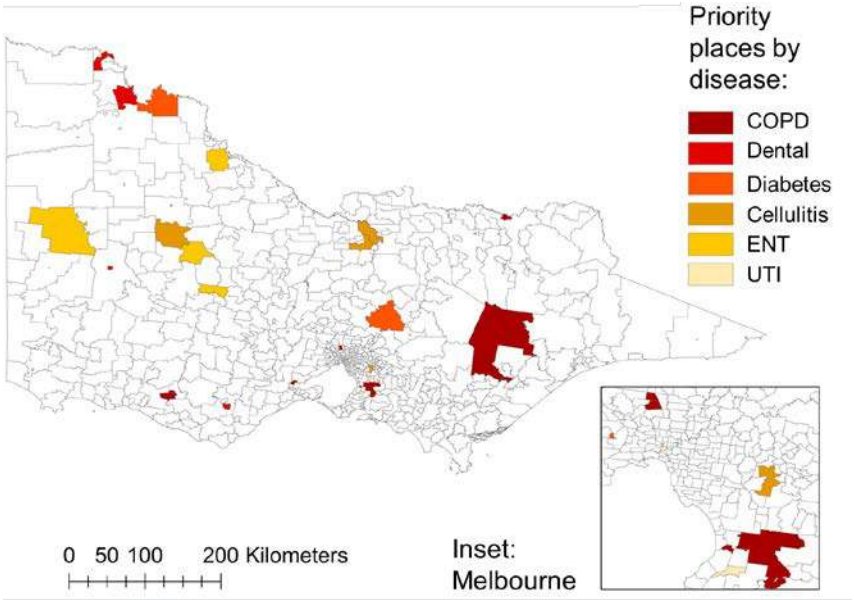
In Queensland there are 38 SA2s that met the same criterion for the decade 2005-06 to 2014-15, and most of these areas qualified for multiple ACSCs (Figure 14). In fact, one priority place had a rate at least 50 per cent above the state average in every year for a decade, for all nine ACSCs analysed. Another priority place had a decade average rate of 20 times the state average for one ACSC (hospitalisation for Chronic Obstructive Pulmonary Disease). This level of place-based inequality is unacceptable.

Figure 12: Most 'hot' places lose their heat within a few years, but some places have been persistently hot for a decade
Count of ACSC-area combinations with rates 50% above state average



Notes: 'Hot' refers to an ACSC rate at least 50% higher than state average. Only ACSC-area combinations that are hot in at least one year are included. Queensland has 4572 possible ACSC-area combinations in our analysis (508 SA2s x 9 ACSCs). Victoria has 4131 possible ACSC-area combinations in our analysis (459 postcodes x 9 ACSCs). The first year of analysis is 2004-05 for Victoria and 2005-06 for Queensland.
Sources: Grattan Institute analysis of QHAPDC and VAED

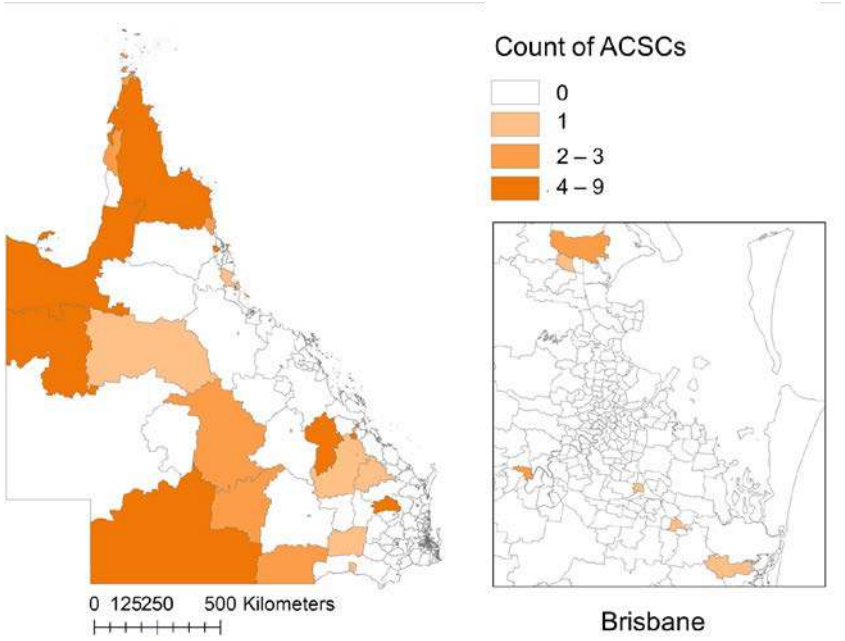
Figure 13: Victorian priority places are spread across the state
Map of Victoria with Melbourne inset, priority postcodes labelled by disease



Notes: Priority places are areas with ACSC rates at least 50 per cent above state average in every year for a decade. Four postcodes in Victoria met these criteria for two different ACSCs.
Sources: Grattan Institute analysis of VAED in ArcGIS

The 63 priority places identified here are areas where place-based risk conditions are more likely to exist and preventive interventions can be trialled to address them. Priority places also represent a high concentration of individuals at risk, where preventive interventions may be targeted to individuals more efficiently (through the primary care system).

Figure 14: Most priority places in Queensland qualified for multiple ACSCs
Map of Queensland with Brisbane inset, priority SA2s labelled by number of ACSCs



Notes: Priority places are areas with ACSC rates at least 50 per cent above state average in every year for a decade. 23 out of 38 areas met these criteria for more than one ACSC.
Sources: Grattan Institute analysis of QHAPDC in ArcGIS

4.2 PHNs could also target additional areas

Beyond these most persistent hotspots may be other places worthy of attention. Exactly how many are given priority depends on the thresholds chosen for heat, persistence and predictability, which naturally depend on context. For example, there will be situations where the intervention horizon is much shorter than the three to five years considered here, and/or where forecasts and priorities can be refreshed each year.

Within Primary Health Networks, the cost-effectiveness of a specific intervention will determine whether it is worth rolling out to areas that are 40 per cent likely to stay hot, or only to those that are at least 80 per cent likely to stay hot. Resources will determine how many hotspots can be tackled.

Where capacity allows for the selection of more priority areas, persistent heat should be the first criterion (the longer a place has been hot, the more likely it is to stay hot).

Yet other characteristics might be used, in combination with persistent heat, to identify additional areas that are likely to stay hot. Areas that are low SES, regional and have a high Indigenous population are more likely to be persistent hotspots and hotspot selection based on combinations of these characteristics improves the likelihood that chosen areas stay hot (as discussed in Section 3.3 and illustrated in Figures 8 and 9).

In addressing place-based health inequalities, we recommend starting with the most persistent disadvantage – the priority places identified above – and testing the cost-effectiveness of preventive interventions in these areas.

Proven interventions could then be rolled out more widely, to all areas with high ACSC rates over five years that also have one or more other characteristics of disadvantage, for example.

5 Preventing potentially preventable hospitalisations

Our analysis shows that in both Queensland and Victoria extreme and persistent disparities exist among areas.

The role of place in shaping people's health and opportunity is well-established but there is still too little evidence of place-based interventions that reduce health inequalities. We cannot ignore the places that have had extreme rates of potentially preventable hospitalisations for a very long time. We need to find out if place-based interventions will help.

We therefore recommend trialling preventive interventions with rigorous evaluation in priority places – all areas with potentially preventable hospitalisation rates at least 50 per cent higher than the state average in every year for a decade, for one or more ACSCs. The ambition should be to strengthen and expand local responses as the evidence builds.

Preventing potentially preventable hospitalisations will require action in three areas:

1. A trial of preventive interventions in priority places,
2. A national monitoring and reporting infrastructure,
3. Staged implementation of funding and support to address health inequalities nationally.

5.1 What we recommend for priority places

Priority places need tailored solutions. Each hotspot has different combinations of contributing factors and existing programs working on solutions. Each will require a different balance of prevention approaches and interventions.

We recommend that Primary Health Networks, working closely with local health authorities, investigate what factors are causing ACSC hospitalisations in priority places. It is essential they consult and work with local communities to develop solutions. Solutions should be developed in collaboration with Aboriginal Community Controlled Health Services and, where possible, within existing frameworks, such as the Municipal Public Health and Wellbeing Plans that local councils in Victoria have.

High rates of potentially preventable hospitalisations point to problems in the effectiveness of primary care. Yet hotspots do not necessarily have poor primary healthcare. Many factors, including primary care effectiveness, underlying disease prevalence and existing interventions, influence the level of ACSC hospitalisations.

Our study has not analysed what interventions are already occurring in these areas. There may well be existing programs – including primary care or population health programs, or interventions aimed at broader social determinants of health – that seek to improve health status.

Yet whatever the effectiveness of these programs in reducing the underlying burden of disease and hospitalisations, the population in these areas still has unacceptably high levels of ill-health and consequent ACSC hospitalisations. This means that successful programs need to be strengthened or new programs introduced.

High rates could also be the result of a different model of care in some places. In regional and remote areas, for example, workforce and service gaps, or a lack of access to bulk-billing general practices, may lead to higher rates of hospitalisation.

Our measure does not distinguish between good and bad primary care, or among different models of care, but it does highlight places clearly in need of additional support and where there is substantial room for improvement. PHNs should investigate potential causes place by place, with strong local support.

PHNs should use all data available to them, including linking datasets such as Medicare Benefits Schedule and Pharmaceutical Benefits Schedule data. They should use general practice data (such as the data collected through clinical software systems like Medical Director) to understand disease prevalence and what is being done about it. They should analyse the problem at a finer geographic scale if possible.

The forces causing high rates of potentially preventable hospitalisations in priority places may not lie within the same exact bounds as the spatial units analysed in this report. Risk of potentially preventable hospitalisation might spill over into neighbouring areas and therefore interventions in priority places should not necessarily be confined to their boundaries.

Nevertheless, each priority place identified in our analysis exhibits a sustained concentration of potentially preventable hospitalisations, and is therefore an appropriate location to begin interrogation of the problem and prioritise intervention activities.

Focusing on just a few priority places should enable a deeper understanding of what is causing potentially preventable hospitalisations in each area.

PHNs will need to share lessons among priority places and jurisdictions in order to contribute to a broader understanding of the causes and preventability of ACSCs. Evaluation will therefore be critical (see Section 5.1.2).

5.1.1 Strategies for reducing ACSCs

The best intervention options are those that address a significant burden of disease while being cost-effective, feasible and fair.[92]

Preventive interventions fall on a continuum from ‘upstream’ strategies that tackle the causes of preventable disease, to ‘downstream’ interventions to manage conditions in primary care rather than hospital settings.

A range of preventive interventions has been endorsed by the World Health Organisation as ‘best buys’[93] and/or evaluated in Australia as being particularly cost-effective.[94] They include a mix

[92] World Health Organisation (WHO) (2011)
[93] Best buys are *“interventions that have significant public health impact, and are highly cost-effective, inexpensive and feasible to implement”* - ibid.
[94] A major Australian study (the first of its kind in the world) evaluated the cost-effectiveness of 150 preventive health interventions - Vos*, et al.* (2010)

of upstream preventive interventions. Some promote healthy behaviours across communities; some, such as screening, vaccination and counselling services, are targeted to specific high-risk groups. The cost-effectiveness of interventions also depends on their being timely, appropriate and accurate in targeting people at risk.

Each priority place will require a different balance of prevention approaches and interventions. This section aims to provide some examples of what tailored solutions might involve.

Community health promotion

Community health promotion may be particularly effective in priority places with underlying problems such as poor diet and exercise, or high smoking rates. These places should consider ways to improve the affordability of and opportunity for a healthier lifestyle, and ways to identify and support high-risk people to move towards one.

US studies have found that individuals with disabilities, lower income and less education are more likely than other people to be hospitalised for an ACSC.[95] One study showing a strong link between geographic variation in life expectancy and health behaviours suggests that policy interventions should focus on changing health behaviours among low-income individuals.[96]

Where possible, community health promotion should be targeted to groups more likely to face barriers in accessing primary care and leading healthier lives. Barriers might include health literacy, accessibility for those with physical or mental disabilities, access to aids and appliances, language barriers, and gaps in services or knowledge of services.

Local government supports many public health interventions such as immunisation, healthy lifestyle promotion and creating healthy built and natural environments. Where possible, PHNs should work with and build on existing initiatives, such as 'Healthy Together' in Victoria.

Chronic disease management

Half of the priority places identified in this report have high rates of one or more chronic ACSCs. Chronic diseases require ongoing management – by individuals, their carers and by the health system – to improve quality of life for people with chronic disease and to prevent the worsening of conditions that leads to hospitalisation.

Priority places that experience high levels of chronic illness should look to improve chronic disease management through care pathways[97] and integrated services for people with chronic disease,[98] among other strategies.

When chronic disease is managed well, patients' needs are identified early, they are helped to manage their own conditions and there is regular review and follow-up. This approach depends

[95] Schüssler-Fiorenza Rose, *et al.* (2016)
[96] Chetty, *et al.* (2016)

[97] 'Care pathways' are recommended diagnosis and treatment options for well-defined groups of patients with a predictable clinical course. Best practice diagnosis and treatment options, often involving various parties, are sequenced over a specific period of time.
[98] Swerissen, *et al.* (2016)

on better co-ordination among services and sharing of best practice among doctors.[99] Good chronic disease management may also offer economies of scale, potentially reducing hospitalisations for many chronic diseases, not just the target disease.

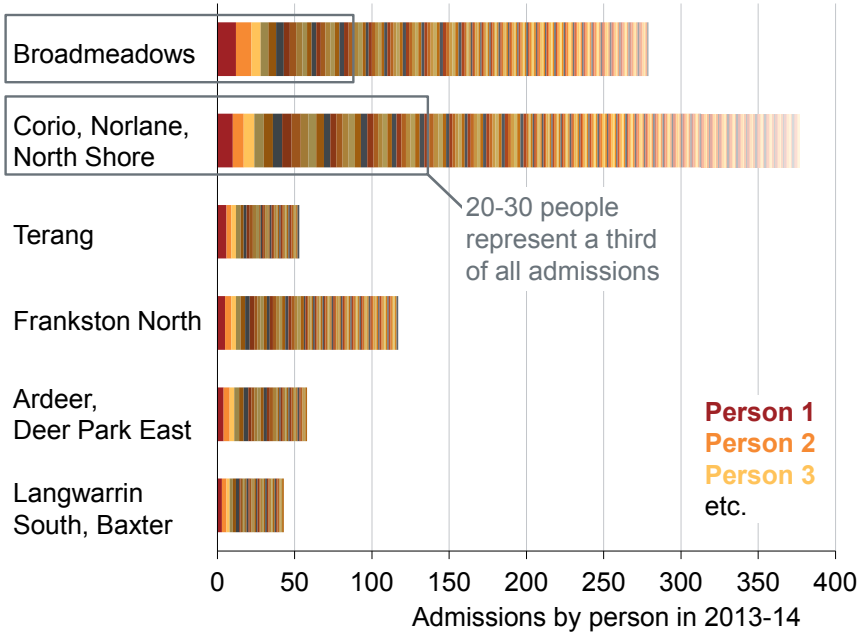
Minimising readmissions

Some individuals are hospitalised for an ACSC multiple times. Where a few people represent a large portion of admissions, the best way to reduce the overall ACSC rate in an area may be to focus on them.

Tackling these readmissions will be part of the solution in some priority places. Figures 15 and 16 show the number of Chronic ACSC admissions *per person* in each of the priority places we chose for Chronic ACSCs.[100] Each colour band represents a different individual, while all bands together represent the total admissions for each priority place. In some places, just a few individuals represent a large portion of admissions.

For example, twenty individuals accounted for a third of all admissions for Chronic ACSCs in Broadmeadows, Victoria (Figure 15, reading from left to right). Similarly, ten individuals comprised more than half of total admissions for Chronic ACSCs on Palm Island, Queensland (Figure 16). In places with high readmissions, solutions such as discharge planning can be tailored to regular users of the hospital system (so called 'super-utilisers').

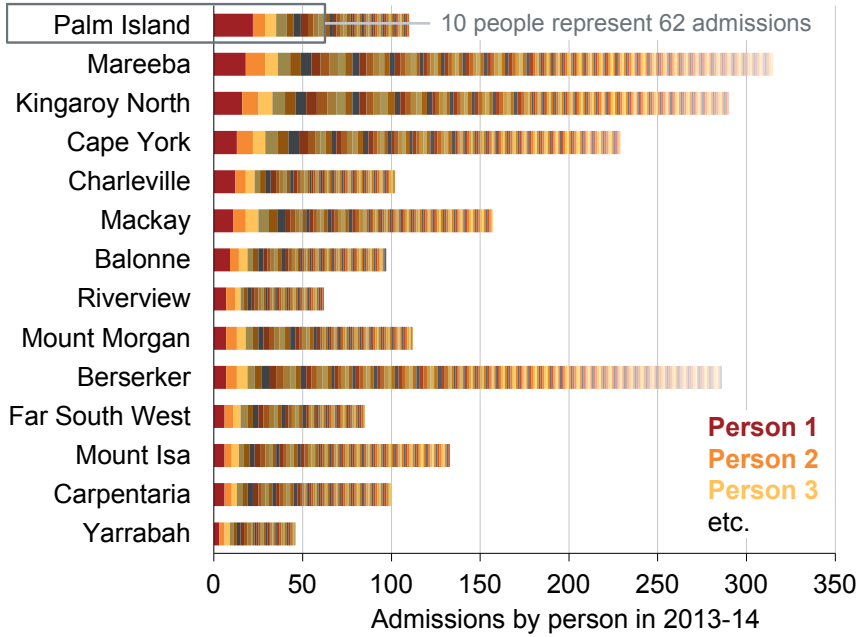
Figure 15: Tackling readmissions will be part of the solution in some priority places (Victoria)
Priority places for Chronic ACSCs



Notes: Each colour band represents a different person. Towards the left are the individuals with the most admissions and towards are right are the individuals with just one admission.
Sources: Grattan Institute analysis of VAED.

[99] Ibid.
[100] The Chronic ACSCs measure combines all ACSC admissions for Angina, Asthma, CCF, COPD, Diabetes and Hypertension

Figure 16: Tackling readmissions will be part of the solution in some priority places (Queensland)
Priority places for Chronic ACSCs



Notes: Each colour band represents a different person. Towards the left are the individuals with the most admissions and towards are right are the individuals with just one admission.
Sources: Grattan Institute analysis of QHAPDC.

However, targeting super-utilisers has been shown to have the same persistence problem as geographic targeting. In other words, from year to year the proportions of super-utilisers and of hotspots remain the same, but the individuals and specific areas change. One recent study shows that while the portion of patients classified as super-utilisers remained steady over time, only 28 per cent of the individuals originally classified as super-utilisers were still classified as super-utilisers a year later.[101] In reducing ACSC readmissions, it will be important to be able to identify the 'stable' super-utilisers and address the forces leading to their readmissions.

Naturally, readmission rates are much higher for chronic ACSCs such as diabetes and COPD than for acute ACSCs such as dental conditions. We might also expect areas that have a high concentration of patients with multiple chronic conditions to have higher readmission rates.[102]

Yet tackling readmissions is only part of the solution. In most priority places, unique patients (hospitalised only once) represented the majority of admissions. Some priority places had no readmissions at all.

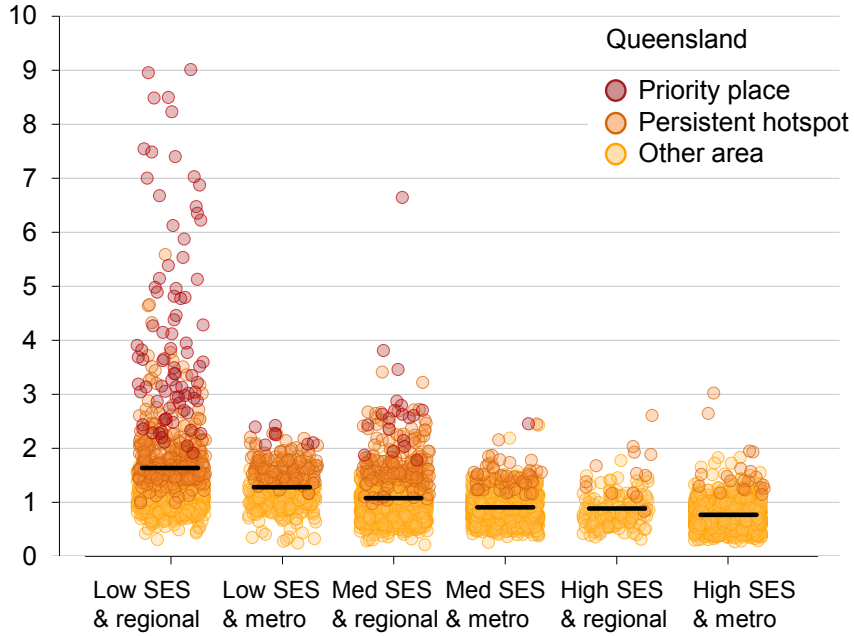
Tackling disadvantage

In many priority places, high rates of potentially preventable hospitalisations are likely linked to place-based problems of disadvantage. Priority places are more likely to be low SES and regional areas, with a higher proportion of Indigenous people, even when compared to persistent hotspots (see Figure 17).

While most priority places are disadvantaged areas, most disadvantaged areas are not hotspots. Many have low rates of potentially preventable hospitalisations. Examining why some disadvantaged areas are hotspots and others are not may help us understand what needs to improve in priority places.

[101] Johnson, *et al.* (2015)
[102] Basu, *et al.* (2015)

Figure 17: Priority places are more disadvantaged even compared to persistent hotspots (Queensland)
10-year average rate by SA2 (all ACSCs)



Notes: Black line represents the average rate across all areas by category. Y-axis cut-off at 10 to improve readability (five areas hidden).
Sources: Grattan Institute analysis of QHAPDC and ABS Census 2011 data

Changing the settings in which people in priority places live, work and play can improve their health.[103] For example, areas can be made safer at night, parks and sporting facilities can be created, public transport improved, and social cohesion can be built through community projects and events.

[103] Newman, *et al.* (2015)

Two recent reports have reviewed lessons for Australian place-based initiatives that tackle disadvantage in health and beyond.[104] One argues that:

> *Untangling the web of disadvantage requires tailored, place-based interventions capable of addressing interrelated causes of local disadvantage that sit side by side with broader system-level reforms.* [105]

The other suggests there is still insufficient evidence of the causal effects of place-based initiatives and their cost-effectiveness in Australia. It recommends investment in high quality evaluation of place-based initiatives.[106]

PHNs are well-suited to support trials of place-based initiatives and to lead the tailoring of services to local conditions, working closely with local councils, health authorities and doctors. PHNs are encouraged to identify populations with special needs.[107] Place-based initiatives need not require large funds, but local communities should be empowered, places must be committed to over the long term, funding must be flexibly applied and outcomes tracked and assessed.[108]

The goal is to reduce contextual factors that contribute to major health problems and health inequalities in priority places. The healthcare sector will need to work with other government sectors,

[104] Wilks, *et al.* (2015); Brotherhood of St Laurence (BSL) (2015)
[105] Brotherhood of St Laurence (BSL) (2015)
[106] Wilks, *et al.* (2015)
[107] Department of Health (Commonwealth) (2015)
[108] Brotherhood of St Laurence (BSL) (2015)

recognising that they also have the potential to improve people's health.[109]

5.1.2 Potential savings in priority places

Action in priority places seeks above all to address extreme inequality. Yet place-based interventions also need to be cost-effective, at least in the mid-term if not the short-term. They will require business cases that weigh implementation costs against direct savings from expected reductions in ACSC admissions, indirect savings and wider benefits to communities.

We estimate direct savings of at least $10 to $15 million a year from reducing ACSC admissions in priority places in the two states we have studied. This estimate is very conservative for five main reasons:

- First, we do not attempt to quantify indirect savings and other benefits from reduced ACSC admissions, such as improved well-being, workforce participation, or neighbourhood renewal. These benefits will depend on the type and place of intervention.
- Second, we assume interventions will only reduce admissions in priority places to average levels. Since tailored interventions are absent in most areas we might expect them to reduce admissions to lower than average, at least in some places.
- Third, we limit avoidable admissions and the estimation of savings to the particular ACSC for which the priority place was chosen. Yet interventions introduced for one type of ACSC may help to reduce other ACSC admissions.
- Fourth, we estimate the typical savings per admission by ACSC for large metropolitan hospitals.[110] The savings per admission are higher for outer metropolitan, regional and rural hospitals and many priority places are regional or remote, but we could not identify in our data which hospital patients were admitted to.
- Finally, we estimate the typical savings per admission by ACSC using Victorian data, and then apply this to our Queensland priority places.[111] The typical cost of an admission to hospital is lower in Victoria than nationally so savings from Queensland admissions (three-quarters of the total) may therefore be an under-estimate.[112]

Direct savings equate to about $200,000 per priority place, although this varies by ACSC and by area. For example, chronic

[109] Baum, *et al.* (2009)

[110] We calculate a typical cost weight for each type of ACSC admission (using the Victoria's Weighted Inlier Equivalent Separation, WIES) and apply this to the efficient price for major providers to get an estimate of the typical savings per admission.

[111] Our Victorian dataset included the diagnosis group (DRG) and time spent in hospital (LOS), which allowed for more accurate pricing estimates than our Queensland dataset. We estimated the typical cost per ACSC using Victorian data and then applied that cost to the Queensland admissions as well. Full details are provided in the methodological supplement to this report.

[112] Our Victorian dataset included the diagnosis group (DRG) and time spent in hospital (LOS), which allowed for more accurate pricing estimates than our Queensland dataset. We estimated the typical cost per ACSC using Victorian data and then applied that cost to the Queensland admissions as well. Full details are provided in the methodological supplement to this report.

ACSC admissions are typically more expensive so there are greater potential savings per admission in reducing admissions for congestive cardiac failure, COPD and diabetes than for ear, nose and throat disorders. Full details of our savings estimate are provided in the methodological supplement to this report.

5.1.3 Funding and evaluating place-based prevention

We recommend a three- to five-year intervention trial to reduce ACSC admissions in priority places. Different places will require different solutions, but all interventions must be evaluated. The development, delivery and evaluation of interventions in priority places, led by PHNs, will require additional resources.

PHNs are allocated flexible funds to address health needs in their region. Funding allocations for relevant PHNs should be adjusted to provide resources for the trial. Lessons from these trials will be valuable to all PHNs.

Over time, we recommend that the formula for allocating flexible funds specifically takes into account persistent health inequalities, so that all PHNs are appropriately resourced to tackle health inequalities.

Priority places are ideal test-cases to see whether place-based prevention can reduce ACSC admissions and perhaps other important outcome measures. Areas that have a substantial and persistent problem with potentially preventable hospitalisations are unlikely to turn around on their own. Whether tailored place-based intervention can reduce ACSC hospitalisations is the vital question.

In developing and trialling interventions for priority places, local knowledge should be combined with lessons from the few programs that have successfully reduced ACSC admissions[113] and from the few place-based interventions that have managed to reduce health inequalities.[114]

Tailored solutions in each place will make it hard to generalise about outcomes. A rigorous and standardised framework for evaluating interventions will be needed. The World Health Organisation is developing such a framework for monitoring social determinants of health and health equity.[115]

Evaluation of interventions in priority places will be critical. PHNs could partner with researchers to design and implement appropriate evaluation.

An individual baseline should be constructed for each priority place taking into account at least three years of ACSC rates before the intervention. ACSC rates should then be monitored over time after the intervention.

Results of interventions in priority places should also be evaluated in comparison with control areas. We recommend that interventions in priority places are evaluated in comparison to a suite of places with persistently high rates (high rates for at least three years) and with similar characteristics (e.g. SES and remoteness). In control areas, while rates will still fluctuate, we would expect 70 to 80 per cent of places to remain hotspots

[113] Katterl, *et al.* (2012); Erny-Albrecht, *et al.* (2016)
[114] Brotherhood of St Laurence (BSL) (2015); Newman, *et al.* (2015); O'Dwyer, *et al.* (2007); See also Section 2.3
[115] Pedrana, *et al.* (2016)

without intervention. In priority places, we would expect a successful intervention to reduce rates over time, at least to average levels, and ideally better. Cost-effective interventions can then be rolled out to control areas and other places with persistently high rates.

It may also be appropriate to stagger interventions over time. For example, they could be introduced in half of priority places in one year and the other half the next (or the year after that). Outcomes could be monitored in relation to both the area's individual baseline and in relation to the comparison group of priority places.

Several control areas should be used (and evaluated over time) because ACSC rates vary significantly year to year.

Where an intervention reduces ACSC admissions cost-effectively, the case for expansion to other similar areas should be considered. Ideally benefits would be visible not only in hospital admission figures but also more widely, in chronic disease outcomes in general practice and in self-reported health for example.

Past experience suggests that success takes time. We recommend a commitment of at least three to five years in a small number of areas to determine the cost-effectiveness of interventions and establish or dismiss the case for place-based prevention.

5.2 A national monitoring and reporting infrastructure

At the national level, geographic health inequalities should be monitored over time to provide a baseline for PHNs and government to track progress in addressing the needs of each region.

The National Health Performance Authority is already set up to do this.[116] The Authority has published two national reports on potentially preventable hospitalisations. These are important contributions, but we recommend a couple of key changes to make the existing monitoring and reporting infrastructure more useful in tracking health inequalities.

First one year of data is not enough. Rates of potentially preventable hospitalisations by area need to be reported over at least three years, preferably longer. The most recent report was published in December 2015 for the year 2013-14. Even if the next report is comparable to this one, there will be only two points for comparison.[117] The next report should publish at least three years of past data, preferably more, to establish a meaningful baseline. Time series data should be made available to enable monitoring of trends and to distinguish extreme but intermittent rates from ongoing problems.

Second, while interactive data is available by PHN and for regions (ABS Statistical Area Level 3), finer spatial scales are needed to design and monitor place-based interventions. We recommend the next national report on potentially preventable hospitalisations

[116] However, the Authority ceased operations as of 30 June 2016 and transferred its functions to the Australian Institute of Health and Welfare and the Australian Commission on Safety and Quality in Health Care. The precise division of responsibilities between these two agencies is unclear as is how they will operate in fulfilling their new mandates.

[117] The Authority's earlier report for 2011-12 is also available; however it advises that the data is not comparable to its 2013-14 data.

publishes small area data (ABS Statistical Area Level 2) over time. Small area time series data, going back at least three years, would contribute to a better understanding of what is driving potentially preventable hospitalisations, and enable interventions to be prioritised and evaluated.

Our analysis uses small area data (ABS Statistical Area Level 2 and postcode data), but even smaller units would have been preferable (ABS Statistical Area Level 1 or mesh block data). Smaller spatial scales better approximate the underlying phenomenon and can always be aggregated up if need be. Cluster analysis of ACSC hospitalisations at smaller scales might reveal neighbourhood-level causes and point to potential solutions within the hotspots we identify.

Smaller spatial units bear the risk of identifying individuals so these may not be publishable. Nevertheless, we recommend that PHNs have access to finer scale data, at least at the SA2 level.

5.3 Staged implementation

Beyond priority places lie many other persistent hotspots. One hundred and twenty places in Queensland and 114 in Victoria have been hot for at least the last three years for one or more ACSCs. These places also appear to have genuine problems with potentially preventable hospitalisations.

PHNs should investigate persistent hotspots to understand better the nature of the problem. Yet until we know whether or not ACSC hospitalisations are reducible through place-based interventions we recommend holding off on significant investment in these areas.

The incidence of some ACSCs may be more easily reduced than others, some interventions will be easier and cheaper than others, and some types of places may be more receptive to interventions.

Successful, cost-effective trials in priority places should be rolled out to hotspots nationally as the evidence builds. Lessons from trials in priority places should inform subsequent interventions. Sharing lessons among PHNs will be very important.

We recommend staged implementation of funding and support to strengthen and expand local responses in all PHNs, focusing on places most in need and on early successes in trials.

5.3.1 Impact of hotspots on overall ACSC admissions is low

Priority places selected here represent only four per cent of all potentially preventable hospitalisations in Queensland and only one per cent in Victoria.

Individually, priority places represent up to 1.4 per cent of hospitalisations for their particular ACSC. Yet this figure is very much influenced by the total population of the areas chosen (Figure 18).[118]

If we were trying to identify just a few areas that capture the most potentially preventable hospitalisations, we would likely choose the areas with the largest population.

[118] Admissions per priority place ranged between 9 and 450 (total 2,767) in Victoria and between 10 and 310 (total 6,557) in Queensland. The population of priority places ranged between 1,800 and 56,700 in Victoria and between 1,300 and 21,500 in Queensland

Priority places are areas with a higher *concentration* of potentially preventable hospitalisations (Figure 18, inset). We are interested in these areas because they are where we can most efficiently target individual risk factors and where place-based risk conditions are most prevalent.

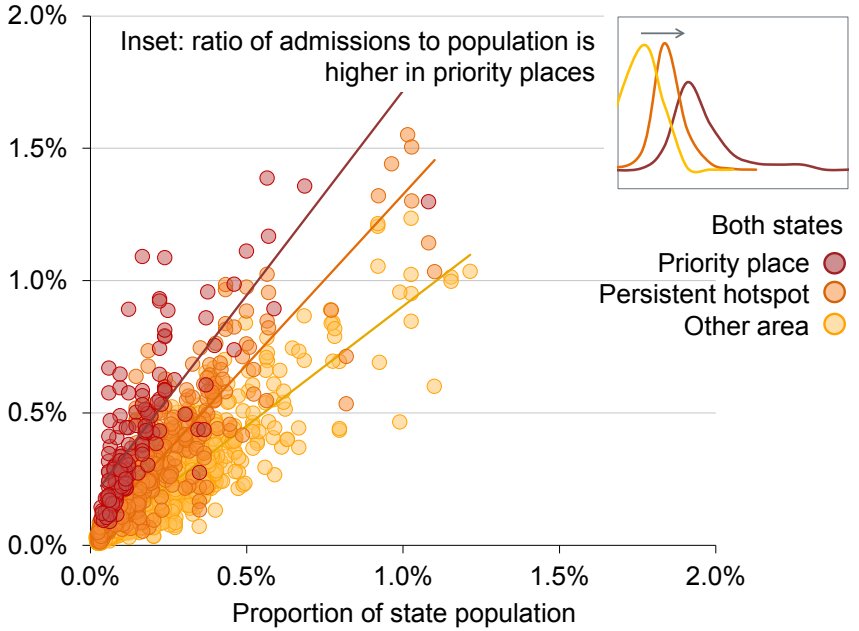
Targeting all priority places *and* all persistent hotspots (places that have been hot for the last three years) would still only address a small portion of total admissions. For example, reducing ACSC hospitalisations for COPD in Queensland through prevention targeted to priority places and persistent hotspots of this condition would at best solve 16 per cent of the problem (Figure 19).[119] This is because these areas are few and potentially preventable hospitalisations are widely spread across the state.

Targeting hotspots alone will not substantially reduce the overall burden of potentially preventable hospitalisations.

Instead, hotspots allow us to more efficiently target populations at risk and may therefore be a cost-effective approach to tackle a small part of the problem.

Figure 18: Larger areas have more admissions but priority places have a higher concentration of admissions

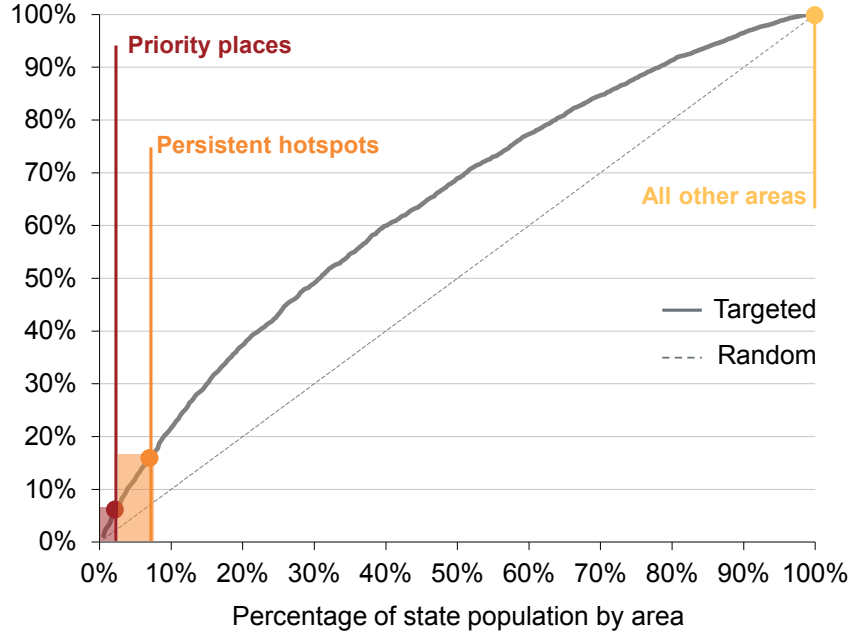
Proportion of ACSC admissions by area



Notes: A random sample of 'persistent hotspots' (n=500) and 'other areas' (n=1000) are displayed to reduce congestion. All priority places are displayed. Percentage of ACSC admissions is by disease and state and uses average annual ACSC admissions over 10 years. Population is also a 10-year average. Sources: QHAPDC and VAED.

[119] But in reality much less, because some ACSC hospitalisations will not be preventable (see Section 1.2)

Figure 19: Hotspots only tackle a small portion of admissions
Cumulative percentage of admissions by area for COPD in Queensland



Sources: Grattan Institute analysis of QHAPDC.

5.3.2 How can we tackle the rest of the problem?

Hotspots will not address the majority of potentially preventable hospitalisations. PHNs will need to invest in other ways of reducing ACSC admissions to improve quality of care and realise greater savings.

Some interventions trialled in priority places may prove cost-effective enough to roll out to all areas. This will certainly help, but tackling the broader problem requires the development of tools and data to enable more precise identification of individuals and places at risk of reducible health problems.

One way to make needs-based targeting more precise is to use finer scale geographic data. We identify hotspots using postcode and SA2-level data but smaller spatial units exist. Mesh blocks, the smallest geographic region in the Australian Statistical Geography Standard, contain about 30 to 60 dwellings, and are therefore the best geographic indicator of individual-level phenomena available.

PHNs should look to invest in sourcing and linking the data that would enable more precise needs-based targeting. At present we can predict places with high densities of individuals at risk, but PHNs will need to develop the capacity to more precisely predict *who* is most likely to be hospitalised for an ACSC.

Better recording and monitoring of patients' health behaviours and risk factors are needed in general practice. PHNs should look to analyse data from general practices in their region to better understand disease prevalence and the characteristics of individuals most at risk of serious but preventable conditions.

A better understanding of ACSCs (and other adverse outcomes) at the individual level could enable individually-targeted preventive interventions to be administered at the level of general practices, within hotspots, or even state or nation-wide.

A combination of individual, population (for example, Indigenous population) and place-based targeting will be required to substantially reduce health inequalities nation-wide.

Even with good individual targeting, place-based targeting will still be needed to reduce health inequalities. Place influences health in many ways. Secondly, some individuals likely to be hospitalised for ACSCs may lie outside the primary care system and do not see doctors.

All levels of government need to act to tackle geographic health inequalities and reduce potentially preventable hospitalisations.

First, we recommend trials of place-based interventions in priority places. Commonwealth government will need to fund these trials and commission a rigorous and independent evaluation. PHNs should lead the trials, working with local councils, health authorities, Aboriginal Community Controlled Health Services and doctors in identifying likely causes and developing solutions. States should support PHNs in implementing the trials, in sharing learnings and should be involved in evaluating initiatives.

Second, we recommend national monitoring of and reporting on potentially preventable hospitalisations. Commonwealth government should lead this, and should track potentially preventable hospitalisations at a small area level and *over time*. It will be critical to have a baseline for assessing interventions of three years or more.

Third, we recommend staged implementation of funding and support to address health inequalities across all PHNs. Commonwealth government should adjust funding formula to enable all PHNs to act on successes from trials in all areas with persistently high rates of potentially preventable hospitalisations. PHNs should also start building the data architecture for more precise needs-based targeting, with support from state governments, and adapt strategies for reducing potentially preventable hospitalisations as more information becomes available.

6 Conclusion and recommendations

In small pockets of Australia, severe yet reducible health inequalities have persisted for at least a decade. We recommend that government invests in small-scale prevention trials in these priority places, with a view to strengthening and expanding local responses as the evidence builds.

There is no single solution. The driving forces will be different in each place. Primary Health Networks should identify and work with these communities to address likely causes and develop strategies to reduce their hospital admission rates.

Identifying hotspots is not straightforward. We recommend focusing on preventable or reducible health outcomes, giving priority to enduring disparities, taking action where disparity is most likely to persist, and pursuing the places and interventions that have the greatest potential impact.

The priority places we identify represent only a handful of areas. Prevention efforts in these areas alone will not substantially reduce the overall burden of potentially preventable hospitalisations but they will help to efficiently reduce the worst health inequalities and will build the evidence base for how to address health inequalities more broadly.

We recommend developing, testing and evaluating tailored interventions in the 63 priority places identified here. PHNs are well-positioned to work with relevant communities and local health authorities in identifying barriers to primary care effectiveness and in developing cost-effective options.

Box 5: What we thought we would find and what we actually found

We expected potentially preventable hospitalisations to be highly concentrated in the most disadvantaged areas, with a small proportion of areas accounting for most hospitalisations.

We found that potentially preventable hospitalisations are actually generally widely spread and the places where hospitalisations are most concentrated are quite different for different diseases (particularly in Victoria, more overlap in Queensland).

We also expected potentially preventable hospitalisation rates to be relatively steady year to year but instead found high variability at the small area level, suggesting many of these hospitalisations are chance events and would be difficult to reduce.

Yet despite high year to year variability and despite these hospitalisations being generally widely spread, for each disease there were some places that stood out – those with persistently high concentrations of potentially preventable hospitalisations.

While these places are more typically low SES, they are not exclusively, and most low SES areas are not hotspots. Persistently high rates of potentially preventable hospitalisations are not normal for any type of area. They are a signal that the existing health policies are not working or are insufficient in these places and that additional resources are required to prevent poor health outcomes.

We recommend specific actions for Commonwealth government, PHNs and States:

The Commonwealth should:

- Fund trials of place-based interventions in priority places. Funding allocations for relevant PHNs should be adjusted to provide resources for the trial. Lessons from these trials will be valuable to all PHNs.
- Commission a rigorous and independent evaluation of the trials.
- Monitor and report on potentially preventable hospitalisations nationally – at a small area level and over time, including publishing a baseline for assessing interventions of three years or more.
- Over time, ensure that the formula for allocating flexible funds to PHNs specifically takes into account persistent health inequalities, so that all PHNs are appropriately resourced to tackle health inequalities.

PHNs should:

- Lead the trials in priority places, working with local health authorities, including Aboriginal Community Controlled Health Services, and the broader community to identify likely causes and develop cost-effective solutions.
- Build the data architecture for more precise needs-based targeting, including sourcing and linking data to enable identification of the individuals most at risk of preventable hospitalisation. Adapt solutions as better information becomes available.
- Share lessons from trials with other PHNs and over time roll out successful, cost-effective interventions across all PHNs.

States should:

- Support PHNs in identifying potential causes and developing cost-effective options, including encouraging local health districts to work with PHNs in priority places.
- Participate in the evaluation of interventions in priority places.

Potentially preventable hospitalisations are a warning of health system failures.

Priority places are the areas where high concentrations of potentially preventable hospitalisations are most likely to endure without intervention. Morally, and from an efficiency standpoint, these are the right places to start.

But this is only the first step. PHNs should begin sourcing and linking data to enable more precise needs-based targeting as a broader solution to bringing down potentially preventable hospitalisations in their regions.

As PHNs develop more sophisticated capabilities in needs-based targeting and as the evidence from intervention trials builds, efforts to reduce health inequalities should be strengthened and expanded beyond the priority places identified here.

Appendix 1: Priority places in Queensland and Victoria

State	*PHN*	*ACSC*	*Area code*	*Region*	*Rate*[120] *(10-yr-avg)*	*Admissions (10-yr avg)*	*Population (10-yr avg)*
Qld	Brisbane North	Angina	31366	Caboolture - South	2.4	86	17115
		COPD	31365	Caboolture	2.1	137	21520
Qld	Brisbane South	COPD	31306	Beenleigh	2.3	52	8506
		COPD	31336	Woodridge	2.1	61	13000
Qld	Central Queensland, Wide Bay, Sunshine Coast	Cellulitis	31190	Central Highlands - East	2.6	42	7804
		Cellulitis	31212	Mount Morgan	3.6	25	3088
		Chronic ACSCs	31205	Berserker	2.3	219	7457
		Chronic ACSCs	31212	Mount Morgan	2.3	111	3088
		COPD	31212	Mount Morgan	2.7	36	3088
		Dental	31190	Central Highlands - East	2.6	62	7804
		Dental	31194	Banana	1.9	47	8966
		Dental	31205	Berserker	3.0	62	7457
		Dental	31207	Emu Park	2.4	26	4451
		Dental	31210	Gracemere	2.6	59	8266
		Dental	31223	Yeppoon	2.7	116	16133
		Diabetes	31190	Central Highlands - East	2.6	38	7804
		Diabetes	31205	Berserker	2.5	53	7457
		Diabetes	31212	Mount Morgan	3.1	31	3088
		ENT	31190	Central Highlands - East	2.4	41	7804
		ENT	31508	Monto - Eidsvold	2.8	18	3787

[120] The rate for each area is effectively a 'location quotient', signifying how concentrated a particular potentially preventable condition is for a specific area compared to the state as a whole

State	*PHN*	*ACSC*	*Area code*	*Region*	*Rate*[120] *(10-yr-avg)*	*Admissions (10-yr avg)*	*Population (10-yr avg)*
Qld	Central Queensland, Wide Bay, Sunshine Coast (cont.)	Epilepsy	31212	Mount Morgan	4.3	21	3088
		UTI	31205	Berserker	2.3	58	7457
Qld	Darling Downs and West Moreton	CCF	31295	Riverview	2.3	19	3417
		Cellulitis	31178	Tara	2.3	21	4164
		Cellulitis	31506	Kingaroy Region - North	4.5	86	9443
		Chronic ACSCs	31295	Riverview	2.1	87	3417
		Chronic ACSCs	31506	Kingaroy Region - North	2.3	287	9443
		COPD	31173	Goondiwindi	1.9	34	6467
		COPD	31295	Riverview	2.4	23	3417
		Diabetes	31506	Kingaroy Region - North	2.9	80	9443
		ENT	31506	Kingaroy Region - North	4.1	75	9443
		Epilepsy	31506	Kingaroy Region - North	3.8	53	9443
		UTI	31506	Kingaroy Region - North	2.0	56	9443
Qld	Gold Coast	UTI	31257	Pimpama	2.5	19	2933
Qld	Northern Queensland	Angina	31342	Andergrove - Beaconsfield	1.8	50	14794
		Angina	31346	Mackay	3.6	35	4105
		CCF	31163	Yarrabah	12.2	15	2563
		CCF	31346	Mackay	4.3	31	4105
		CCF	31401	Torres	2.9	10	3497
		Cellulitis	31161	Tully	3.5	82	10617
		Cellulitis	31163	Yarrabah	8.5	35	2563
		Cellulitis	31164	Daintree	3.8	47	6173
		Cellulitis	31170	Mareeba	3.4	73	10166
		Cellulitis	31396	Cape York	6.9	101	7063
		Cellulitis	31399	Northern Peninsula	9.0	29	2340

State	*PHN*	*ACSC*	*Area code*	*Region*	*Rate*[120] *(10-yr-avg)*	*Admissions (10-yr avg)*	*Population (10-yr avg)*
Qld	Northern Queensland (cont.)	Cellulitis	31401	Torres	7.0	38	3497
		Cellulitis	31402	Torres Strait Islands	3.9	27	4576
		Cellulitis	31403	Weipa	6.6	28	3337
		Cellulitis	31407	Northern Highlands	3.5	27	3750
		Cellulitis	31466	Palm Island	12.6	53	2367
		Chronic ACSCs	31163	Yarrabah	6.2	72	2563
		Chronic ACSCs	31170	Mareeba	2.1	311	10166
		Chronic ACSCs	31346	Mackay	3.5	150	4105
		Chronic ACSCs	31396	Cape York	2.9	196	7063
		Chronic ACSCs	31466	Palm Island	9.0	113	2367
		COPD	31163	Yarrabah	7.4	19	2563
		COPD	31170	Mareeba	2.5	97	10166
		COPD	31346	Mackay	4.4	41	4105
		COPD	31396	Cape York	3.1	47	7063
		COPD	31466	Palm Island	20.7	43	2367
		Dental	31395	Aurukun	3.1	17	1289
		Dental	31466	Palm Island	2.9	23	2367
		Diabetes	31163	Yarrabah	5.0	16	2563
		Diabetes	31170	Mareeba	2.2	73	10166
		Diabetes	31346	Mackay	3.0	32	4105
		Diabetes	31395	Aurukun	6.5	12	1289
		Diabetes	31396	Cape York	4.1	72	7063
		Diabetes	31399	Northern Peninsula	7.5	29	2340
		Diabetes	31402	Torres Strait Islands	5.4	39	4576
		Diabetes	31466	Palm Island	8.5	34	2367

State	*PHN*	*ACSC*	*Area code*	*Region*	*Rate*[120] *(10-yr-avg)*	*Admissions (10-yr avg)*	*Population (10-yr avg)*
Qld	Northern Queensland (cont.)	ENT	31170	Mareeba	3.7	66	10166
		ENT	31396	Cape York	3.2	46	7063
		ENT	31403	Weipa	2.8	17	3337
		ENT	31466	Palm Island	5.9	34	2367
		Epilepsy	31163	Yarrabah	12.9	34	2563
		Epilepsy	31164	Daintree	3.1	32	6173
		Epilepsy	31170	Mareeba	4.9	77	10166
		Epilepsy	31396	Cape York	3.2	38	7063
		Epilepsy	31399	Northern Peninsula	6.1	20	2340
		Epilepsy	31466	Palm Island	12.4	48	2367
		UTI	31170	Mareeba	2.4	75	10166
		UTI	31346	Mackay	3.4	36	4105
		UTI	31396	Cape York	3.0	44	7063
		UTI	31466	Palm Island	6.3	32	2367
Qld	Western Queensland	Angina	31406	Mount Isa Region	3.6	28	3944
		CCF	31404	Carpentaria	3.7	26	5141
		CCF	31406	Mount Isa Region	5.1	27	3944
		Cellulitis	31404	Carpentaria	8.2	83	5141
		Cellulitis	31406	Mount Isa Region	7.0	55	3944
		Cellulitis	31408	Barcaldine - Blackall	2.9	34	5522
		Cellulitis	31411	Far South West	3.9	24	3334
		Chronic ACSCs	31171	Balonne	2.1	112	4829
		Chronic ACSCs	31404	Carpentaria	3.2	137	5141
		Chronic ACSCs	31406	Mount Isa Region	5.1	174	3944
		Chronic ACSCs	31409	Charleville	1.9	110	4715

State	*PHN*	*ACSC*	*Area code*	*Region*	*Rate*[120] *(10-yr-avg)*	*Admissions (10-yr avg)*	*Population (10-yr avg)*
Qld	Western Queensland (cont.)	Chronic ACSCs	31411	Far South West	2.7	107	3334
		COPD	31171	Balonne	2.6	32	4829
		COPD	31406	Mount Isa Region	7.5	55	3944
		COPD	31409	Charleville	2.4	33	4715
		COPD	31411	Far South West	3.3	32	3334
		Dental	31406	Mount Isa Region	3.0	35	3944
		Diabetes	31404	Carpentaria	4.8	47	5141
		Diabetes	31406	Mount Isa Region	4.8	40	3944
		Diabetes	31411	Far South West	2.7	24	3334
		ENT	31171	Balonne	3.8	36	4829
		ENT	31176	Roma	2.0	29	7059
		ENT	31404	Carpentaria	3.0	36	5141
		ENT	31406	Mount Isa Region	5.5	40	3944
		ENT	31408	Barcaldine - Blackall	2.7	28	5522
		ENT	31409	Charleville	2.5	23	4715
		ENT	31411	Far South West	3.3	19	3334
		Epilepsy	31404	Carpentaria	4.8	41	5141
		Epilepsy	31406	Mount Isa Region	6.7	46	3944
		Epilepsy	31411	Far South West	2.5	13	3334
		UTI	31404	Carpentaria	3.8	39	5141
		UTI	31406	Mount Isa Region	5.0	37	3944

State	*PHN*	*ACSC*	*Area code*	*Region*	*Rate*[120] *(10-yr-avg)*	*Admissions (10-yr avg)*	*Population (10-yr avg)*
Vic	Eastern Melbourne	Cellulitis	3156	Ferntree Gully and surrounds	2.1	89	35889
Vic	Gippsland	COPD	3858	Heyfield, Licola, Reynard and surrounds	3.2	25	2610
Vic	Murray	Cellulitis	3480	Donald and surrounds	3.1	9	1787
		Cellulitis	3616	Tatura and surrounds	2.2	15	5074
		Cellulitis	3629	Ardmona, Coomboona, Undera & surrounds	2.6	29	9173
		Cellulitis	3630	Shepparton	2.5	91	29530
		COPD	3690	Wodonga	1.8	123	30711
		Dental	3500	Mildura	2.0	180	29785
		Dental	3501	Hattah and surrounds	2.2	14	1983
		Diabetes	3549	Robinvale, Annuello and surrounds	2.4	26	3968
		Diabetes	3717	Murrindindi and surrounds	2.1	17	2489
		ENT	3480	Donald and surrounds	3.8	9	1787
		ENT	3585	Swan Hill and surrounds	2.5	41	11063
Vic	North Western Melbourne	CCF	3022	Ardeer and Deer Park East	2.2	20	2792
		Chronic ACSCs	3022	Ardeer and Deer Park East	2.2	86	2792
		Chronic ACSCs	3047	Broadmeadows	1.8	368	19279
		COPD	3047	Broadmeadows	2.6	118	19279
		COPD	3048	Meadow Heights and Coolaroo	2.5	60	18913
		Diabetes	3022	Ardeer and Deer Park East	2.6	31	2792
		UTI	3000	Melbourne	2.5	39	18148
Vic	South Eastern Melbourne	CCF	3911	Langwarrin South and Baxter	4.0	14	3038
		Chronic ACSCs	3200	Frankston North	2.1	141	5755
		Chronic ACSCs	3911	Langwarrin South and Baxter	2.7	54	3038
		COPD	3200	Frankston North	2.8	44	5755
		COPD	3977	Cranbourne	1.8	178	56725

State	*PHN*	*ACSC*	*Area code*	*Region*	*Rate*[120] *(10-yr-avg)*	*Admissions (10-yr avg)*	*Population (10-yr avg)*
Vic	South Eastern Melbourne (cont.)	Diabetes	3200	Frankston North	2.5	41	5755
		UTI	3911	Langwarrin South and Baxter	3.4	17	3038
Vic	Western Victoria	Chronic ACSCs	3214	Corio, Norlane and North Shore (Geelong)	1.7	449	23981
		Chronic ACSCs	3264	Terang	2.1	76	2312
		COPD	3214	Corio, Norlane and North Shore (Geelong)	2.2	135	23981
		COPD	3264	Terang	2.8	24	2312
		Dental	3250	Colac	2.5	82	11699
		Dental	3400	Horsham	2.4	96	13925
		ENT	3418	Little Desert, Nhill and surrounds	3.1	13	2972
		ENT	3478	St Arnaud and surrounds	2.6	12	3534

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