



About

The potentially preventable hospitalisations (PPH) indicator is a proxy measure of primary care effectiveness. PPH are specific hospital admissions that potentially could have been prevented by timely and adequate health care in the community. This report highlights disparities in PPH rates between populations, particularly the very young and the elderly, those in socioeconomically disadvantaged areas, remote areas, and Indigenous Australians, and illustrates some challenges and opportunities for PPH reporting.

More information is available in the companion PDF report [*Disparities in potentially preventable hospitalisations across Australia, 2012-13 to 2017-18.*](#)

Cat. no: HPF 51

- [Exploring the PPH data](#)
- [PPH condition descriptions](#)
- [Data](#)

Findings from this report:

- Around 7% of all hospitalisations in 2017-18 were classified as potentially preventable
- Nearly 10% of all hospital bed days in 2017-18 were for potentially preventable hospitalisations
- There were nearly 748,000 potentially preventable hospitalisations in Australia in 2017-18
- The most common cause of PPH in males was COPD; in females it was urinary tract infections

Disparities in potentially preventable hospitalisations across Australia: Exploring the data

Web report | Last updated: 06 Feb 2020 | Topic: [Primary health care](#) | [Media release](#)

Introduction

Primary and community health care is usually a person's first encounter with the health system, and includes a range of activities and services, from health promotion and prevention, to management and treatment of acute and chronic conditions. Currently, few data sources measure the impact of this sector on the health of Australians (AIHW 2019).

What are potentially preventable hospitalisations (PPH)?

Potentially preventable hospitalisations (PPH) are used as a measure of access to timely, effective and appropriate primary and community health care.

PPH are specific hospital admissions that could potentially have been avoided through preventative health interventions (such as vaccination), or appropriate individualised disease management (such as treatment of infections or management of chronic conditions) in the community.

Classifying a hospitalisation as "potentially preventable" does not mean that the hospitalisation itself was unnecessary, it means that optimal management at an earlier stage might have prevented the patient's condition worsening to the point where they needed hospitalisation.

PPH are grouped into three broad categories: *Vaccine-preventable*, *Acute* and *Chronic conditions*.

How might hospitalisations be prevented?

Primary health care interventions that can help people avoid hospitalisation for some conditions include:

- reducing and managing risk factors for disease
- vaccination
- oral health checks
- sexual health checks
- antenatal care
- diagnosis and prescribing to manage infections
- lifestyle interventions to reduce the development of chronic conditions
- management of chronic conditions to slow progression and risk of complications, including support for self-management

This care is usually delivered by general practitioners, medical specialists, dentists, nurses and allied health professionals and may be accessed through a variety of community settings, including Aboriginal and Community Controlled Health Services.

What factors affect PPH other than primary care?

PPH are a useful tool for identifying and investigating variation in health outcomes between different populations.

It is important not to assume that higher rates of PPH always indicate a less effective primary care system. There are other reasons why an area or group of people may have higher rates of PPH—including higher rates of disease, lifestyle factors and other risks, as well as a genuine need for hospital services.

Some PPH may not be avoidable, such as those for chronically ill or elderly patients who have received optimum primary care, or procedures such as tonsillectomies that are an appropriate follow-up to primary care.

Changes in hospital coding standards, admission policies and clinical practices can artificially affect PPH rates—conditions known to be impacted include hepatitis B, iron deficiency anaemia, angina and some conditions requiring rehabilitation care.

These factors need to be considered when looking at PPH data.

More information on these factors is in the PDF report, *Disparities in potentially preventable hospitalisations across Australia, 2012-13 to 2017-18*. The PDF report explores disparities in PPH between populations and provides information to help users interpret PPH data.

A summary of findings is available in the [fact sheet](#).

References

AIHW (Australian Institute of Health and Welfare) 2019. Developing a National Primary Health Care Data Asset: consultation report. Cat. no. PHC 1. Canberra: AIHW.





Exploring the potentially preventable hospitalisations data

The likelihood of a person having a potentially preventable hospitalisation (PPH) can vary according to their age, sex, where they live, their level of socioeconomic disadvantage, and Indigenous status.

On this page

[PPH by age and sex](#)

[PPH by Indigenous status, remoteness and socioeconomic disadvantage](#)

[PPH by Indigenous status, age and sex](#)

[PPH by small geographic areas \(PHN and SA3\)](#)

[Distribution of PPH within a PHN or SA3 area](#)

The information in this web report should be looked at in conjunction with [Disparities in potentially preventable hospitalisations across Australia, 2012-13 to 2017-18](#). The PDF report explores disparities in PPH between populations and provides information to help users interpret the PPH data.

A summary of findings is available in the [fact sheet](#).

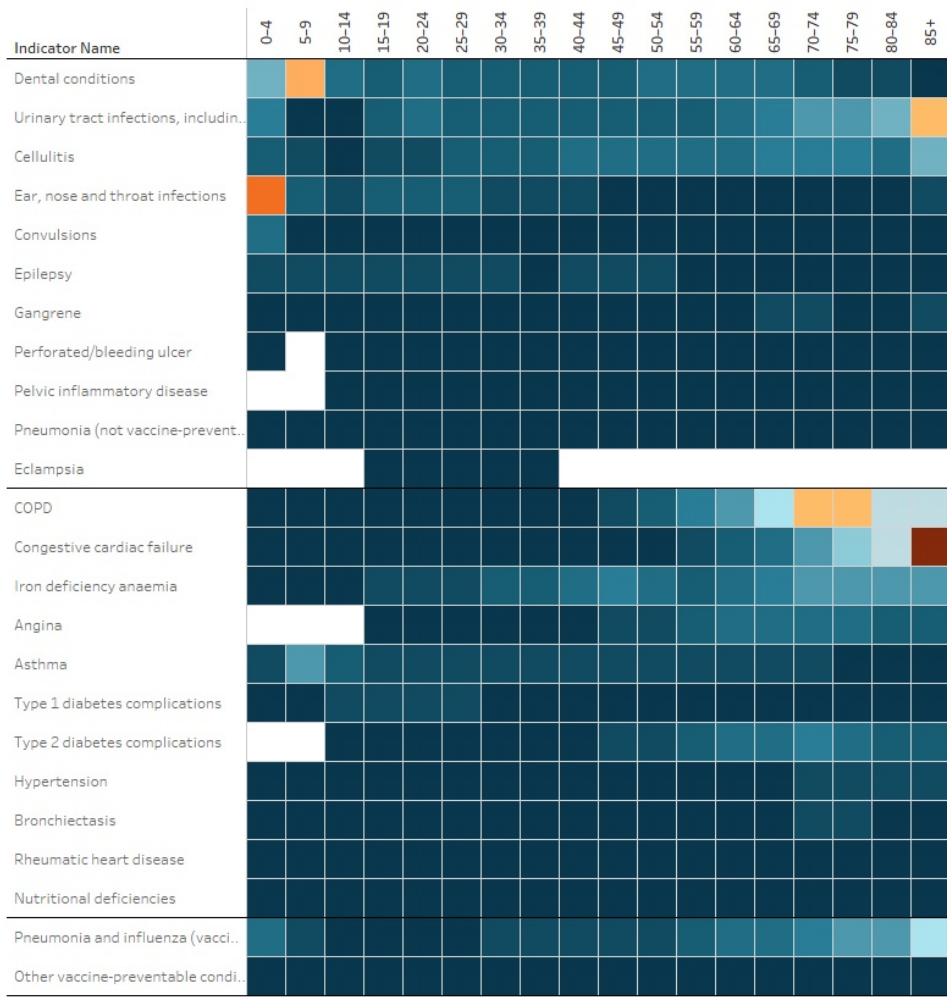
Age and sex

The likelihood of a person having a PPH varies with age and sex.

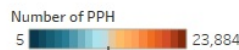
Use the interactive graph to explore the number of admissions for each PPH condition in 2017-18, by five-year age groups, and see how causes of PPH vary across life stages for males, females and persons.

“Hover text” includes information on the average length of stay and proportion of same day admissions, which can also be found in the [data tables](#).

Figure 1. Distribution of PPH by age in 2017–18: Persons



Filter by sex
Persons



Note: Where data is unable to be displayed due to confidentialisation or volatility, this has been excluded from the graph or denoted with "n.p"

Source: AIHW 2020

Indigenous status, remoteness and socioeconomic disadvantage

PPH rates have frequently been shown to increase with increasing remoteness and socioeconomic disadvantage, and both factors disproportionately affect Indigenous Australians (Duckett & Griffiths 2016; ACSQHC & AIHW 2017)

Use the interactive graph to explore PPH rates by life stage (0-14, 15-64 and 65+ years), Indigenous status, remoteness and the socioeconomic disadvantage of an area, for males, females and persons, from 2012-13 to 2017-18.

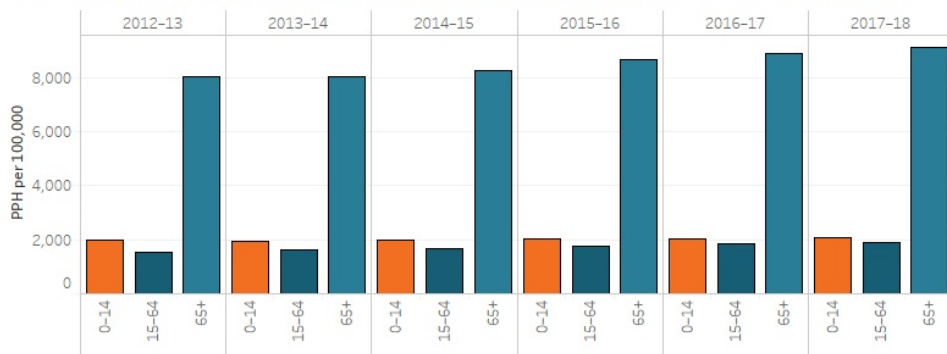
"Hover text" includes information on the number of PPH, average length of stay and proportion of same day admissions, which can also be found in the [data tables](#).

Figure 2. Explore potentially preventable hospitalisation data by influencing factors

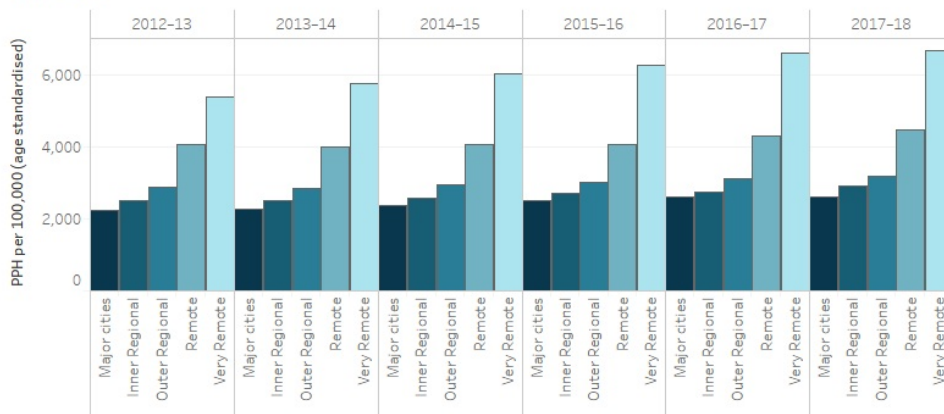
Explore by sex
Persons

Explore by condition
Total potentially preventable

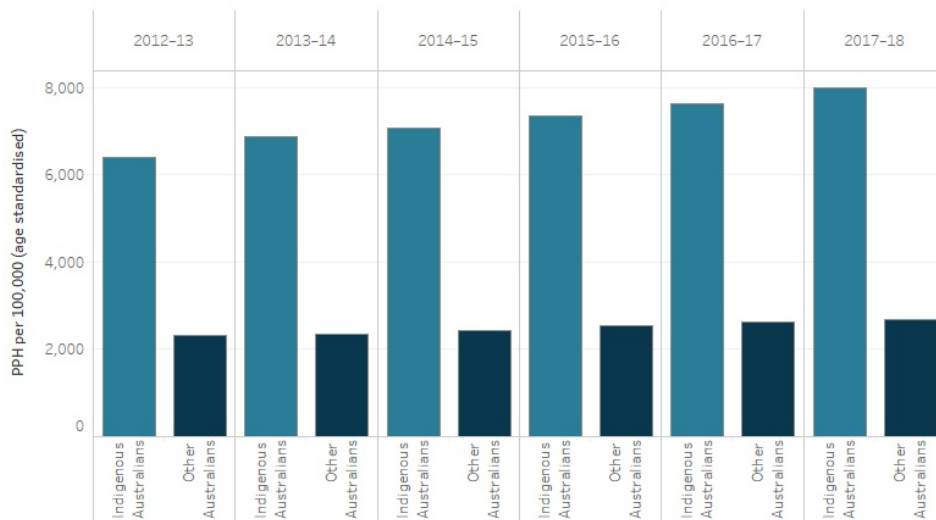
Distribution of total potentially preventable conditions by life stage - Persons



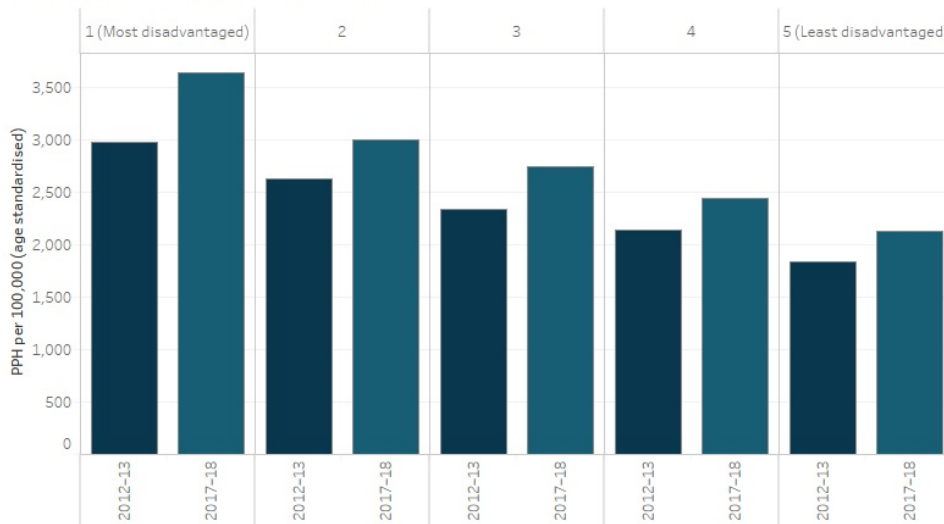
Distribution of **total potentially preventable conditions** by remoteness area -
Persons



Distribution of **total potentially preventable conditions** by Indigenous status -
Persons



Distribution of **total potentially preventable conditions** by Socio-Economic Indexes for Areas (SEIFA) - Persons



[Notes]

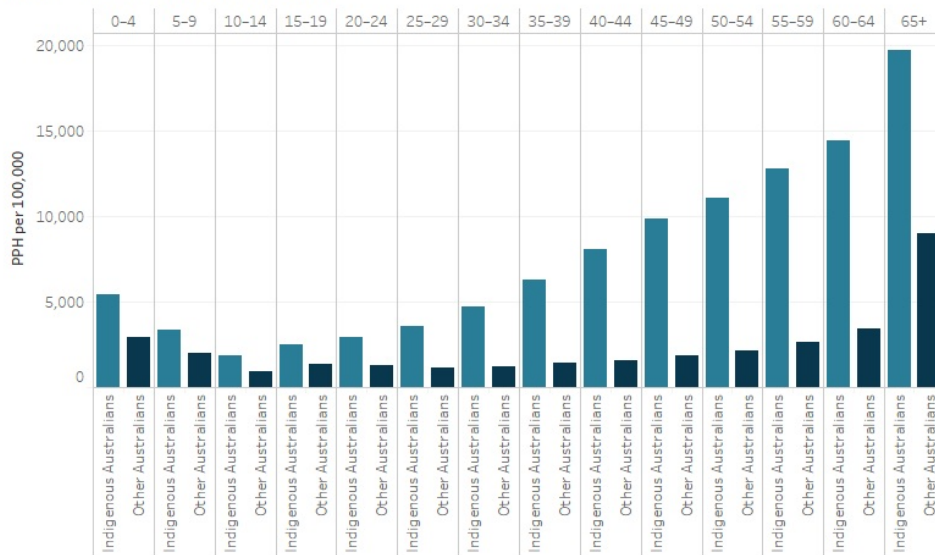
Source: AIHW 2020

Indigenous status, age and sex

Use the interactive graph to explore differences in PPH rates by Indigenous status and 5-year age group, for males, females and persons, for the years 2012-13 to 2017-18.

“Hover text” includes information on the number of PPH, which can also be found in the [data tables](#).

Figure 3. Age specific rates for **total potentially preventable conditions** in 2017–18 by Indigenous status



View by year
2017-18

Explore by sex
Persons

Explore by condition
Total potentially preventable

[Notes]

Source: AIHW 2020

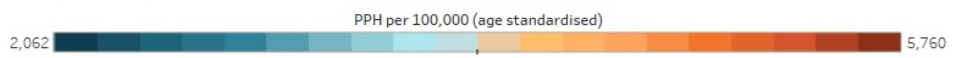
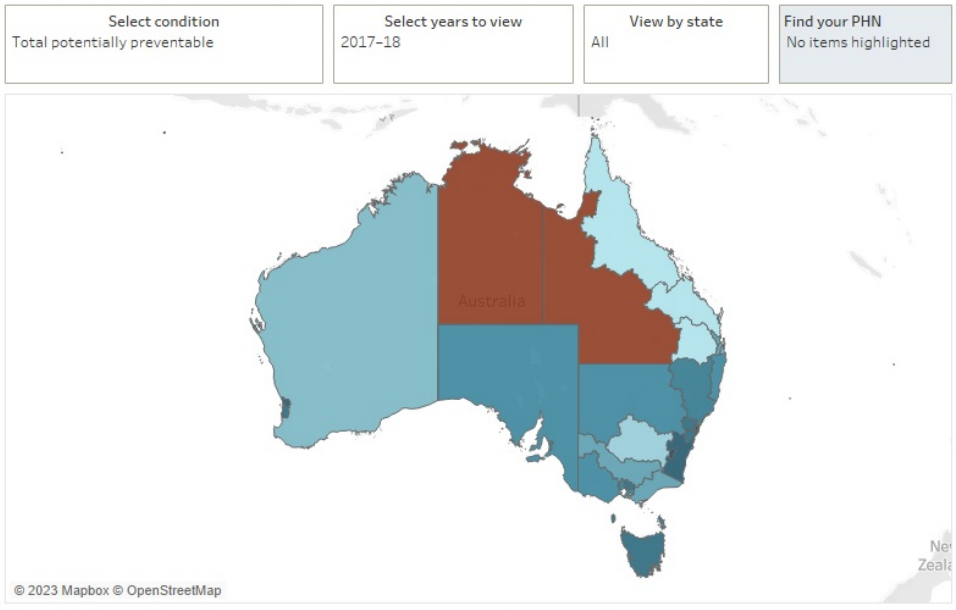
Small geographic areas

Variation in PPH rates within a region, or between areas with similar characteristics, can be used to identify and investigate areas or populations of need (Falster & Jorm 2017).

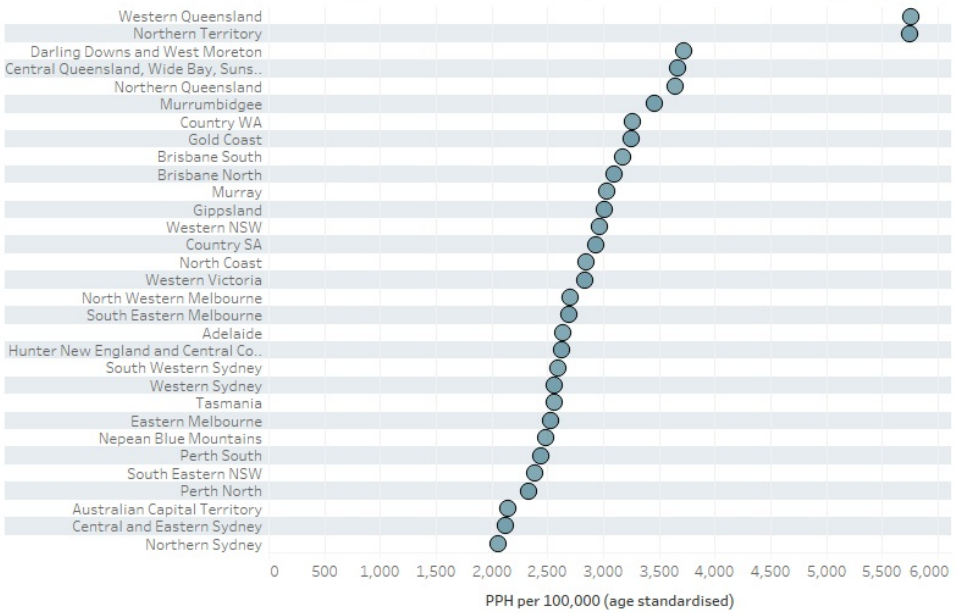
Use the interactive maps and graphs to explore variation in PPH rates across small geographic areas (PHNs and SA3s) between 2012-13 and 2017-18.

“Hover text” includes information on the number of PPH, average length of stay and proportion of same day admissions, which can also be found in the [data tables](#).

Figure 4. Map of PPH by PHN



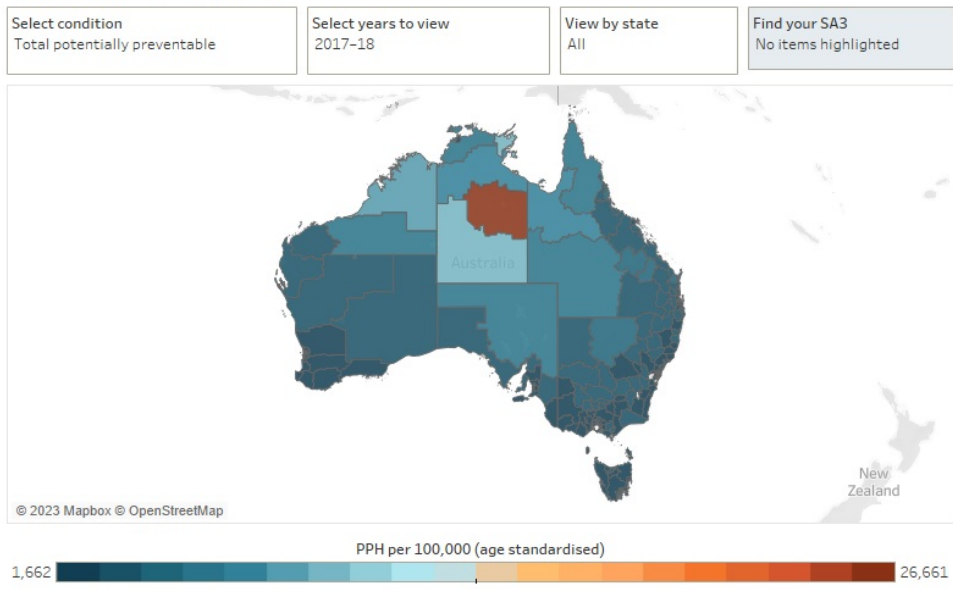
Distribution of total potentially preventable conditions by Primary Health Network (PHN)



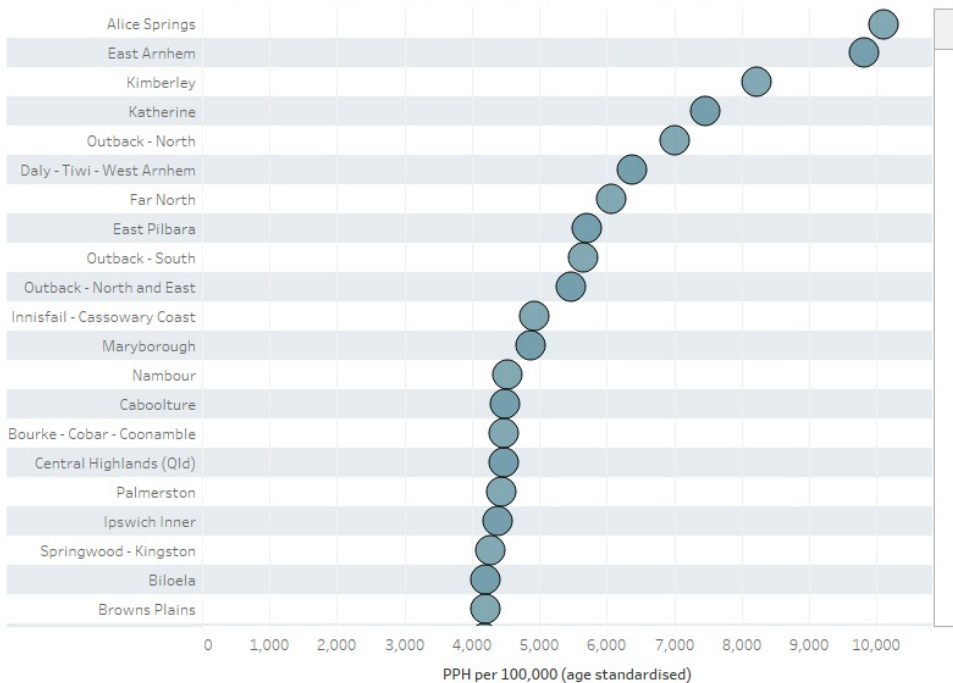
[Notes]

Source: AIHW 2020

Figure 5. Map of PPH by SA3



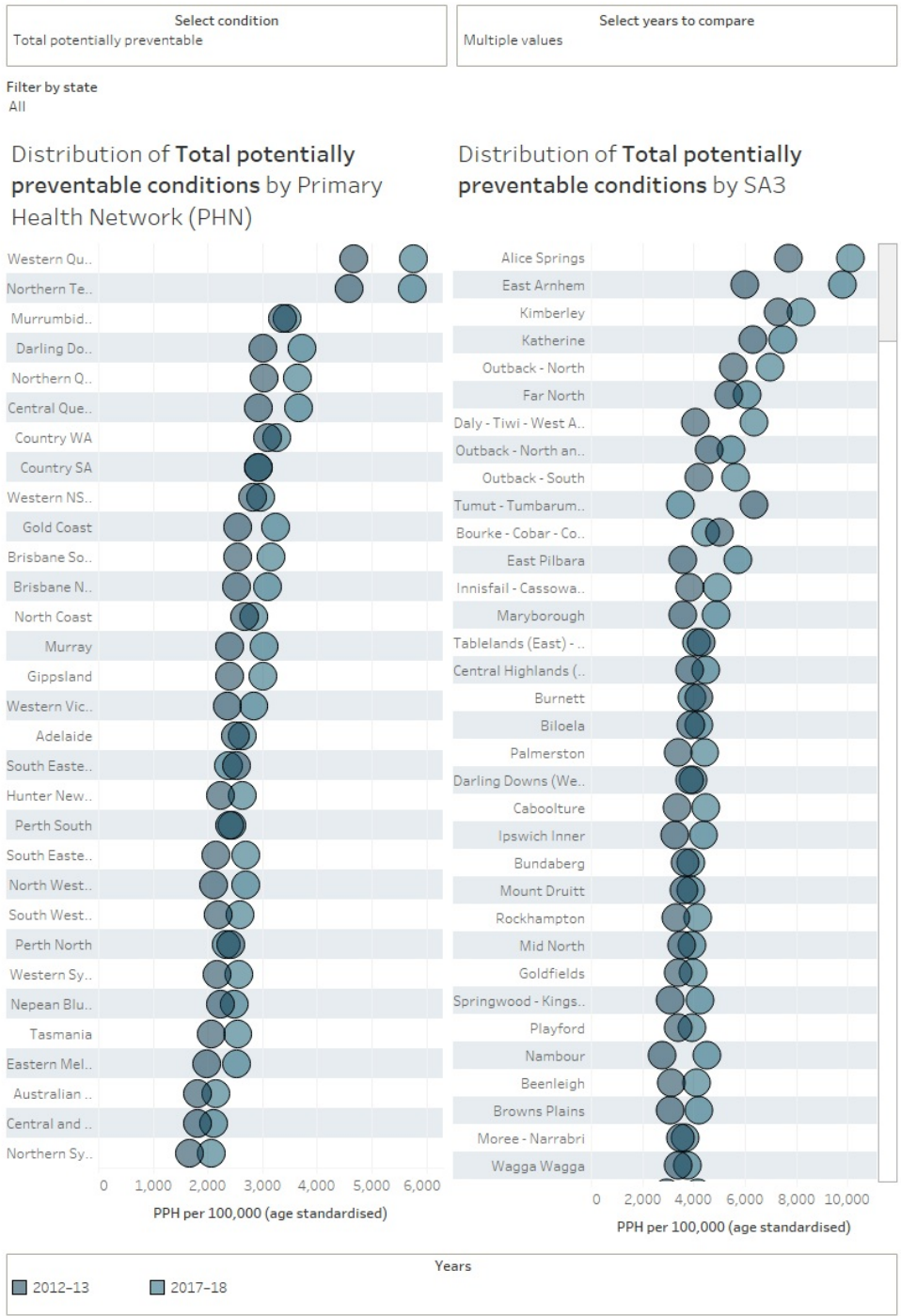
Distribution of total potentially preventable conditions by SA3



[Notes]

Source: AIHW 2020

Figure 6. Explore potentially preventable hospitalisation data by small geographic areas



[Notes]

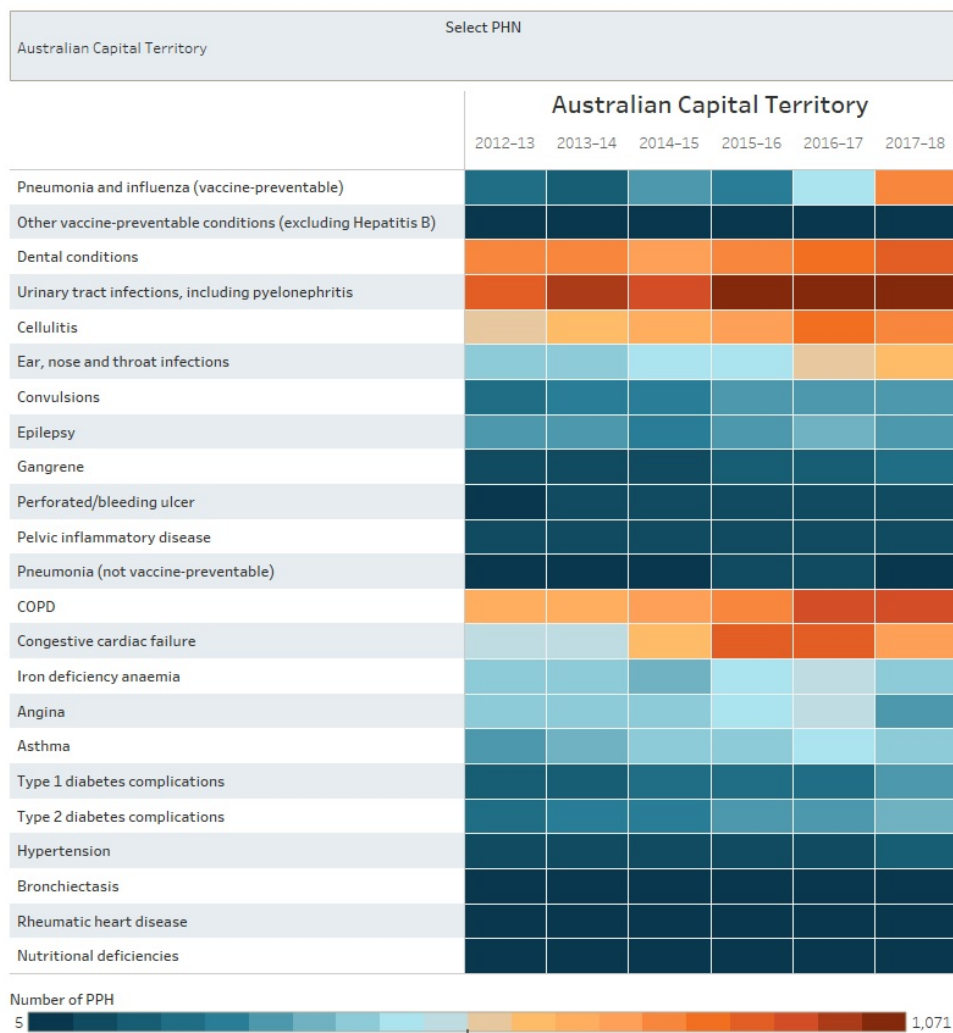
Source: AIHW 2020

Distribution of potentially preventable hospitalisations within a PHN

Use the interactive graph to explore trends in PPH rates within a PHN between 2012-13 and 2017-18.

“Hover text” includes information on the number of PPH, average length of stay and proportion of same day admissions, which can also be found in the [data tables](#).

Figure 7. Distribution of PPH conditions by PHN and year



[Notes]

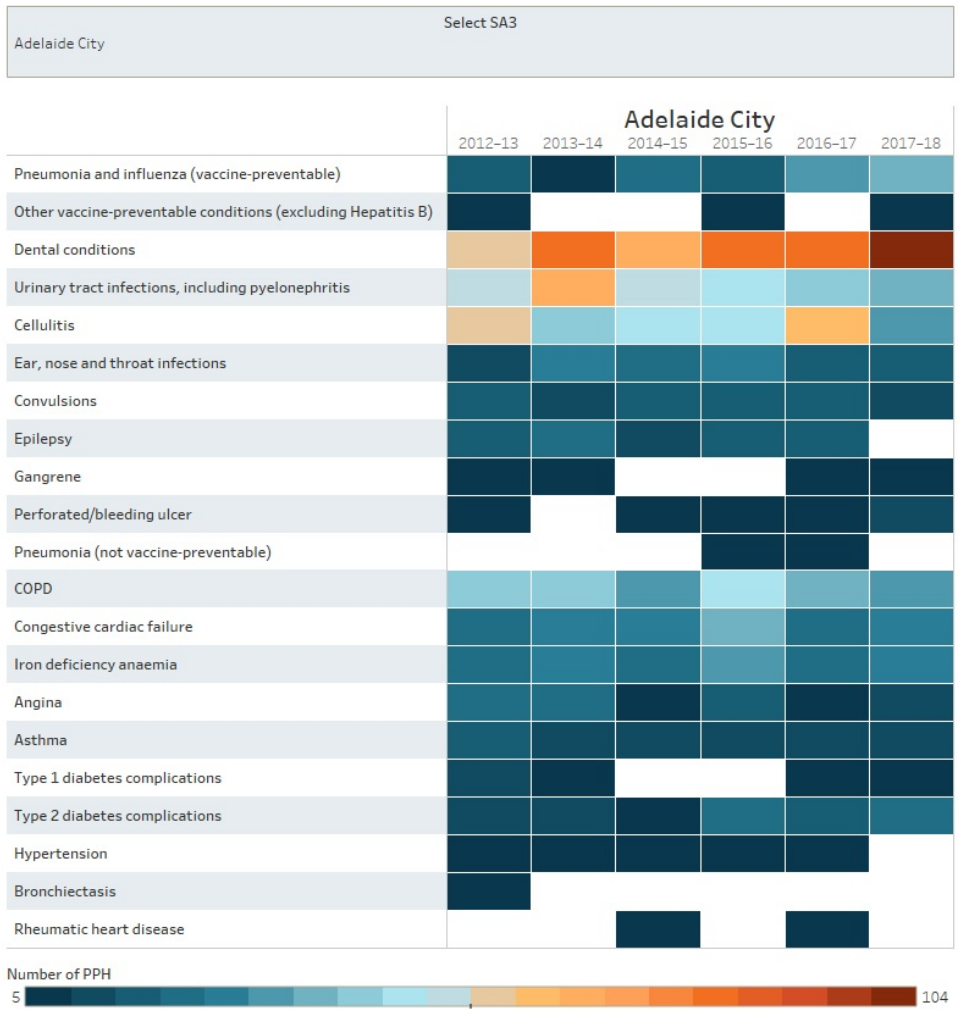
Source: AIHW 2020

Distribution of potentially preventable hospitalisations within an SA3 area

Use the interactive graph to explore trends in PPH rates within an SA3 area between 2012-13 and 2017-18.

“Hover text” includes information on the number of PPH, average length of stay and proportion of same day admissions, which can also be found in the [data tables](#).

Figure 8. Distribution of PPH conditions by SA3 and year



[Notes]

Source: AIHW 2020

References

ACSQHC (Australian Commission on Safety and Quality in Health Care) & AIHW (Australian Institute of Health and Welfare) 2017. The Second Australian Atlas of Healthcare Variation. Sydney: ACSQHC.

Duckett S & Griffiths K 2016. Perils of Place: identifying hotspots of health inequalities. Melbourne: Grattan Institute.

Falster M & Jorm L 2017. A guide to the potentially preventable hospitalisations indicator in Australia. Centre for Big Data Research in Health, University of New South Wales, in consultation with the Australian Commission on Safety and Quality in Health Care and the Australian Institute of Health and Welfare. Sydney: ACSQHC.

Potentially preventable hospitalisations condition descriptions

Vaccine-preventable conditions

Pneumonia and influenza (vaccine-preventable)

Pneumococcal disease is caused by the bacterium *Streptococcus pneumoniae*. The bacteria can cause a number of diseases, including non-invasive pneumonia and invasive pneumonia with bacteraemia (ATAGI 2018). *S. pneumoniae* is one of the most common causes of community-acquired pneumonia in Australia (Charles et al. 2008). *Haemophilus influenzae* type b (Hib) may also cause bacterial pneumonia, but this is increasingly rare in Australia since the introduction of the Hib vaccine.

Infants and elderly people have the highest pneumococcal disease burden. Invasive pneumococcal disease disproportionately affects Aboriginal and Torres Strait Islander children and adults.

Influenza is a viral disease of the respiratory tract. It affects people of all ages and is the most common vaccine-preventable disease in Australia. Although it can be a relatively mild disease, it can also cause very serious illness in otherwise healthy people. It can require hospitalisation and can cause death (ATAGI 2018). The burden of disease from influenza is highest in the young and elderly populations, and is significantly higher among Indigenous people of all ages, possibly due to increased levels of underlying chronic disease (Li-Kim-Moy et al. 2016).

Other vaccine-preventable conditions

Other vaccine-preventable conditions in the PPH indicator include the majority of diseases covered by childhood immunisation: rotaviral enteritis, tetanus, diphtheria, whooping cough, acute poliomyelitis, varicella (chickenpox), measles, rubella, hepatitis B, mumps, and *Haemophilus meningitis*.

The current specification for *Other vaccine-preventable conditions* includes hospital admissions with these diseases in 'any diagnosis', not just as the 'principal diagnosis'. Furthermore, hepatitis B is recorded as a diagnosis if it is mentioned in clinical notes, regardless of whether the condition was of significance to the hospitalisation (ACCD 2016). The current specification therefore captures a number of hospitalisations that may not be directly related to a vaccine preventable condition (AIHW 2018a).

In 2017-18, the majority of PPH for *Other vaccine-preventable conditions* were for hepatitis B (88%), followed by rotaviral enteritis (7%), chicken pox (3%) and whooping cough (2%).

To separate out the effects of hepatitis B, data are presented for *Other vaccine-preventable conditions* and *Other vaccine-preventable conditions (excluding hepatitis B)*.

Acute conditions

Kidney and urinary tract infections

Urinary tract infections (UTIs) are common: up to half of all women will get a UTI in their lifetime (Foxman 2002) and women are about 50 times more likely to get a UTI than men (Zalmanovici Trestioreanu et al. 2010). One in four women is likely to have a repeat infection (Franco 2005). Prevalence increases with age in men and women (RACGP 2006).

Most UTIs occur in the bladder (called cystitis), but may also affect the kidney (called pyelonephritis). UTIs can result in painful urination, increased frequency and increased urgency of urination. The most common cause of UTIs is the bacterium *Escherichia coli*, usually spread from the anus to the urethra (Foxman 2010).

There are several peaks for UTIs: for females with the onset of sexual activity, during pregnancy and childbirth, and in the elderly; and for males at birth, then after 50 years with the onset of prostate gland enlargement. Risk factors for UTIs include diabetes and urinary catheters (Foxman 2010). People with diabetes also have a higher risk of developing serious complications such as kidney infection, longer hospitalisations and increased mortality (Nitzan et al. 2015).

Most UTIs require antibiotic treatment. However, treatment varies depending on individual risk factors (Jarvis 2014), and antibiotic resistance is becoming more common (Flores-Mireles et al. 2015).

A UTI in a child needs to be investigated as it may indicate a more serious condition such as urinary reflux. In Australia the PPH indicator for *Urinary tract infections* includes people of all ages, however, the differences in the presentation and management of UTIs in young children (Desai et al. 2016) compared with adults led investigators in New Zealand to limit the PPH indicator for UTIs to those aged 5 and over (Anderson et al. 2012).

Cellulitis

Cellulitis is a serious bacterial infection of the skin and subcutaneous tissues (just under the skin). Bacteria, including those that normally live on the skin, may gain access to tissues through a wound, ulcer, insect bite or pre-existing skin infections such as tinea. Common bacteria that cause cellulitis include streptococci or staphylococci. Infection can develop on any part of the body, but often affects the lower leg (Therapeutic Guidelines 2019a). Risk factors include poor circulation, diabetes and obesity (Phoenix et al. 2012).

Indigenous people are likely to have higher rates of infection due to the increased prevalence of many risk factors, as well as poor housing conditions and reduced access to appropriate health care.

Cellulitis is treated with oral antibiotics, or in more severe cases, intravenous antibiotics are given in hospital (or “hospital in the home” - these admissions are included in the current PPH indicator). Complications such as bloodstream infections or deeper tissue infection may require broad spectrum antibiotics or surgery.

Many conditions present similarly to cellulitis, which may inflate the number of PPH recorded for *Cellulitis* (Therapeutic Guidelines 2019a).

Ear, nose and throat infections

Ear, nose and throat (ENT) infections are caused by a bacterial or viral infection of the upper respiratory tract. These infections may result in inflammation of the ear and surrounding tissue (otitis media, mastoiditis, otitis externa), the sinus passages (sinusitis) and the throat (tonsillitis and pharyngitis).

Babies and young children are particularly susceptible to ENT infections due to their developing anatomy. ENT infections are generally non-severe and readily treatable in primary care settings with antibiotics for bacterial infections, and symptomatic treatment for viral infections. ENT infections may result in more severe conditions such as chronic tonsillitis, abscesses, chronic suppurative otitis media or rheumatic fever.

Recurrent otitis media can cause hearing loss, which can delay a young child's speech and language development, make learning more difficult and result in poorer long-term outcomes (Kong & Coates 2009). Indigenous children in both remote and urban settings tend to suffer otitis media earlier, more frequently and severely, and with more serious complications than other Australian children (Jervis-Bardy et al. 2014). Risk factors may include poverty, household overcrowding and hygiene, and secondhand smoke exposure (AIHW 2018b).

Selected surgical procedures such as tonsillectomy, adenoidectomy and myringotomy, are included in the current *ENT infections* PPH specification, but were excluded from a proposed general practice-specific PPH indicator, as they were considered part of appropriate management (AIHW 2018a).

Perforated / bleeding ulcer

An ulcer is a break in the surface or mucous membrane of an organ or tissue. Ulcers occurring in the stomach (gastric ulcers) or the duodenum (duodenal ulcers) are together known as peptic ulcers.

Ulcers are the most common cause of upper gastrointestinal bleeding. Ongoing management is required to reduce the risk of recurrent bleeding (Laine & Jensen 2012). Peptic ulcers are managed with acid-suppressing medications.

A perforated ulcer is a serious medical condition in which a hole forms in an area of the ulcer, allowing the contents of the digestive tract to leak into the abdominal cavity. A perforated ulcer may require immediate surgery.

Most duodenal ulcers and about two-thirds of gastric ulcers are caused by infection with *Helicobacter pylori* bacterium (Mitchell & Katelaris 2016). Non-steroidal anti-inflammatory drugs (NSAIDs) such as aspirin cause most other ulcer disease and an increasing proportion of all ulcers. If a person is taking NSAIDs and has *H. pylori* infection, they have a higher risk of ulcers and bleeding (Huang et al. 2002). Patients with a perforated peptic ulcer tend to be elderly with multiple co-morbidities and have associated use of NSAIDs or steroids (Chung & Shelat 2017).

Most transmission of *H. pylori* infection occurs early in life. Although the prevalence of *H. pylori* infection is decreasing in Australia, older age groups still have higher prevalence of infection. Prevalence is also higher in Indigenous Australians, people with socioeconomic disadvantage, and residents who were born in high prevalence countries (Mitchell & Katelaris 2016).

Pelvic inflammatory disease

Pelvic inflammatory disease (PID) is an infection of the upper female reproductive tract - the endometrium, fallopian tubes, ovaries or pelvic peritoneum. The inflammation can result in pelvic pain, however many women do not have symptoms despite the spread of infection. PID can cause infertility, ectopic pregnancy and chronic pelvic pain (Therapeutic Guidelines 2019b).

The majority of infections are due to sexually transmitted pathogens, such as *Chlamydia trachomatis* and *Neisseria gonorrhoea*, however, often no pathogen is identified (ASHA 2018).

PID caused by a sexually transmitted infection can be prevented by the use of condoms and regular sexual health check-ups. Early treatment of PID with antibiotics may minimise the risk of complications (ASHA 2018).

Pneumonia (not vaccine-preventable)

Pneumonia is a lung infection that is usually caused by viruses or bacteria and occasionally by fungal pathogens. The *Pneumonia (not vaccine-preventable)* PPH specification includes pneumonia caused by selected bacteria (streptococcus group B, other streptococci, *Mycoplasma pneumoniae*, and chlamydial pneumonia) for which there are not yet vaccines available.

Pneumonia can affect people of all ages, but tends to be most common in young children and the elderly.

For patients with low-severity pneumonia, early diagnosis and treatment may reduce the need for hospitalisation. However, hospitalisation may not be avoidable for more severe cases. Preventive strategies (other than vaccination) such as smoking cessation and oral hygiene may reduce the risk of pneumonia in vulnerable individuals (Therapeutic Guidelines 2019c).

Dental conditions

Potentially preventable dental hospitalisations are general anaesthetic procedures for dental treatment, where hospitalisation could have been avoided through primary prevention of oral disease or by the provision of timely and adequate non-hospital care (Rogers et al. 2018a). The indicator for *Dental conditions* includes PPH for dental decay, gum disease and tooth loss, cysts and other disorders affecting tooth and gum health or the oral region.

Rates of PPH for *Dental conditions* are highest for young children and the main cause of admission is tooth decay. Young children with severe tooth decay and/or oral infection are often unable to tolerate all the necessary treatment in a dental clinic setting (Australian Dental Association, NSW 2019).

Poor oral health may be caused or exacerbated by diet, poor oral hygiene, smoking, alcohol, lack of fluoridation in water supplies, and issues with access and availability of dental care (NACDH 2012). Poor oral health is also a risk factor for a range of other health conditions, such as diabetes and cardiovascular disease (AIHW 2019a). Poor oral health is more common in socioeconomically disadvantaged populations, Indigenous populations, people living in remote areas, and people with additional and/or specialised health care needs (COAG 2015; ABS 2018b).

Higher rates of PPH for *Dental conditions* have been described in Indigenous and rural populations (Acharya et al. 2018; Caffery et al. 2017). However, studies have also found higher rates of PPH for *Dental conditions* in metropolitan areas of socioeconomic advantage (Acharya et al. 2018; Yap et al. 2018) and areas with high levels of private health insurance (WAPHA 2017), suggesting complex drivers for hospitalisation amongst different population groups (Rogers et al. 2018b).

Convulsions and epilepsy

The PPH specification includes hospitalisations for epilepsy and convulsions “not elsewhere classified”, including febrile convulsions.

A convulsion is a type of seizure that involves a change in brain function, resulting in loss of consciousness and involuntary jerking of the body. Febrile convulsions are common seizures occurring in 3% of healthy children up to the age of 6 years. The seizures are generally harmless and associated with an illness causing a fever, such as a viral infection (RCH 2019).

Epilepsy is a common, long-term brain condition where a person has repeated seizures. Epilepsy is not one single condition; rather it is a range of different conditions that can cause seizures. Although epilepsy has been considered a disorder of the young, the over 55 years age group is now being recognised as being the most vulnerable group, as they are subject to the kinds of cerebrovascular, respiratory and cardiac events that can lead to epileptic seizures (Epilepsy Australia 2019).

Epilepsy is usually managed with antiepileptic medications, supported by patient education and lifestyle modification. Surgery is usually only used where medication fails (Epilepsy Australia 2019).

A study in Far North Queensland found that Indigenous patients had higher rates of anti-convulsant non-adherence, likely contributing to higher rates of ED presentation (Wilson et al. 2012).

Repeated hospitalisation is common for children and adults with seizures (Bellon et al. 2017), and a source of frustration for some patients (Peterson et al. 2019), who may be inadvertently hospitalised by concerned bystanders who are unaware of the person’s care requirements.

Gangrene

Gangrene is the death and decay of body tissue, caused by reduced blood flow. Gangrene is an outcome of peripheral vascular disease, which is the reduced circulation of blood to a body part other than the brain or heart. This narrowing and blockage of blood vessels can arise from a number of causes - including diabetes, blood clots, infections causing vascular scarring, and certain conditions that narrow the blood vessels abnormally.

The only treatment for gangrene is surgical intervention.

Diabetes is an important risk factor for peripheral vascular disease, along with smoking, being overweight, sedentary, hypertension, diabetes, high blood cholesterol and increasing age.

Prevention and management of peripheral vascular disease includes regular monitoring, lifestyle modifications, medication regimens common to other atherosclerotic diseases, and wound care (Gerhard-Herman et al. 2017).

Eclampsia

Eclampsia is the occurrence of convulsions in association with the signs and symptoms of pre-eclampsia (Douglas & Redman 1994).

Pre-eclampsia develops during the second half of pregnancy, or less commonly, after delivery. In the mother, pre-eclampsia usually takes the form of high blood pressure (hypertension), leakage of protein into the urine and abnormal kidney or liver function (Poon et al. 2019).

The causes of pre-eclampsia are not fully understood. Detection and management of pre-eclampsia through regular checks during pregnancy can reduce the risk of eclampsia (Poon et al. 2019), however, some cases occur without the common warning signs of pre-eclampsia (Douglas & Redman 1994). A woman with severe pre-eclampsia may need admission to hospital for monitoring and treatment until her baby is born.

Chronic conditions

Congestive cardiac failure

Congestive cardiac failure, or heart failure, is a chronic condition in which the heart muscle is weakened and cannot pump as well as it usually does. This leads to symptoms including fluid retention (particularly in the lungs, legs and abdomen) and shortness of breath.

The major causes of heart failure include coronary heart disease (usually accompanied by a history of past heart attacks), hypertension, cardiomyopathy and other heart diseases.

People admitted to hospital with heart failure often have other conditions with shared risk factors, such as renal disease, diabetes and pulmonary disease.

The prevalence of heart failure in Australia has been estimated at 1-2%, and rates are higher in Indigenous Australians and people living in rural and remote areas (Sahle et al. 2016). An estimated 37,300 Australian women and 67,700 men aged 18 and over had heart failure in 2017-18, based on self-reported data (ABS 2018a). Prevalence of heart failure rises steeply with age—two-thirds of adults with heart failure are aged over 65 years (ABS 2018a; AIHW 2019h).

Management of heart failure involves multidisciplinary care across primary and acute care sectors, and may include lifestyle modification, dietary and fluid management, cardiac rehabilitation programs, medication and, if required, surgical procedures (Atherton et al. 2018; ACSQHC & AIHW 2017).

Common reasons for hospitalisation are infection, non-adherence to dietary and fluid restrictions or to medications, and atrial fibrillation (Newton et al. 2016).

Angina

Angina is temporary chest pain or discomfort caused by insufficient flow of blood to supply the oxygen needs of the heart. In most cases, the lack of blood flow is due to a narrowing of the coronary arteries. Angina is not a disease; rather a symptom of an underlying heart problem - usually of coronary heart disease (CHD). Stable angina usually occurs during exertion, severe emotional stress, or after a heavy meal. Unstable angina is more serious and unpredictable and may progress to a heart attack. Unstable angina and heart attacks are considered to be part of a continuum of diseases described as 'acute coronary syndrome'.

Of the estimated 580,300 Australian adults with CHD in 2017-18, about two in five (227,300 or 39%) had experienced angina (ABS 2018a). People hospitalised with acute coronary syndrome often have co-morbidities including hypertension, diabetes, heart failure and atrial fibrillation (Nedkoff et al. 2011).

National rates of PPH for *Angina* have decreased steadily over the last 20 years, primarily due to changing diagnostic criteria and blood tests (AIHW 2011; Roffi et al. 2016). Differences in PPH rates for *Angina* may partly be related to increasing access to these diagnostic tests (Spaeth et al. 2017).

Management of angina in the primary care setting involves lifestyle modification, medication and, if required, surgery (a number of these procedures, such as angioplasty and stenting, are excluded from the PPH specification). Treatment can reduce the frequency and discomfort of angina, and lower the risk of heart attack and death by treating the underlying heart condition.

Hypertension

High blood pressure - or hypertension - means that a person's blood pressure is consistently higher than their recommended level. If left untreated, the heart may become enlarged and pump less effectively.

Having high blood pressure increases the risk of having a heart attack, heart failure, stroke or kidney disease.

In 2017-18, about one in three Australians aged 18 and over (34%) had measured high blood pressure, comprising 23% with uncontrolled high blood pressure (that is, not taking medication) and 11% whose blood pressure was controlled using medication/s (ABS 2018a; AIHW 2019b). The prevalence of uncontrolled high blood pressure has not changed since 2011-12.

The proportion of adults with uncontrolled high blood pressure increased with age, and men were more likely than women to have uncontrolled high blood pressure: 25% compared with 20% (ABS 2018a; AIHW 2019b).

In 2012-13, Indigenous adults were more likely than non-Indigenous adults to have a measured high blood pressure reading (ABS 2013).

Management of hypertension includes regular blood pressure checks, lifestyle modification and medication (National Heart Foundation of Australia 2016).

Chronic obstructive pulmonary disease (COPD)

Chronic obstructive pulmonary disease (COPD) is a serious, progressive lung condition that limits airflow in the lungs, making it difficult to breathe (Lung Foundation Australia 2018). COPD includes conditions such as emphysema and chronic bronchitis and mainly affects older people (AIHW 2019d). In 2015, COPD was the third leading specific cause of total burden of disease in Australia (AIHW 2019d).

Smoking is the most common risk factor for COPD—although it is worth noting that in 2017-18, one quarter (26%) of people aged 45 and over with COPD had never smoked cigarettes (AIHW 2019d). Other causes may include environmental pollution, childhood respiratory infections and chronic asthma (AIHW 2019d). Poor health literacy is associated with worse outcomes for COPD, independent of socioeconomic disadvantage (Omachi et al. 2013).

COPD may be associated with other respiratory diseases and other chronic conditions such as cardiovascular disease and diabetes, due to shared risk factors and the effect of COPD on other parts of the body. There is increasing recognition of asthma-COPD overlap syndrome, which affects around one in five people with either diagnosis, and requires specific management to address the higher risk of poor health outcomes (National Asthma Council Australia & Lung Foundation Australia 2017).

The prevalence of COPD is difficult to determine from routine health surveys - accurate estimates require clinical testing. In Australia, the prevalence of COPD in 2006-2010 was estimated to be 7.5% for people aged 40 years and over and 30% for people aged 75 and over (Toelle et al. 2013). In 2017-18, the prevalence of self-reported current and long-term emphysema and/or bronchitis in Australians aged 45 and over was 4.8% (ABS 2018a). In 2013, the prevalence of COPD among Indigenous Australians of all ages was 2.5 times as high as the prevalence for non-Indigenous Australians, after adjusting for differences in age structure (ABS 2013).

Management of COPD is mainly focused on preventing further deterioration and maintaining lung function and quality of life. This includes assisting smokers to quit, pulmonary rehabilitation, medications, regular vaccinations and, for people with very severe disease, long-term oxygen therapy. Patients may require hospitalisation for severe exacerbations of COPD - these are frequently due to respiratory tract infections, as well as increases in exposure to air pollution and changes in ambient temperature (AIHW 2019d).

Asthma

Asthma is a common chronic inflammatory disorder of the airways. People with asthma experience variable episodes of wheezing, breathlessness and chest tightness due to narrowing of their airways (AIHW 2019e).

Around 2.7 million Australians (11% of the total population) have asthma (ABS 2018a). Among children, boys have a higher prevalence of asthma compared to girls, and asthma is the leading cause of disease burden for both boys and girls aged 5-14 (AIHW 2019c). After adolescence, the prevalence of asthma is generally higher in women compared to men. This is likely due to a complex interaction between changing airway size and hormonal changes that occur during adolescent development (Almqvist et al. 2008).

In 2012-13, about one in six (18%) of Indigenous Australians reported having asthma, with higher rates in females (20%) than males (15%). The age-adjusted prevalence of asthma was almost twice as high among Indigenous Australians compared with non-Indigenous Australians (ABS 2013). The rate of asthma varies by remoteness and socioeconomic area (AIHW 2019e).

There is increasing recognition of asthma-COPD overlap syndrome, which affects around one in five people with either diagnosis, and requires specific management to address the higher risk of poor health outcomes (National Asthma Council Australia & Lung Foundation Australia 2017).

Although asthma cannot be cured, the symptoms of asthma are usually reversible, either with or without treatment. Preparation of an asthma action plan with a primary health care provider can help people manage their condition. Asthma medicines include relievers for rapid relief of symptoms, and preventers to minimise symptoms and reduce the likelihood of episodes. People can also learn to avoid personal triggers such as environmental or dietary factors. People require admission to hospital when their asthma episodes are potentially life-threatening or when they cannot be managed in the community (AIHW 2019e).

In 2017-18, only 24% of people aged 15 and over with asthma, and 67% of children aged 0-14 with asthma, had an asthma action plan (ABS 2018a; AIHW 2019e). A 2012 survey found poor symptom control in 45% of Australians aged 16 years and over with asthma, suggesting scope for the improvement of asthma care and management (Reddel et al. 2015).

Bronchiectasis

Bronchiectasis is the abnormal widening of the airways in the lungs usually caused by damage to the airway walls (AIHW 2019i). This condition is characterised by a persistent cough with excess amounts of mucus and, often, airflow obstruction together with episodes of worsening symptoms. People with bronchiectasis are prone to recurrent respiratory tract infections.

Bronchiectasis can affect anyone at any age; the cause is often unknown. Known causes include cystic fibrosis, reduced immune functioning and severe pneumonia. Bronchiectasis often coexists with other lung diseases such as COPD and asthma (Maguire 2012).

There is little information on the prevalence of bronchiectasis in Australia. Internationally, the disease occurs more commonly in rural and remote Indigenous communities and in disadvantaged communities (AIHW 2019i). The Australian Bronchiectasis Registry, established in 2015, should allow better estimates of local disease burden (Nicholson & Lee 2019).

While the prevalence of bronchiectasis is higher in males (especially those aged 65 years and over), the disease is more severe in females (Vidaillac et al. 2018). In addition to biological differences, studies have shown that females seek medical attention later and underestimate their symptoms; fewer women use inhalers appropriately and have poorer attendance at follow-up appointments for treatment and pulmonary rehabilitation (Vidaillac et al. 2018).

The diagnosis and management of bronchiectasis is complex, and requires a multidisciplinary team, led by primary care providers, to help patients manage their disease and minimise disability and premature death (Maguire 2012; Nicholson & Lee 2019). Treatment may include lifestyle modifications, physiotherapy, antibiotics, inhalers, influenza and pneumococcal vaccinations or, where appropriate, surgery. Hospitalisation may be required for management of severe disease exacerbations.

Diabetes complications

When someone has diabetes, their body can't maintain healthy levels of glucose in the blood. There are multiple forms of diabetes (Diabetes Australia 2019):

- Type 1 diabetes is an auto-immune condition that usually has an onset in childhood or early adulthood in which the immune system is activated to destroy the cells in the pancreas which produce insulin. Without insulin, the body's cells cannot turn glucose into energy.
- Type 2 diabetes is a progressive condition in which the body becomes resistant to the normal effects of insulin and/or gradually loses the capacity to produce enough insulin in the pancreas.
- Gestational diabetes occurs during pregnancy when the hormones that assist in growing the placenta interfere with insulin action, resulting in insulin resistance. Gestational diabetes is not included in the current PPH specification.

At least 1.2 million Australians (one in 20, or 4.9% of the total population) have diabetes. Diabetes is more common in males (5.5%) than females (4.3%), and disease prevalence increases with age: almost one in five adults aged 75 years and over (18.7%) has diabetes (ABS 2018a).

In 2012-13, rates of diabetes in Indigenous Australians were 3.5 times as high as rates in non-Indigenous Australians (AIHW 2017). People with socioeconomic disadvantage have higher rates of type 2 diabetes, and more hospitalisations and deaths due to diabetes (AIHW 2019f).

Early diagnosis, optimal treatment and effective ongoing support and management of all types of diabetes are required to reduce the risk of complications such as heart disease and strokes, eye disease, kidney disease, amputation and depression or anxiety.

- Type 1 diabetes (10% of people with diabetes) is managed with insulin injections, medication and lifestyle support. Ongoing management of blood sugar levels and insulin dosing can prevent many of the complications of type 1 diabetes.
- Type 2 diabetes (85% of people with diabetes) is associated with modifiable lifestyle risk factors (such as poor diet, obesity, high blood pressure and insufficient physical activity), as well as genetic factors, and is therefore potentially preventable. Type 2 diabetes can be managed through lifestyle modifications and medication. Ongoing maintenance is required to manage disease progression.

Iron deficiency anaemia

Anaemia occurs when there are too few red blood cells or not enough haemoglobin in the blood. When anaemia is caused by low iron, it is known as iron deficiency anaemia (IDA) (National Blood Authority 2019).

Not all people who are low in iron have iron deficiency anaemia - severe and prolonged iron deficiency is needed to cause anaemia.

Iron deficiency anaemia is common in Australia, particularly in women, premature or very small babies, children and people on restricted diets. The symptoms of iron deficiency anaemia are caused by a lack of oxygen being supplied to the tissues. The World Health Organization (2015) estimated that in 2011, 15% of preschool children, 25% of pregnant women and 17% of non-pregnant women of reproductive age in Australia had anaemia, with IDA a major cause.

Blood loss is the most important cause of iron deficiency in adults: menstrual blood loss in pre-menopausal women, and gastrointestinal blood loss in men and post-menopausal women.

Treatment for IDA involves identification and management of the underlying cause of the anaemia and replacing iron with iron supplements and an iron-rich diet. Oral iron therapy is usually sufficient; however, some patients may require intravenous iron therapy or red cell transfusion (Pasricha et al. 2010). A gastroscopy or colonoscopy may be required to identify gastrointestinal bleeding.

Intravenous iron infusions are increasingly being used during pregnancy and prior to certain types of elective surgery, in order to optimise patient haemoglobin and iron stores and reduce the likelihood of red blood cell transfusion (National Blood Authority 2012).

It should be noted that states and territories differ in their coding of same day intravenous iron infusions as an inpatient admission (eg, Victoria) or outpatient procedure (eg, Australian Capital Territory) - only inpatient admissions are included in the PPH specification.

Rheumatic heart disease

Acute rheumatic fever (ARF) is a disease caused by an autoimmune reaction to an infection with group A streptococcus (GAS) bacteria. ARF episodes resolve within weeks but can result in permanent damage to the heart, known as rheumatic heart disease (RHD).

ARF and RHD are associated with socioeconomic and environmental factors such as poverty and poor living conditions, and barriers to accessing health care. Reducing exposure to these risk factors reduces number of ARF and RHD diagnoses. Also, ARF can be prevented by timely and adequate treatment of GAS infections. The overall rate of ARF diagnosis in Indigenous Australians is more than 250 times the rate among non-Indigenous Australians (AIHW 2019g).

ARF usually occurs in childhood through to early adult years. Children aged 5-14 years have the highest rates of ARF and RHD diagnosis. Delivery of intramuscular injections of preventative antibiotics every 28 days is challenging for health services, patients and their families, particularly those living in remote communities. In 2017, 36% of Indigenous Australians (living in Queensland, Western Australia, South Australia and Northern Territory) received at least 80% of prescribed antibiotic doses, ranging from 63% in South Australia to 23% in Queensland (AIHW 2019g).

RHD can be prevented through regular, long-term preventative antibiotic treatment after the first known ARF episode occurs. Management of RHD is complex and includes treating symptoms and preventing worsening of disease, with the coordination of multiple services including primary health care, oral health care, specialist medical care, and cardiothoracic and interventional cardiology services (RHD Australia 2012).

In 2017, there were 4,259 living RHD cases recorded in Australia, 65% of whom were female (AIHW 2019g). Seventy-two percent of all new 1,261 RHD diagnoses made in 2013-2017 were among Indigenous Australians aged less than 45 years old.

Nutritional deficiencies

In the current PPH specification, *Nutritional deficiencies* include conditions resulting from protein energy malnutrition (kwashiorkor, marasmus, marasmic-kwashiorkor and unspecified severe protein-energy malnutrition) and prolonged, severe Vitamin D deficiency (rickets). All the conditions listed under *Nutritional deficiencies* indicator occur in children, except unspecified severe protein-energy malnutrition, which is most common in the elderly.

Nutritional deficiencies can result from a number of causes including insufficient diet and sunlight exposure, disorders of the digestive tract, social isolation, and other factors such as medication use and age, that interfere with absorption and transport of nutrients in the body.

Screening of people at risk of undernutrition in the primary care setting allows early identification and management, which is important to avoid irreversible health complications. Undernutrition can be managed through lifestyle and dietary support or modifications, and the identification of any underlying disorders (Flanagan et al. 2012).

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Technical notes

Detailed information on data sources and methods are in Section 1.2 and the Appendix of the [companion PDF report](#).

Data for this report were sourced from the AIHW National Hospital Morbidity Database for the years 2012-13 to 2017-18. The data are based on the patient's usual residence, not the location of the hospital. The data are based on the count of hospitalisations - repeat admissions by the same person are counted as separate hospitalisations, as are transfers of a person from one hospital to another. Therefore, PPH counts cannot be used to estimate the number of individuals with a particular condition.

Comparability of data

The most recent geography boundaries, remoteness classifications and PPH codes were used for all six years of data. For this reason, numbers in this report may differ slightly from those in previous PPH reports.

Trends in PPH over time can be affected by changes to codes and coding standards. The major changes affecting the interpretation of data in this report are outlined below.

Changed coding standard for 'past history' of viral hepatitis on 1 July 2013

Z22.51 Carrier of viral hepatitis B and Z22.59 Carrier of other specified viral hepatitis codes were reassigned as *B18.0 Chronic viral hepatitis B with delta agent* and *B18.1 Chronic viral hepatitis B without delta agent*. This increased the number of PPH for *Other vaccine-preventable conditions*, as discussed in Section 2.1 of the [companion PDF report](#).

New reporting of principal diagnoses for rehabilitation care hospitalisations

A change to the coding standard was made from 1 July 2015 to record the underlying condition requiring rehabilitation as the principal diagnosis, rather than the code *Z50.- Care involving the use of rehabilitation procedures*.

The impact on PPH was relatively small. *Rehabilitation* admissions accounted for 2.2% to 2.3% of total PPH admissions between 2015-16 and 2017-18, as discussed in the Appendix of the [companion PDF report](#).

Analysis of sociodemographic factors

In this report, "Indigenous Australians" include people identified as Aboriginal and/or Torres Strait Islander; "other Australians" include non-Indigenous Australians and people whose identity was not stated or not known.

Area of remoteness is based on the Australian Bureau of Statistics (ABS) Australian Statistical Geography Standard Remoteness Structure, 2016.

Socioeconomic areas are based on the ABS Index of Relative Socio-economic Disadvantage (IRSD). The five groups represent area-based socioeconomic disadvantage, from the least disadvantaged 20% of areas to the most disadvantaged 20%. Data from 2012-13 were calculated using 2011 IRSD scores; data from 2017-18 were calculated using 2016 IRSD scores.

Where appropriate, directly age-standardised rates were calculated using the 2001 Australian standard population.

Comparability between states and territories

States and territories vary in their policies for considering same day procedures as inpatient admissions or outpatient procedures (for example, intravenous iron infusions - see Section 2.3 of the report). Therefore, the rate of same day PPH may be underestimated nationally, and may not be comparable between jurisdictions.

Some states and territories contain a substantially higher proportion of remote areas than others, and the challenges of providing health care in these settings should be considered when interpreting variation in PPH rates between jurisdictions. Similarly, it should be borne in mind that although a relatively high proportion of people living in *Very remote* areas (47%) and the Northern Territory (30%) are Indigenous Australians, 61% of Indigenous Australians live in *Major cities* and *Inner regional* areas.



Data





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