Australian Government
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Disparities in potentially preventable hospitalisations across Australia

2012–13 to 2017–18

AIHW

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Australian Institute of Health and Welfare
Canberra

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Contents

Summary

Primary and community health care—for example, care from a general practitioner or community health nurse—can effectively manage and treat many health conditions. Primary care provides an opportunity for early intervention, helping reduce the risk of a person developing a disease, their symptoms worsening, or complications developing.

If this care is not available or not accessed, a person can end up requiring hospital care that could potentially have been avoided. A specific set of these hospital admissions are known as 'potentially preventable hospitalisations'.

Why measure potentially preventable hospitalisations?

Potentially preventable hospitalisations (PPH) are often used as a proxy measure of the effectiveness of health care in the community, as higher rates may suggest a lack of timely, accessible and adequate primary care.

However, there are many 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 patients with complex illness, or patients having procedures as follow-up to primary care.

This means that it is important not to assume that higher rates of PPH always indicate a less effective primary care system. Rather, PPH are a useful tool for identifying and investigating variation between different groups of people to better understand health inequalities. PPH can help guide research about how different groups access health services, including possible barriers they may face and areas of unmet demand.

What this report adds

The Australian Institute of Health and Welfare (AIHW) has reported PPH annually since 2004. For the first time, this report and the accompanying data and interactive graphs examine how rates of PPH have varied over time depending on where a person lives and their circumstances—including how old they are, whether they are male or female, Aboriginal and/or Torres Strait Islander, live in a lower socioeconomic area, or live in a more remote part of Australia.

The report also illustrates how changes to hospital coding standards and clinical practices, and differences in admission policies can artificially affect rates of PPH for some conditions, and aims to assist users of PPH to better interpret the data.

Potentially preventable hospitalisations are grouped into 3 broad categories:

- **Vaccine-preventable conditions**: hospitalisations due to diseases that can be prevented by vaccination, such as influenza, measles and whooping cough.
- **Acute conditions**: these conditions usually have a quick onset and may not be preventable, but theoretically would not result in hospitalisation if timely and adequate care was received in the community. This category includes conditions such as dental conditions, urinary tract infections and ear, nose and throat (ENT) infections.
- **Chronic conditions**: these long-lasting conditions may be preventable through lifestyle change, but can also be managed in the community to prevent worsening of symptoms and hospitalisation. This category includes conditions such as diabetes complications, chronic obstructive pulmonary disease (COPD) and asthma.

How common are potentially preventable hospitalisations?

In 2017–18, 748,000 admissions in public and private hospitals were classified as PPH, accounting for 1 in 15 hospital admissions (6.6%) and 1 in 10 hospital bed days (9.8%).

Overall, the most common reason for hospitalisation was *COPD*, but *Pneumonia and influenza (vaccine-preventable)* and *Congestive cardiac failure* accounted for the most days of hospital care, reflecting their tendency to affect elderly people who often require more complex or longer-term hospital care.

The most common cause of PPH in males was COPD; in females it was urinary tract infections

Males and females had similar rates of PPH overall in 2017–18, but males had higher rates of PPH for *COPD*, *Congestive cardiac failure*, type 2 *Diabetes complications*, *Cellulitis* and *Epilepsy*, while females had higher rates of PPH for *Urinary tract infections (UTIs)*, *Iron deficiency anaemia*, *Asthma* and *Hypertension*.

The recent increase in PPH rates was driven by hospitalisations for influenza

In 2017–18, *Pneumonia and influenza (vaccine-preventable)* accounted for 1 in 13 PPH admissions (7.6%) and 1 in 7 PPH bed days (14%).

PPH rates for *Pneumonia and influenza (vaccine-preventable)* were highest in people aged 65 and over and children under 5, and in Indigenous Australians of all ages, highlighting the importance of vaccination in these groups.

Nearly half of all PPH were in older people, mostly due to chronic conditions

In 2017–18, 46% of all PPH were for people aged 65 and over. Of these PPH, the majority (61%) were for *Chronic condition*s, most commonly *COPD*, *Congestive cardiac failure*, *Iron deficiency anaemia* and type 2 *Diabetes complications*. The most common *Acute conditions* PPH were *UTIs* and *Cellulitis*.

There is continuing debate about the ‘preventability’ of hospital admissions in older people, due to the complexity of disease that is often seen in these age groups.

Children had PPH for infections, dental conditions and asthma

In 2017–18, three-quarters (77%) of PPH in children aged 0–14 were for *Acute conditions* such as *Ear, nose and throat infections* and *Dental conditions*. Children also had PPH for *Chronic conditions* including *Asthma,* type 1 *Diabetes complications*, and in Indigenous children, *Rheumatic heart disease*.

Childhood vaccination coverage in Australia is high, and PPH rates for *Other vaccine-preventable conditions (excluding hepatitis B)* remained low between 2012–13 and 2017–18.

Indigenous Australians had high rates of PPH, and rates have increased faster in females

In 2017–18, there were nearly 45,000 PPH for Aboriginal and/or Torres Strait Islander (subsequently referred to as Indigenous) Australians, at a rate 3 times as high as Other Australians. Disparities in age-standardised rates of PPH between Indigenous Australians and Other Australians were observed for most conditions, particularly *COPD*, *Cellulitis*, *Diabetes complications, Rheumatic heart disease* and *Pelvic inflammatory disease*.

Between 2012–13 and 2017–18, the rate of *Total* PPH for Indigenous Australians increased by 25%, compared with a 15% increase for Other Australians.

Over the 6 years, *Total* PPH rates increased by 32% for Indigenous females and 16% for Indigenous males. The most striking difference was the rapid increase in PPH for *COPD* in Indigenous women (38%), compared to a 13% increase in Indigenous men.

The 'health gap' may have widened for people living in remote areas and areas of socioeconomic disadvantage

PPH rates are often shown to increase with increasing remoteness and socioeconomic disadvantage.

The gap in PPH rates between people living in the lowest and highest socioeconomic areas increased for a number of PPH conditions from 2012–13 to 2017–18, particularly for common *Chronic conditions* such as *COPD* and *Diabetes complications*, and *Acute conditions* such as *ENT infections*, *Cellulitis* and *Gangrene*.

Similarly, between 2012–13 and 2017–18, the gap in PPH rates between people living in *Very remote* areas and *Major cities* widened for some conditions, particularly *COPD, Gangrene* and *Pelvic inflammatory disease*.

Improving the PPH indicator

This report examines certain factors outside the primary health care system that have had an impact on PPH rates, such as changes in hospital coding standards and clinical practices, and differences in admission policies. Conditions known to be affected include hepatitis B, *Iron deficiency anaemia*, *Angina* and some conditions requiring rehabilitation care, and these factors could be considered in future revisions of the PPH indicator.

In the future, the use of linked data sets could allow investigation of the relationships between PPH and disease prevalence, use of primary health care, use of medicines and health outcomes.

1 Introduction

1.1 What are potentially preventable hospitalisations?

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 2019a).

The potentially preventable hospitalisations (PPH) indicator has been used in Australia and internationally as a proxy measure of primary care performance for over 30 years (Box 1.1). The PPH indicator is attractive because it uses routinely collected hospital admitted patient data to provide insights into the interface between primary and secondary health care (Falster & Jorm 2017).

PPH are defined as hospital admissions that could have potentially been prevented through the provision of appropriate individualised preventative health interventions and early disease management, usually delivered in primary care and community-based care settings, including Aboriginal and Community Controlled Health Services, by general practitioners (GPs), medical specialists, dentists, nurses and allied health professionals (AIHW 2019b).

Classifying a hospitalisation as 'potentially preventable' does not mean that the patient did not need to be hospitalised at that time—it means that optimal management at an earlier stage might have prevented the patient's condition worsening to the point where they needed hospitalisation (ACSQHC & AIHW 2017).

Primary care interventions relevant to PPH include vaccinations, oral health and sexual health checks, antenatal care, appropriate diagnosis and prescribing to manage infections, lifestyle interventions to mitigate the development of chronic conditions, and effective management of chronic conditions to slow disease progression and risk of complications.

Box 1.1: History of the PPH indicator

An indicator for ambulatory care sensitive conditions (ACSC) was designed in the United States in the late 1980s and early 1990s as a tool for examining socioeconomic and racial disparities in primary care access (Billings et al. 1993). ACSC are also referred to as PPH or potentially avoidable hospitalisations.

As studies emerged supporting a relationship between ACSC and various measures of access to primary health care (such as self-rated access to care or the number of physicians in an area), the indicator was adapted for use by other countries, including New Zealand, Canada, the United Kingdom and Australia (Falster & Jorm 2017). Each country uses a different set of conditions and some countries exclude people aged over 75 (see AIHW 2018a for an overview of how PPH are defined and used in other countries).

In Australia, the PPH indicator was initially developed for the Victorian Ambulatory Care Sensitive Conditions Study in the early 2000s (Ansari et al. 2002; Ansari et al. 2006). Revisions have been made over time to account for changes in disease coding and classification and changes in the broader health system.

In Australia, PPH are currently:

- a performance indicator for primary and community health services in the National Healthcare Agreement between all states and territories and the Australian Government (AIHW 2019b)
- an indicator of health system effectiveness under the Australian Health Performance Framework (AIHW 2019c), and the Aboriginal and Torres Strait Islander Health Performance Framework (AIHW 2019d)
- used by policy makers, health service managers and researchers as a marker of variation—to identify and investigate areas or populations of need, and direct resources to the appropriate settings.

PPH are a useful tool for exploring health disparities between different populations (ACSQHC & AIHW 2017; Beckwith & Glover 2019; Duckett & Griffiths 2016; Health Performance Council 2017; Queensland Health 2018; WAPHA 2017). However, the validity of the PPH indicator for performance purposes is subject to some debate in Australia (Falster et al. 2015; Longman et al. 2015) and internationally (Anderson et al. 2012; Hodgson et al. 2019; Solberg 2015; Vuik et al. 2017), due to the influence of many factors that are beyond the control of the primary and community health care sector (Box 1.2).

Box 1.2: Limitations of the PPH indicator

The PPH indicator has a number of limitations (Falster & Jorm 2017):

- It is a representative, not comprehensive, set of all potentially preventable hospitalisations (see sections 2.1 and 4.5).
- It includes some hospitalisations that may not be avoidable, such as those for chronically ill or elderly patients who have received optimum primary care, or procedures that are an appropriate intervention following relevant primary care (see Section 2.2).
- It does not include care completed in an outpatient or emergency department.
- It counts the number of hospitalisations, not the number of people hospitalised—repeat admissions, changes of care type and transfers between hospitals are counted as separate hospitalisations, which may artificially increase rates of PPH for some conditions (see Section 2.3).

What factors affect PPH rates other than access to primary care?

While high rates of PPH in an area or population may reflect poor access to primary care, PPH are influenced by a number of other factors.

Patient characteristics include age, sex, ethnicity, area of residence, socioeconomic factors, social and family support, mental health, disease prevalence and health behaviours—including health literacy and patient compliance with disease management plans (Ansari et al. 2006; Falster et al. 2015; Longman et al. 2018; Mohanty et al. 2016; Tran et al. 2014).

PPH rates are also influenced by health system factors such as changes in hospital coding standards, diagnostic practices, hospital admission policies, and access to aged care services and support (Katterl et al. 2012). Conditions known to be affected by some of these factors include hepatitis B (see Section 2.1), *Urinary tract infections* and *ENT infections* (see Section 2.2), *Iron deficiency anaemia* (see Section 2.3), *Angina* (see Section 2.3) and conditions requiring rehabilitation (see Appendix).

Reductions in PPH rates are not necessarily associated with improved clinical outcomes (Katterl et al. 2012) and higher rates of PPH may reflect appropriate referrals from the primary care setting (Sanmartin & Khan 2011; Weinberger et al. 1996).

Further information on potentially preventable hospitalisations can be found in the following sources:

- *A guide to the potentially preventable hospitalisations indicator in Australia* (Falster & Jorm 2017) provides an overview of the history of the PPH indicator, its reporting and interpretation.
- *A potentially preventable hospitalisation indicator for general practice* consultation paper examines a number of challenges of PPH particular to general practice, and outlines the process used to develop a general practice-focused indicator (AIHW 2018a).
- *The Second Australian Atlas of Healthcare Variation 2017* examines variation in rates for 5 of the most common PPH conditions (ACSQHC & AIHW 2017).

PPH and health inequality

There is growing evidence that the association between PPH and health care provision is very complex. Sociodemographic factors, health and behavioural characteristics have been found to account for a greater amount of geographic variation in PPH than GP supply (Falster et al. 2015) or primary care practitioner access (Mazumdar et al. 2019). Furthermore, a New South Wales study found that people admitted for a PPH tended to have high levels of engagement with primary care services before their hospitalisation (Falster et al. 2016).

PPH as a concept may therefore better reflect health inequality (with many factors contributing to these outcomes) rather than just the performance of primary and community care. In the face of rising hospital admissions and expenditure, knowing who is at greatest risk of a PPH may assist with the allocation of resources across the health and social services sectors, in order to reduce the increasing burden on individuals and hospitals.

A closer look at who is more vulnerable to PPH

The AIHW has reported PPH by state and territory annually since 2004. Current reporting by the AIHW and the Productivity Commission includes PPH by Indigenous status, socioeconomic status and area of remoteness (AIHW 2019e; Productivity Commission 2019). Since 2017, the AIHW has reported PPH by smaller geographic areas—Primary Health Networks (PHN) and Statistical Area Level 3 (SA3) regions (AIHW 2018b). *The Social Health Atlas of Australia* also reports PPH by Population Health Area (PHIDU 2019).

Understanding health inequality is a core part of the Australian Health Performance Framework (AIHW 2019c). The aim of this report is to examine disparities in PPH rates between populations. For the first time, this report and the accompanying data and interactive graphs examine how rates of PPH have varied over time depending on where a person lives and their circumstances—including how old they are, whether they are male or female, Aboriginal and/or Torres Strait Islander, live in a lower socioeconomic area, or live in a more remote part of Australia.

The report also illustrates how changes to hospital coding standards and clinical practices, and differences in admission policies can artificially affect rates of PPH for some conditions, and aims to assist users of PPH to better interpret the data. The report has been written for a wide audience, but is primarily for health service managers, policy makers and researchers.

The report has 3 parts:

- This document presents the most recent data for each PPH category—*Vaccine-preventable conditions*, *Acute conditions* and *Chronic conditions*. It looks at

trends in PPH rates between 2012–13 and 2017–18 and describes variation by age, sex, Indigenous status, socioeconomic disadvantage and remoteness. The report also examines certain factors outside the primary health care system that have had a clear impact on PPH rates.

- This should be read in conjunction with the online web report, Disparities in potentially preventable hospitalisations across Australia: exploring the data. The web report contains interactive data visualisations and data spreadsheets. It presents background information on all 22 PPH conditions, with national PPH data from 2012–13 to 2017–18 by age and sex, Indigenous status and area of remoteness. It compares socioeconomic inequity between 2012–13 and 2017–18, and looks at seasonal variation. Data at the state and territory, PHN and SA3 level are available for all PPH conditions, for the age groups 0–64 and 65 and over.
- A fact sheet summarising the main findings of this report is available at *Who is hospitalised for potentially preventable reasons?*

1.2 Methods

Categories of potentially preventable hospitalisations

PPH for this report are defined in accordance with the National Health Agreement indicator PI 18—Selected potentially preventable hospitalisations (AIHW 2019b). The indicator includes 22 conditions and these are grouped into 3 broad categories: *Vaccine-preventable*, *Acute* and *Chronic* conditions.

Vaccine-preventable conditions

Diseases that can be prevented by vaccination, often grouped as *Pneumonia and influenza (vaccine-preventable)* and *Other vaccine-preventable conditions*. *Other vaccine-preventable conditions* include:

- chickenpox
- diphtheria
- haemophilus meningitis
- hepatitis B
- measles
- mumps
- pertussis (whooping cough)
- polio
- rubella
- tetanus.

Note: the PPH specification does not include all infections that can be prevented by vaccination, such as meningococcal disease and human papilloma virus (HPV).

Acute conditions

Conditions that theoretically would not result in hospitalisation if adequate and timely care (usually non-hospital) was received. These include:

- cellulitis

- convulsions and epilepsy
- dental conditions
- ear, nose and throat (ENT) infections
- eclampsia
- gangrene
- pelvic inflammatory disease (PID)
- perforated/bleeding ulcer
- pneumonia (not vaccine-preventable)
- urinary tract infections (UTI) including kidney infections.

Chronic conditions

Conditions that can be managed effectively through timely care (non-hospital) to prevent deterioration and hospitalisation, or through behaviour modification and lifestyle changes. These include:

- angina
- asthma
- bronchiectasis
- chronic obstructive pulmonary disease (COPD)
- congestive cardiac failure
- diabetes complications
- hypertension
- iron deficiency anaemia
- nutritional deficiencies
- rheumatic heart diseases.

As more than 1 PPH condition may be reported for a hospital admission, the sum of *Vaccine-preventable*, *Acute* and *Chronic* conditions does not necessarily equal the number of *Total* PPH.

Some of the PPH conditions have been analysed in more detail for this report:

- *Other vaccine-preventable conditions* have been analysed with and without admissions associated with hepatitis B.
- *Convulsions* and *Epilepsy* have been analysed separately.
- *Diabetes complications* have been separated into type 1 *Diabetes complications* and type 2 *Diabetes complications*.

Data analysis

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 Statistical Area Level 2 (SA2) of a 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 geographical boundaries, remoteness classifications and PPH codes were used for all 6 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 C*hronic viral hepatitis B without delta agent*. This increased the number of PPH for *Other vaccine-preventable conditions*, as discussed in Section 2.1.

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. See the Appendix for more details.

Analysis of sociodemographic factors

The data include hospitalisations by PPH condition, age group, sex, Indigenous status, socioeconomic area and area of remoteness, at the national, state and territory, PHN and Statistical Local Area Level (SA3) level.

Indigenous status is based on whether a person identifies as being of Aboriginal and/or Torres Strait Islander origin. In this report, 'Indigenous Australians' includes people identified as Aboriginal and/or Torres Strait Islander; 'Other Australians' includes non-Indigenous Australians and people whose identity was not stated or not known. It should be noted that incomplete and inconsistent reporting of Indigenous status may occur due to misclassification by service providers, or Indigenous people not identifying in certain circumstances. This usually results in an underestimation of Indigenous population size and service use (AIHW 2013; AIHW 2019f). Because 'Other Australians' is likely to include some Indigenous people, this report may underestimate the differences in PPH between Indigenous and Other Australians.

Area of remoteness is based on the Australian Bureau of Statistics (ABS) Australian Statistical Geography Standard Remoteness Structure, 2016. This structure divides Australia into 5 classes of remoteness based on a measure of relative access to services: *Major cities*, *Inner regional*, *Outer regional*, *Remote* and *Very remote*.

Socioeconomic areas are based on the ABS Index of Relative Socio-economic Disadvantage (IRSD). The 5 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.

All the rates in this report are age-standardised except when referring to specific age groups. 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). 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. Population breakdowns by state, area of remoteness and Indigenous status are in tables A1–A3 in the Appendix.

For further information on the data sources and methods used in this report, see the Appendix.

2 Potentially preventable hospitalisations: the big picture

In 2017–18, nearly 748,000 hospitalisations in Australia were classified as potentially preventable. This represented 6.6% of all hospital admissions to a public or private hospital that year—8.6% of public hospital admissions and 3.7% of private hospital admissions (AIHW 2019e). *Total* PPH accounted for nearly 3 million bed days—equivalent to 9.8% of all public and private hospital bed days. The average length of stay (ALOS) for a PPH admission (4.0 days) was longer than that for all hospitalisations (2.7 days), partly due to a smaller proportion of same-day admissions for PPH—34% compared with 61% of total hospitalisations (AIHW 2019e) (Box 2.1).

Box 2.1: Does length of hospital stay reflect the 'preventability' of a condition?

The length of time a patient spends in hospital is determined by many factors, including the measures taken to stabilise, diagnose and treat an unplanned patient admission, and arrangements for their care after discharge. A same-day admission may be for a planned procedure, such as tonsillectomy, iron infusion or dental treatment.

In 2017–18, the ALOS of PPH was 6.8 days for *Vaccine-preventable conditions*, 3.2 days for *Acute conditions*, and 4.1 days for *Chronic conditions*. The proportion of PPH that were same-day admissions was 16% for *Vaccine-preventable conditions*, 39% for *Acute conditions*, and 33% for *Chronic conditions*. The PPH conditions with the most same-day admissions were *Dental conditions* (86%), *Iron deficiency anaemia* (84%) and *ENT infections* (45%).

The proportion of same-day PPH admissions in 2017–18 decreased with increasing remoteness (36% of PPH for people living in *Major cities*, compared with 23% in *Very remote* areas) and socioeconomic disadvantage (39% for people living in the highest socioeconomic areas compared with 30% in the lowest socioeconomic areas).

Geographic variation in the length of stay for PPH has been observed in a number of studies—the reasons for variation are complex and are likely to involve both patient and health system factors (Busby et al. 2015).

Some researchers have suggested separating the PPH indicator into admissions with short stays (2 days or less) and longer stays, on the basis that primary care interventions (in the short to medium term) may be effective only in preventing lower severity admissions, and that these are likely to be shorter stays in hospital (Swerissen et al. 2016).

Where a person lives, and differences in hospital roles and practices, can also affect length of stay. Smaller regional facilities with higher rates of admission for short-stay PPH may reflect poor access to primary care, or an appropriate integration of services to suit community needs (Falster et al. 2019).

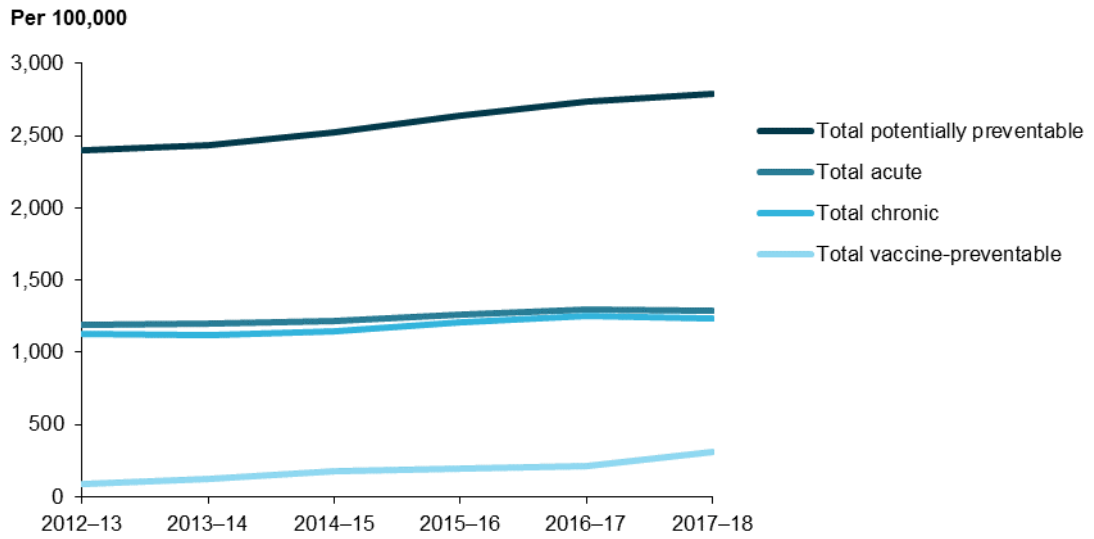
Variation in hospital admission practices can also affect the comparability of data between areas and jurisdictions, particularly for conditions with high rates of same-day hospitalisations—for example, iron infusions are given in inpatient and outpatient settings but only inpatients are counted as PPH. The proposed PPH indicator for general practice suggested excluding same-day hospitalisations to improve comparability, while acknowledging that this would also exclude some true PPH (AIHW 2018a).

More information on same-day admissions and the ALOS for PPH is available in the online data and interactive graphs in the web report.

Nationally, the age-standardised rate of *Total* PPH in 2017–18 was 2,793 per 100,000 people (Figure 2.1), a 17% increase from 2,394 per 100,000 people in 2012–13. PPH for *Acute* and *Chronic* conditions increased between 2012–13 and 2016–17, but remained stable in 2017–18. However, an increase in hospitalisations for influenza led to a substantial increase in PPH for *Vaccine-preventable conditions*, and a corresponding increase in *Total* PPH.

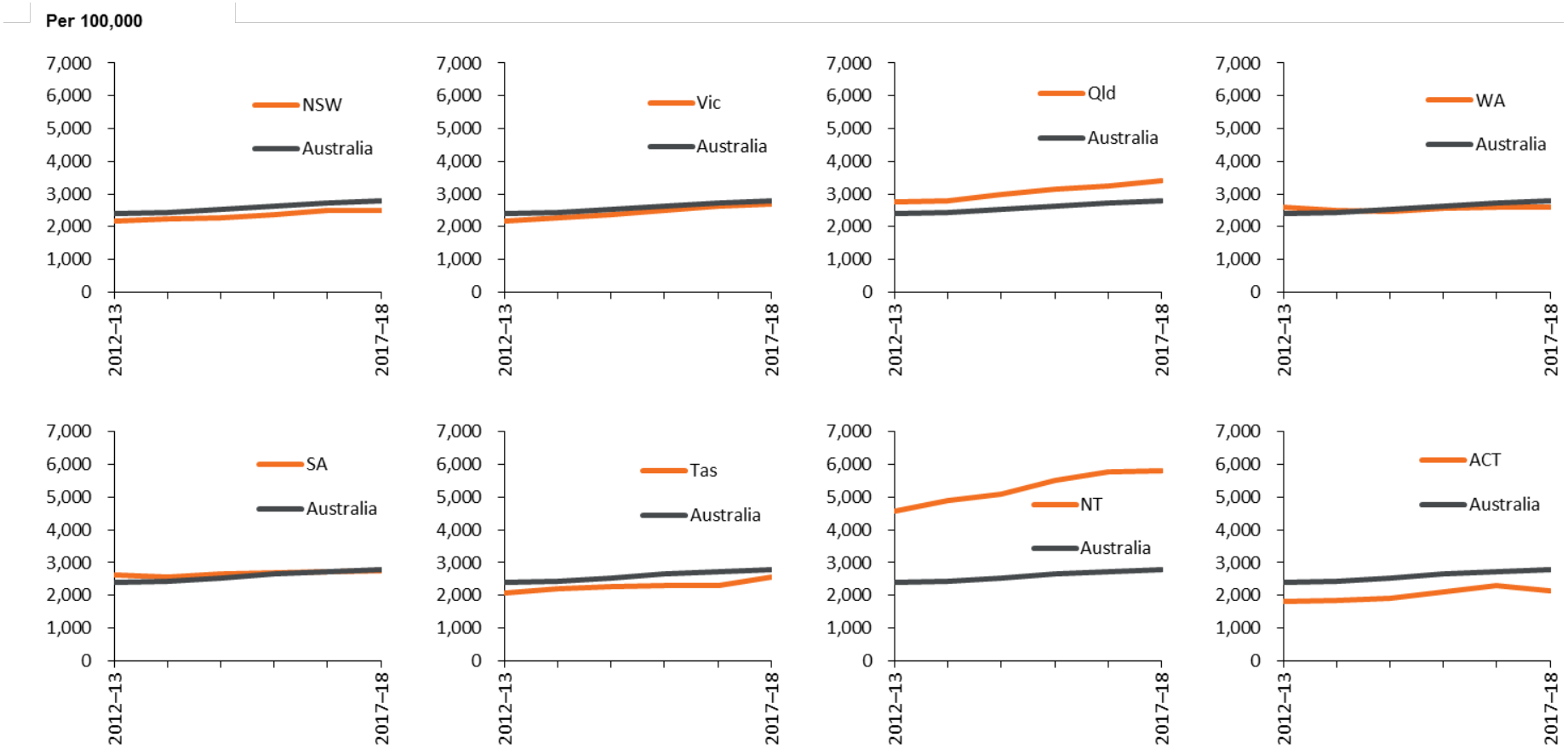
- In 2017–18, *Total* PPH rates were highest in the Northern Territory (5,807 per 100,000 people), and lowest in the Australian Capital Territory (2,145 per 100,000 people) (Figure 2.2).
- In 2017–18, *Total* PPH rates were highest for people living in the lowest socioeconomic areas. Between 2012–13 and 2017–18, *Total* PPH rates increased in this population by 22%, compared with a 16% increase for people living in the highest socioeconomic areas (Figure 2.3).
- Between 2012–13 and 2017–18, *Total* PPH rates were highest for people living in *Very remote* areas. Over the 6 years, PPH rates increased in this population by 24%, compared with an 18% increase for people living in *Major cities* (Figure 2.4).
- In 2017–18, *Total* PPH rates had a small peak in young children aged 0–4, and then increased steeply with age from 60–64 (Figure 2.5).
- In the youngest (ages 0–9) and oldest (55–59 and over) age groups, *Total* PPH rates in 2017–18 were higher in males, but between the ages 10–14 and 50–54 rates were higher in females (Figure 2.5).

Figure 2.1: Age-standardised rates of Total potentially preventable hospitalisations, by condition category, 2012–13 to 2017–18



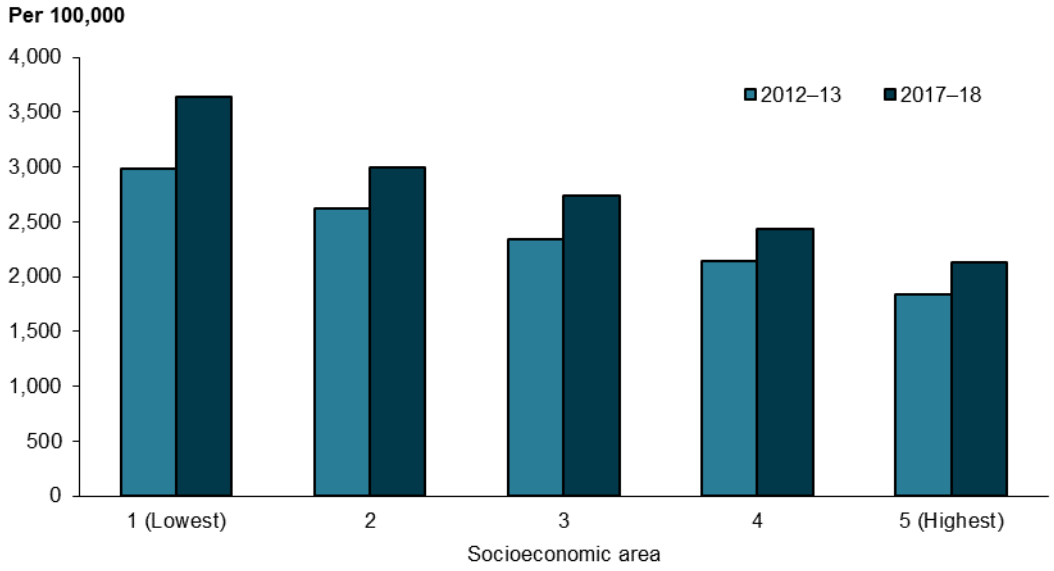
Source: AIHW National Hospital Morbidity Database.

Figure 2.2: Age-standardised rates of Total potentially preventable hospitalisations, by state/territory of residence, 2012–13 to 2017–18



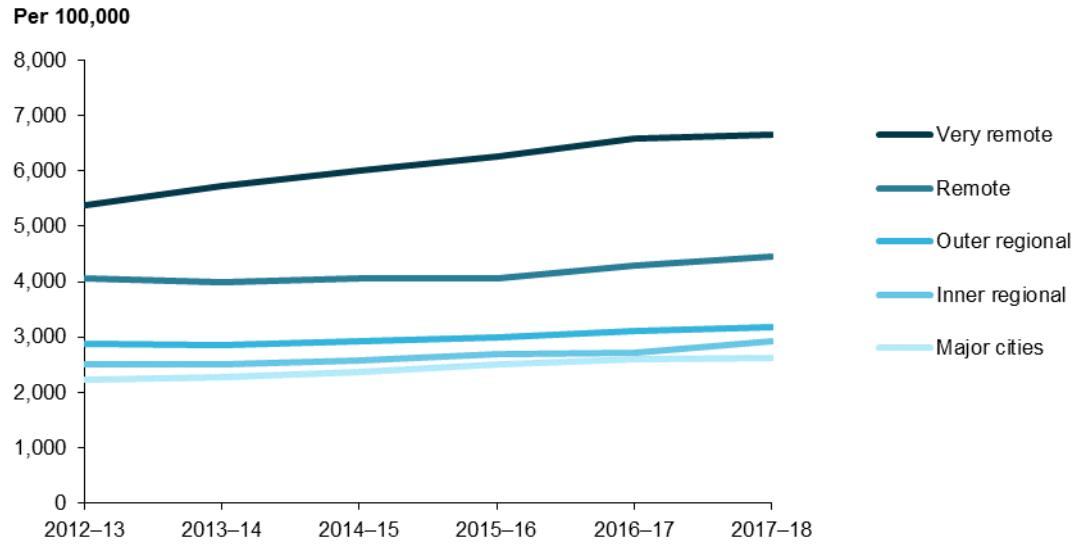
Source: AIHW National Hospital Morbidity Database.

Figure 2.3: Age-standardised rates of Total potentially preventable hospitalisations, by socioeconomic area, 2012–13 and 2017–18



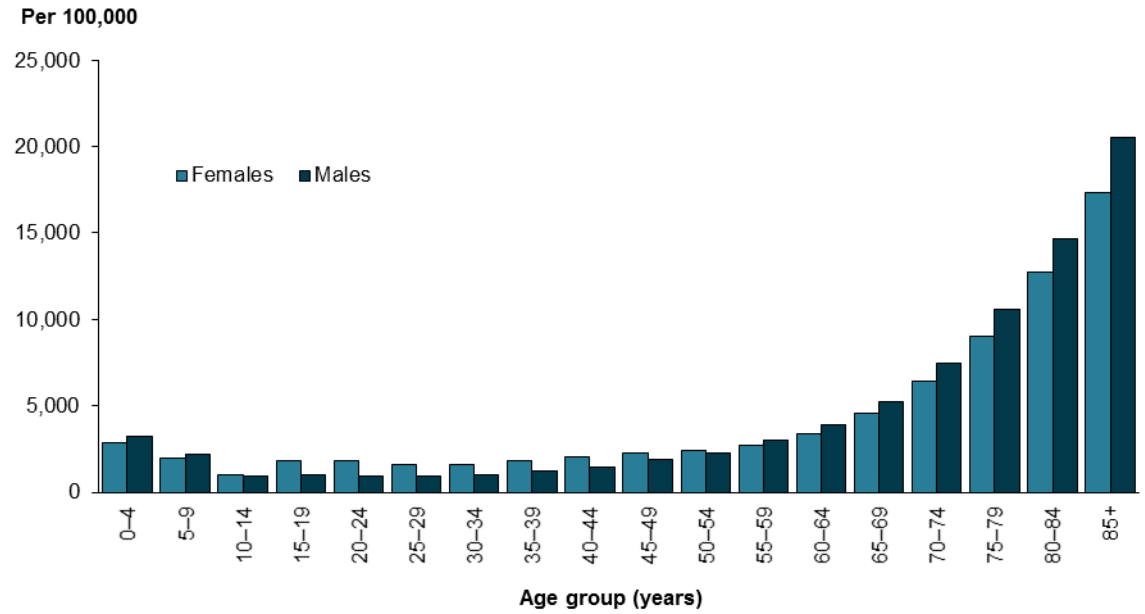
Source: AIHW National Hospital Morbidity Database.

Figure 2.4: Age-standardised rates of Total potentially preventable hospitalisations, by remoteness area, 2012–13 to 2017–18



Source: AIHW National Hospital Morbidity Database.

Figure 2.5: Rates of Total potentially preventable hospitalisations, by age group and sex, 2017–18



Source: AIHW National Hospital Morbidity Database.

Table 2.1 lists the top 5 conditions associated with PPH admissions and the conditions that accounted for the most bed days in 2017–18, broken down by all Australians, males and females (see also figures 2.6, 2.20 and 2.25). *COPD*, *Cellulitis* and *Dental conditions* were associated with high numbers of PPH in males and females. Males had a high number of PPH for *Congestive cardiac failure* and *Diabetes complications*, and females had a high number of PPH for *UTIs* and *Iron deficiency anaemia*. Factors contributing to these common PPH admissions are discussed in sections 2.2 and 2.3.

Not surprisingly, there was considerable overlap between the most common PPH conditions and the number of bed days they accounted for. However, it is notable that *Pneumonia and influenza (vaccine-preventable)* PPH accounted for a comparatively high number of bed days for males and females.

Table 2.1: Most common PPH admissions and bed days, by sex, 2017–18

	Most admissions	Most bed days
Persons	COPD	Pneumonia and influenza (vaccine-preventable)
	UTIs	Congestive cardiac failure
	Dental conditions	COPD
	Cellulitis	Diabetes complications
	Iron deficiency anaemia	UTIs
Males	COPD	Congestive cardiac failure
	Cellulitis	Pneumonia and influenza (vaccine-preventable)
	Dental conditions	COPD
	Congestive cardiac failure	Diabetes complications
	Diabetes complications	Cellulitis
Females	UTIs	Pneumonia and influenza (vaccine-preventable)
	Iron deficiency anaemia	COPD
	COPD	Congestive cardiac failure
	Dental conditions	UTIs
	Cellulitis	Cellulitis

Source: AIHW National Hospital Morbidity Database.

Each of the PPH categories is presented in more detail below. In brief, in 2017–18:

- PPH for *Vaccine-preventable conditions* accounted for 11% of PPH admissions and 19% of PPH bed days
- PPH for *Acute conditions* accounted for 44% of PPH admissions and 35% of PPH bed days
- PPH for *Chronic conditions* accounted for 46% of PPH admissions and 48% of bed days.

2.1 Vaccine-preventable conditions

Vaccines protect individuals by preventing infection or reducing the severity of a disease. Hospitalisations for *Vaccine-preventable conditions* show which groups of people are more vulnerable to severe disease.

PPH for *Vaccine-preventable conditions* are grouped as *Pneumonia and influenza (vaccine-preventable)* and *Other vaccine-preventable conditions*. Due to hospital coding changes implemented from July 2013, this report also includes analysis of *Other vaccine-preventable conditions (excluding hepatitis B)*.

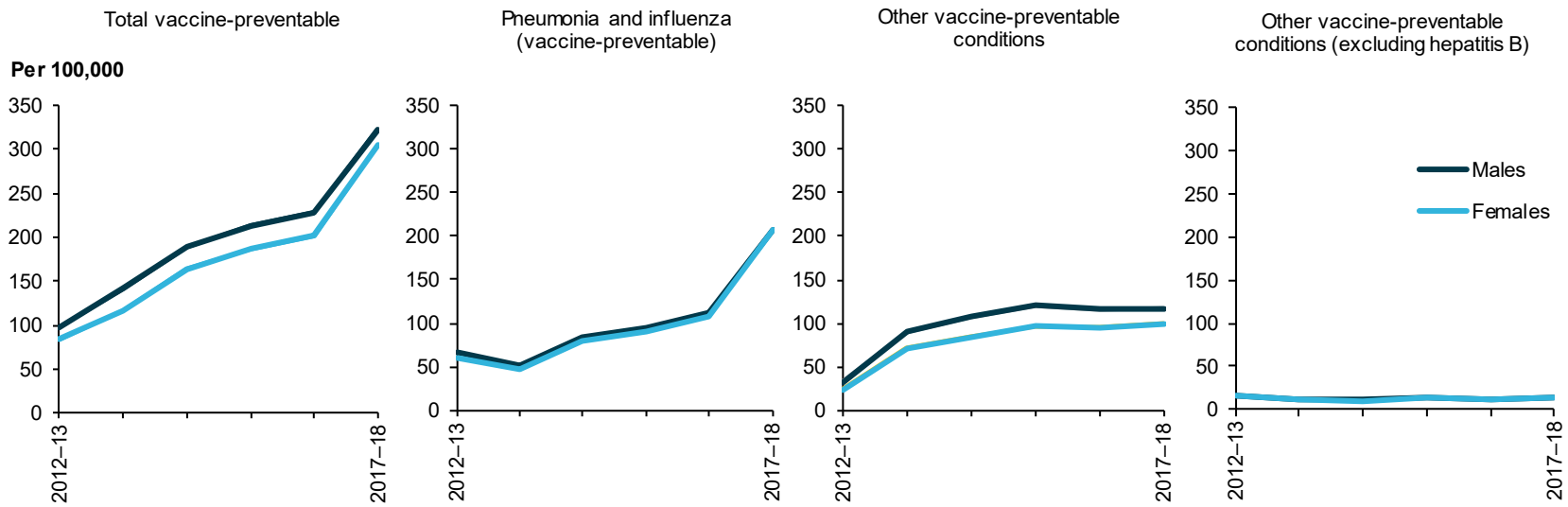
In 2017–18, there were about 85,100 PPH for *Vaccine-preventable conditions* at a rate of 346 per 100,000 people (Figure 2.6). Rates of PPH for *Vaccine-preventable conditions*, which rose steeply between 2012–13 and 2017–18, are affected by 4 main factors:

- Changes in testing and reporting practices
- Annual variation in influenza activity
- Additional reporting of hospital admissions mentioning hepatitis B from July 2013
- Other vaccine-preventable diseases, including rotaviral enteritis, whooping cough and chicken pox

In 2017–18, there were about 57,200 PPH for *Pneumonia and influenza (vaccine-preventable)* (207 per 100,000 people) and 28,300 for *Other vaccine-preventable conditions*, of which 24,800 were associated with hepatitis B. When hepatitis B was excluded, 3,500 PPH were for other vaccine-preventable diseases, including rotaviral enteritis, whooping cough and chickenpox, at a rate of 14 per 100,000 people.

Rates of PPH for *Vaccine-preventable conditions* were higher in males, primarily due to higher rates of hepatitis B-associated hospitalisations (see Figure 2.11).

Figure 2.6: Age-standardised rates of potentially preventable hospitalisations for Vaccine-preventable conditions, by sex, 2012–13 to 2017–18



Source: AIHW National Hospital Morbidity Database.

Pneumonia and influenza (vaccine-preventable): most PPH for vaccine-preventable conditions were due to influenza

Pneumonia and influenza are respiratory infections that disproportionately affect young and elderly populations, and Indigenous Australians of all ages (figures 2.7, 2.8). All of these populations are high priority groups for vaccination against influenza and pneumonia, as well as pregnant women and people with underlying conditions or occupations that increase their risk of infection (ATAGI 2018) (Box 2.2).

In 2017–18, *Pneumonia and influenza (vaccine-preventable)* accounted for:

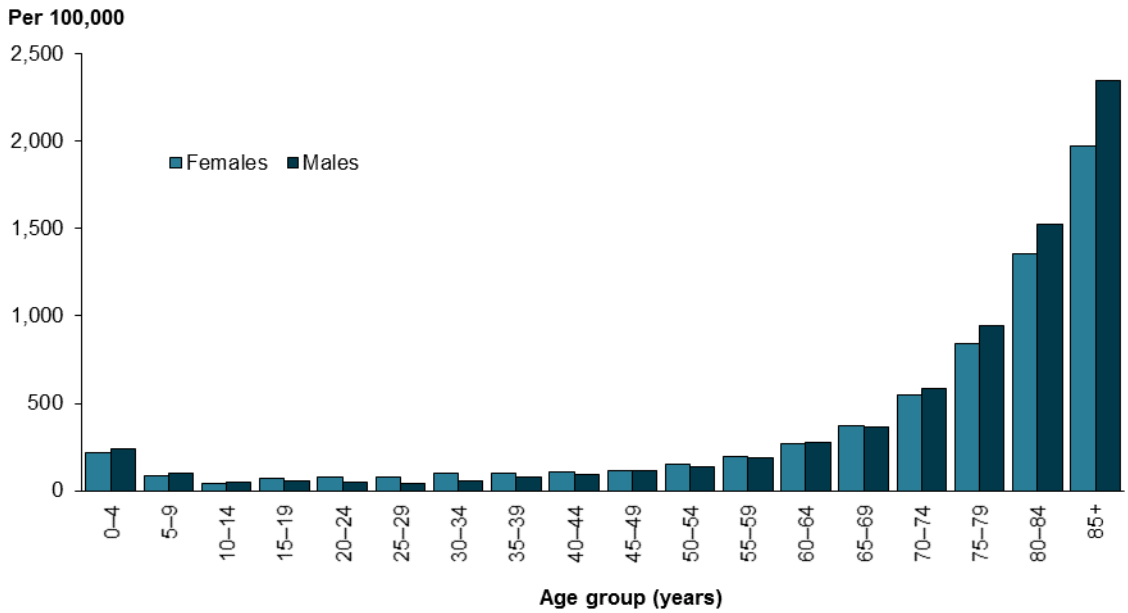
- 67% of *Vaccine-preventable conditions* PPH and 7.6% of *Total* PPH
- 73% of *Vaccine-preventable conditions* PPH bed days and 14% of *Total* PPH bed days.

Since 2012–13, the rate of PPH for *Pneumonia (vaccine-preventable)* has remained relatively steady. However, the number of hospital visits for influenza rises and falls each year depending on the characteristics of the particular influenza season. In 2017–18, *Influenza* accounted for 87% of PPH for *Pneumonia and influenza (vaccine-preventable)*, compared with 57% in 2013–14. Increased laboratory testing also influences the proportion of patients with a respiratory illness who are confirmed as having influenza, and may account for some of the increase in PPH rates (AIHW 2018c).

In 2017–18, PPH rates for *Pneumonia and influenza (vaccine-preventable)* were highest in the Northern Territory (355 per 100,000 people), and lowest in Western Australia (72 per 100,000 people) (Figure 2.9).

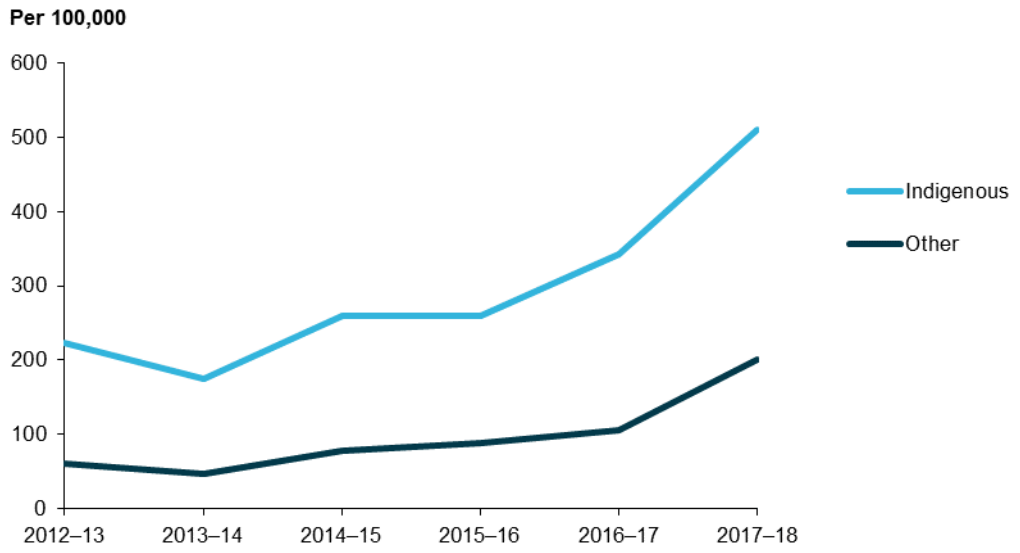
PPH highlight those populations most vulnerable to more severe disease: between 2013–14 and 2017–18, an increase in PPH rates for *Pneumonia and influenza (vaccine-preventable)* was seen in all age groups, but was steepest in people aged 65 and over and children under 5 (Figure 2.10), and in Indigenous Australians of all ages (Figure 2.8).

Figure 2.7: Rates of potentially preventable hospitalisations for Pneumonia and influenza (vaccine-preventable), by age group and sex, 2017–18



Source: AIHW National Hospital Morbidity Database.

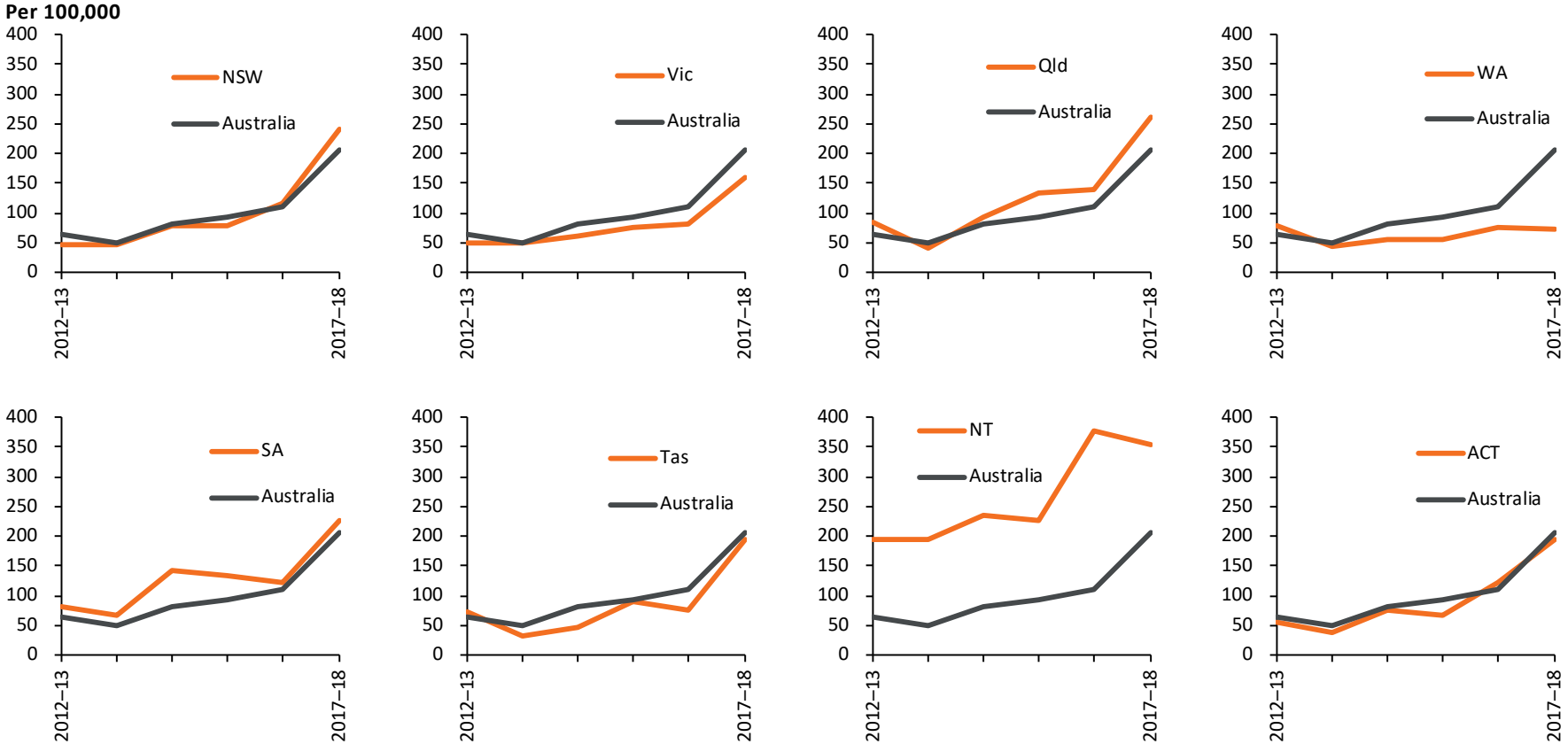
Figure 2.8: Age-standardised rates of potentially preventable hospitalisations for Pneumonia and influenza (vaccine-preventable), by Indigenous status, 2012–13 to 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

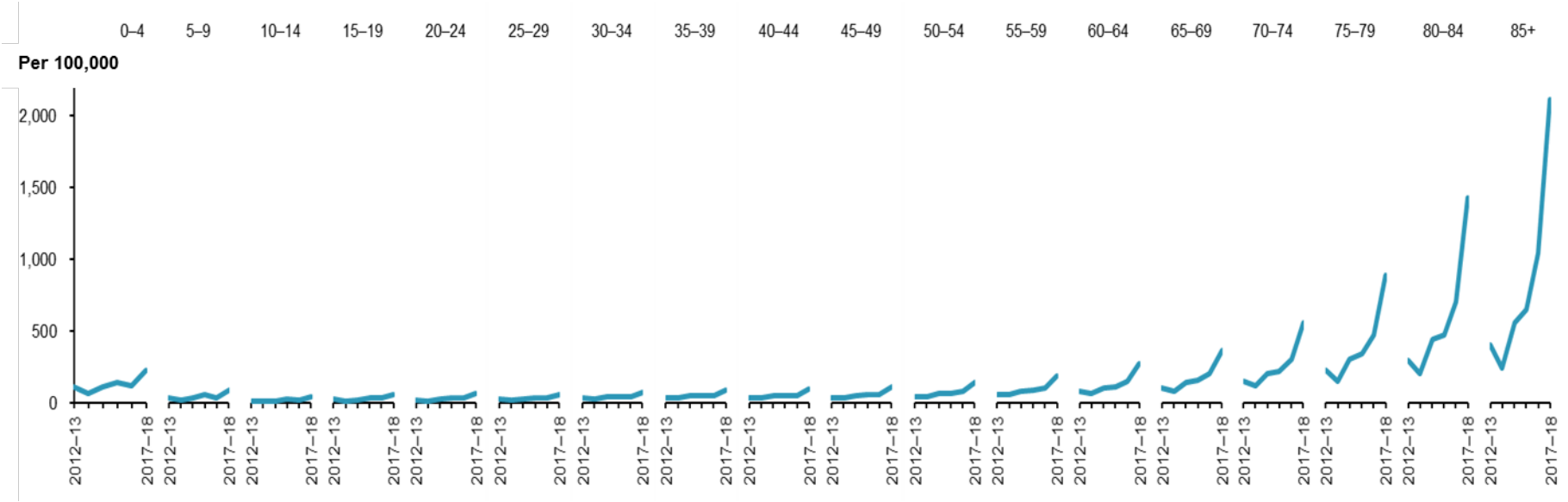
Figure 2.9: Age-standardised rates of potentially preventable hospitalisations for Pneumonia and influenza (vaccine-preventable), by state/territory of residence, 2012–13 to 2017–18



Note: Results for NSW may vary slightly from those reported on the NSW HealthStats public website due to minor variations in the scope of records excluded.

Source: AIHW National Hospital Morbidity Database.

Figure 2.10: Rates of potentially preventable hospitalisations for Pneumonia and influenza (vaccine-preventable), by age group, 2012–13 to 2017–18



Source: AIHW National Hospital Morbidity Database.

Box 2.2: Vaccination against influenza

The current PPH indicator captures admissions with *Influenza* in 'any diagnosis' (excluding infants under 2 months), and shows the impact of influenza on the Australian population and the hospital system.

Annual influenza vaccination continues to be the best available measure to prevent influenza and its complications. While in some cases influenza vaccination may not prevent a person developing the disease, it can help to reduce the severity and/or duration of the disease and potentially prevent further serious complications (National Influenza Surveillance Committee 2017).

The effectiveness of the vaccine changes from year to year, but people who are vaccinated have a decreased chance of severe illness, hospitalisation and death (AIHW 2018c).

It is difficult to estimate the number of Australians vaccinated against influenza because vaccinations can also be purchased by work places or individuals, in addition to programs funded by governments (AIHW 2018c).

About three-quarters (75%) of adults aged 65 and over were estimated to have received annual influenza vaccination in the period 1999 to 2013 (Dyda et al. 2016). In 2012–13, 57% of Indigenous Australians aged 50 and over, and 74% of those aged 65 and over, reported recent influenza vaccination (AIHW 2018d).

In 2018, national influenza vaccine coverage for children aged 6 months to less than 5 years was 26% overall and 30% in Indigenous children (Beard et al. 2019).

Hepatitis B

Other vaccine-preventable conditions in the PPH indicator include most (but not all) of the 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 captures these diseases if they are listed in 'any diagnosis', not just the 'principal diagnosis'.

In 2017–18, the majority (88%) of PPH for *Other vaccine-preventable conditions* were for hepatitis B. From July 2013, the coding standard for 'past history' of viral hepatitis was changed (see Section 1.2). As a result, the PPH specification for *Other vaccine-preventable conditions* currently includes all hospital admissions where hepatitis B is mentioned in clinical notes, regardless of whether the infection was of significance to the hospitalisation (ICD-10-AM 2019). It therefore captures admissions related to newly acquired or acute hepatitis B infections and admissions related to chronic hepatitis B (CHB) infection, as well as potentially unrelated admissions of people who have CHB (for example, women giving birth—see Figure 2.11 for the age and sex profile of admissions mentioning hepatitis B). This led to an increase in the rate of PPH for *Other vaccine-preventable conditions* in 2013–14 (Figure 2.12).

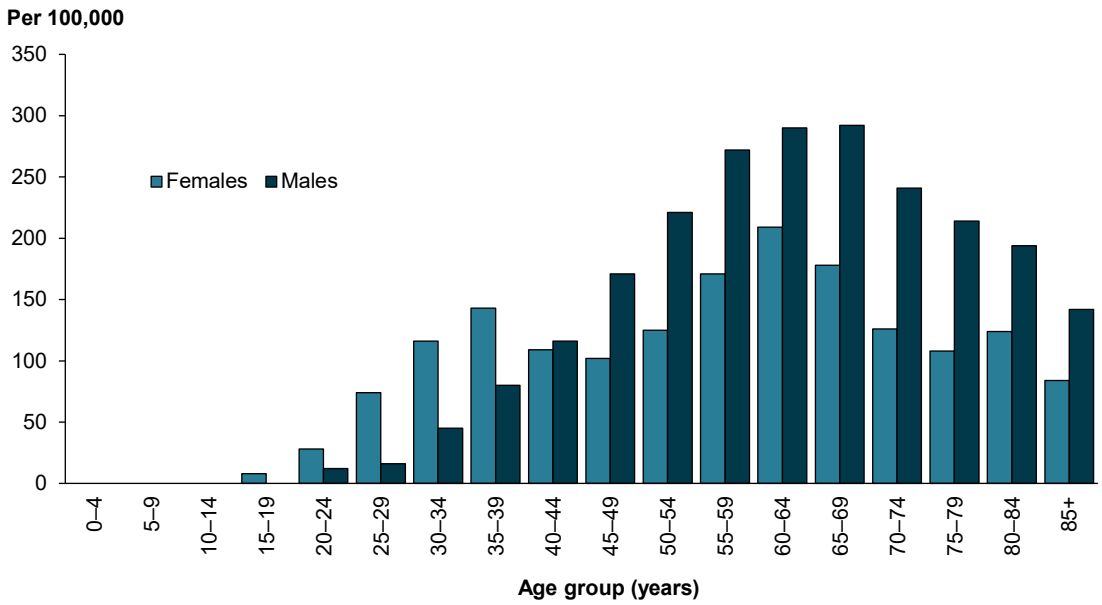
In 2017–18, 2.0% of PPH for hepatitis B were associated with acute infection; the remaining 98% were related to CHB infection.

Therefore, while PPH for *Other vaccine-preventable conditions* may give an indication of the impact of hepatitis B infection, they hide the rate of PPH due to most other vaccine-preventable conditions, which remains low. To avoid this problem, and capture only hospitalisations directly related to vaccine-preventable conditions, the proposed general practice-specific PPH indicator recommended using only the 'principal diagnosis' for all *Other vaccine-preventable conditions* (AIHW 2018a). In this report, data are presented for

Other vaccine-preventable conditions and *Other vaccine-preventable conditions (excluding hepatitis B)* (see next section), to separate the effects of hepatitis B.

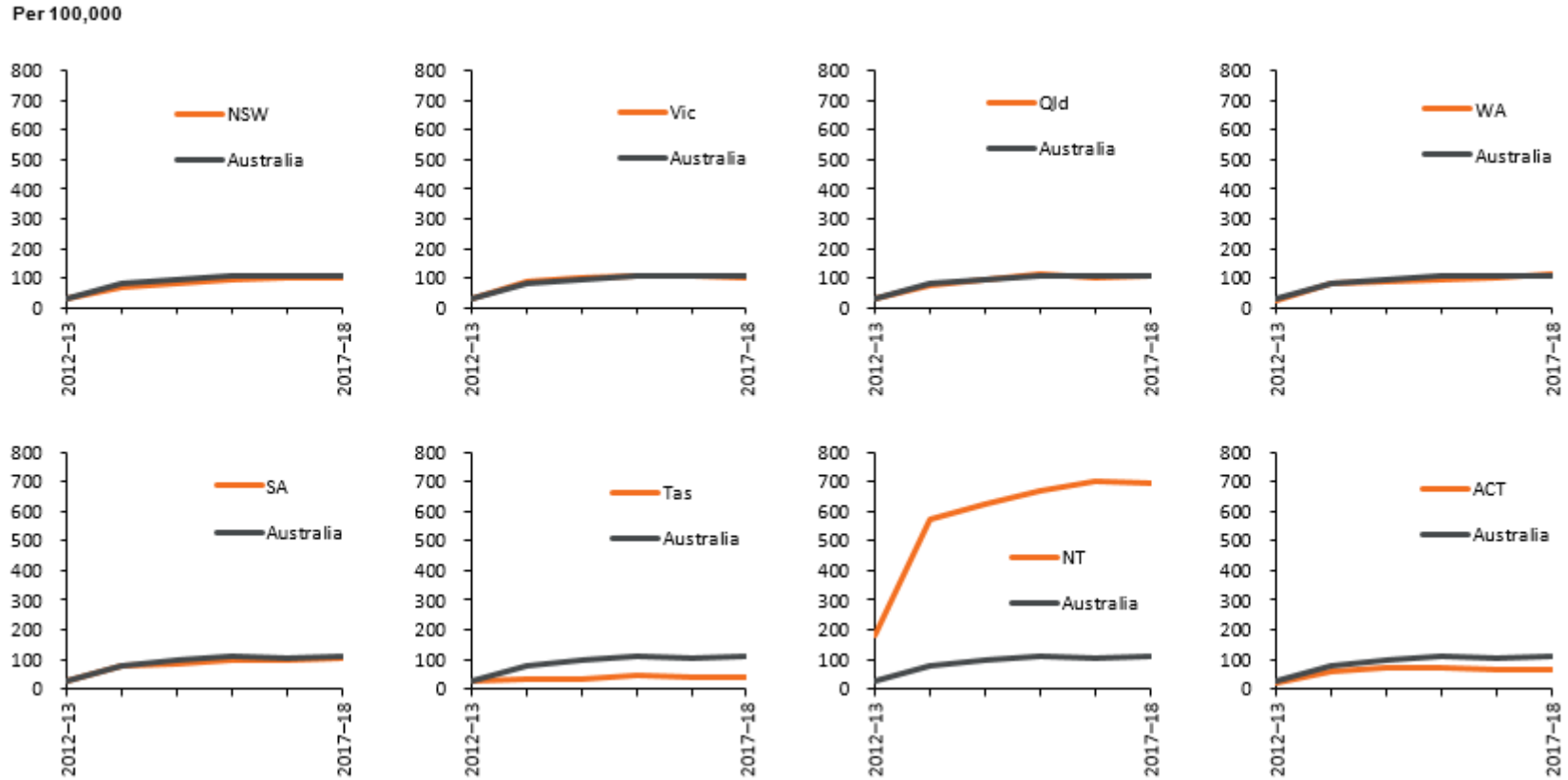
In 2017, an estimated 11% of people living with CHB were Aboriginal or Torres Strait Islander people (Kirby Institute 2018). This high prevalence is reflected in the substantial increase in PPH rates for *Other vaccine-preventable conditions* for Indigenous Australians from July 2013 (Figure 2.13), and contributes to the high PPH rates seen in the Northern Territory (Figure 2.12).

Figure 2.11: Rate of hepatitis B-associated hospitalisations, by age and sex, 2017–18



Source: AIHW National Hospital Morbidity Database.

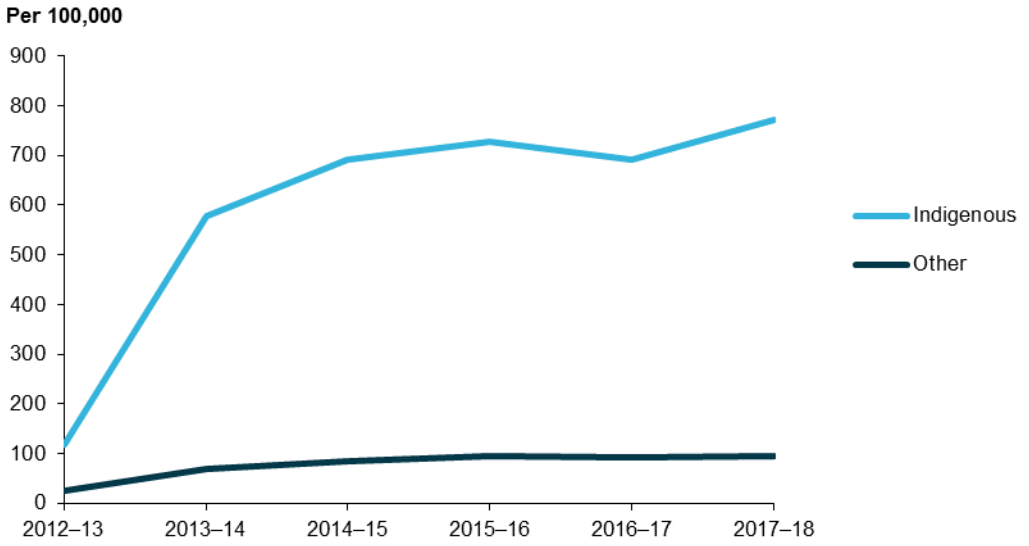
Figure 2.12: Age-standardised rates of potentially preventable hospitalisations for Other vaccine-preventable conditions, by state/territory of residence, 2012–13 to 2017–18



Note: Results for NSW may vary slightly from those reported on the NSW HealthStats public website due to minor variations in the scope of records excluded.

Source: AIHW National Hospital Morbidity Database.

Figure 2.13: Age-standardised rates of potentially preventable hospitalisations for Other vaccine-preventable conditions, by Indigenous status, 2012–13 to 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

Other vaccine-preventable conditions (excluding hepatitis B): rates of PPH for childhood vaccine-preventable conditions remained low

Childhood vaccination coverage in Australia is high (Hull et al. 2018), and *Other vaccine-preventable conditions (excluding hepatitis B)* accounted for 0.5% of *Total* PPH in 2017–18.

In the 6 years 2012–13 to 2017–18, these PPH were most commonly due to rotaviral enteritis (44%), chickenpox (26%), pertussis/whooping cough (22%), mumps (3.5%) and measles (2.3%).

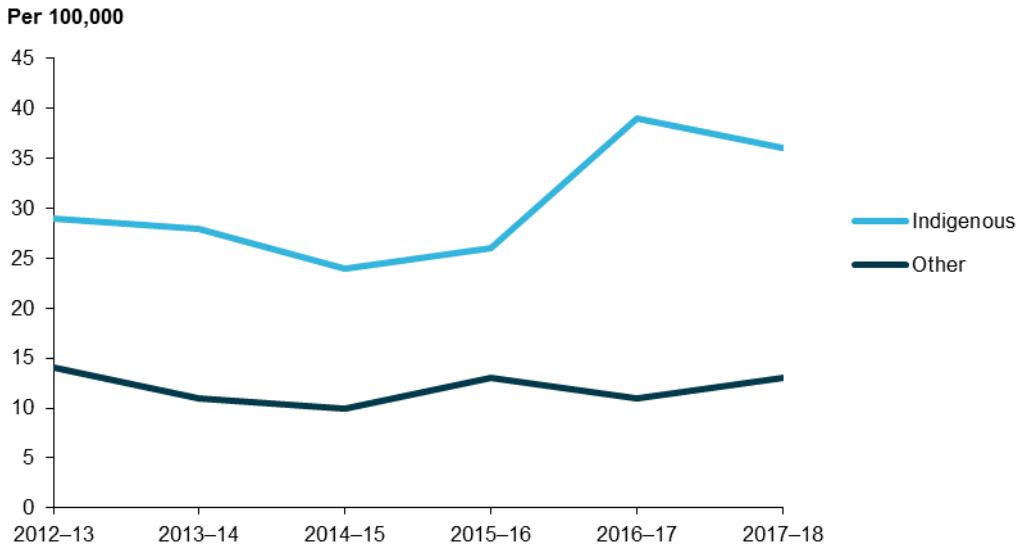
In 2017–18, rates of PPH for *Other vaccine-preventable conditions (excluding hepatitis B)* were highest in the Northern Territory (Figure 2.14), and rates for Indigenous Australians (36 per 100,000 people, Figure 2.15) were 2.8 times as high as for Other Australians (13 per 100,000 people).

Figure 2.14: Age-standardised rates of potentially preventable hospitalisations for Other vaccine-preventable conditions (excluding hepatitis B), by state/territory of residence, 2012–13 to 2017–18

Note: Results for NSW may vary slightly from those reported on the NSW HealthStats public website due to minor variations in the scope of records excluded.

Source: AIHW National Hospital Morbidity Database.

Figure 2.15: Age-standardised rates of potentially preventable hospitalisations for Other vaccine-preventable conditions (excluding hepatitis B), by Indigenous status, 2012–13 to 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

More information about PPH for *Vaccine-preventable conditions* is available in the online data and interactive graphs in the web report, including trends by sex and age group, Indigenous status, remoteness area, socioeconomic area, PHN and SA3 area.

2.2 Acute conditions

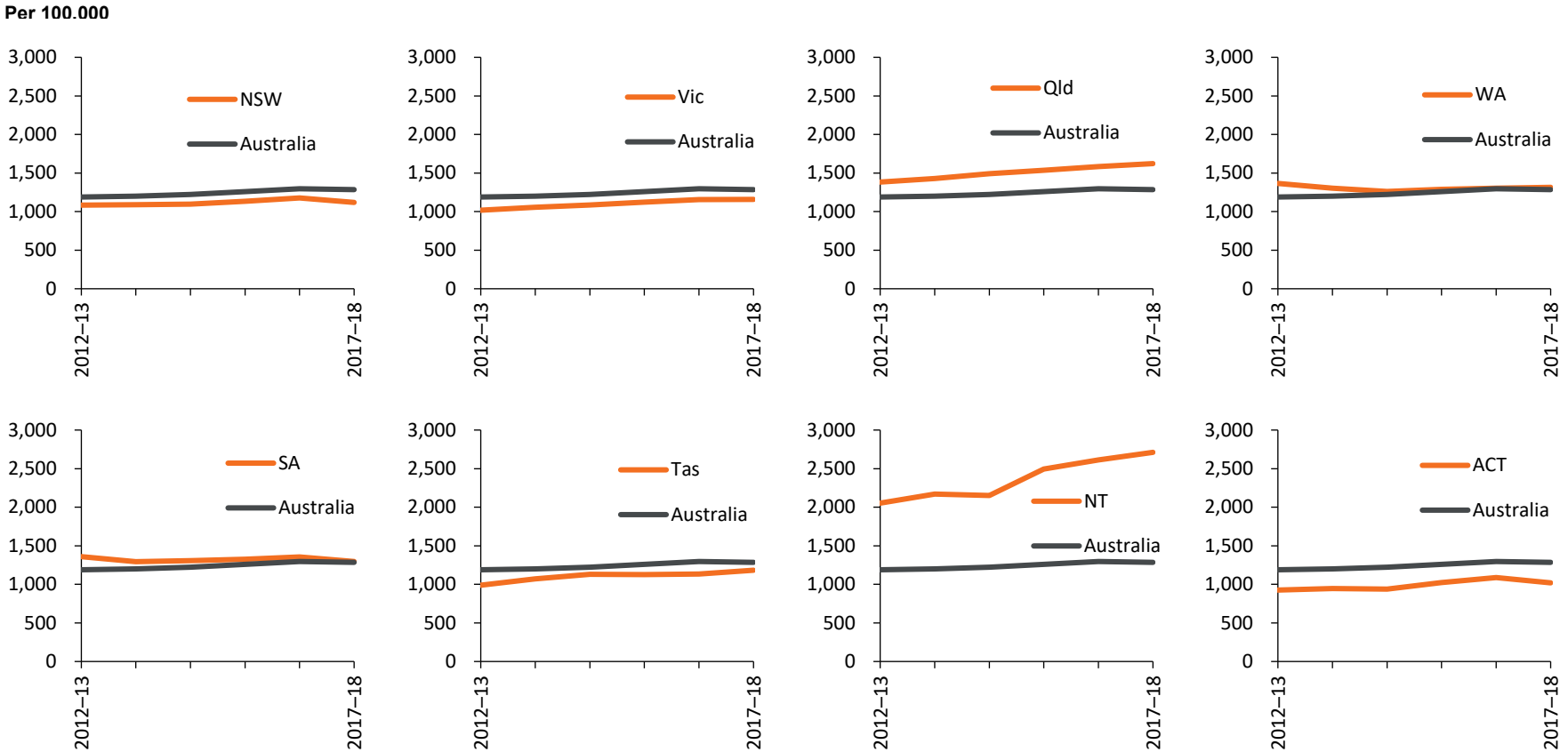
Acute conditions typically have a quick onset and last for only a short period, with appropriate management. Monitoring PPH for acute conditions provides insights into the management of acute infections, oral health, and public health and sanitation.

In Australia in 2017–18, there were nearly 330,000 PPH for *Acute conditions*, at a rate of 1,286 per 100,000 people, accounting for 44% of *Total* PPH. PPH for *Acute conditions* accounted for more than 1 million bed days—equivalent to 35% of *Total* PPH bed days. The ALOS for an *Acute condition* PPH admission was 3.2 days, ranging from 1.2 days for *Dental conditions* to 12.7 days for *Gangrene*. The proportion of same-day admissions for *Acute conditions* PPH was 39%, ranging from 3.5% for *Pneumonia (not vaccine-preventable)* to 86% for *Dental conditions*. Rates of PPH for *Acute conditions* increased by 9.0% between 2012–13 and 2016–17, and remained steady in 2017–18.

- In 2017–18, PPH rates for *Acute conditions* were highest in the Northern Territory (2,711 per 100,000 people), and lowest in the Australian Capital Territory (1,018 per 100,000 people) (Figure 2.16).
- In 2017–18, PPH rates for *Acute conditions* were highest for people living in the lowest socioeconomic areas (Figure 2.17). Between 2012–13 and 2017–18, PPH rates increased in these areas by 12%, compared with a 5.5% increase for people living in the highest socioeconomic areas.

- Between 2012–13 and 2017–18, PPH rates for *Acute conditions* were highest for people living in *Very remote* areas (Figure 2.18). Over the 6 years, PPH rates increased in this population by 15%, compared with a 7.6% increase for people living in *Major cities*.
- In 2017–18, there were peaks in PPH for *Acute conditions* in young children, young women and in people aged 75–79 and over (Figure 2.19).
- Between 2012–13 and 2017–18, females had higher rates of PPH for *Acute conditions* overall, although there was variation between conditions (Figure 2.19). Variation in PPH by sex is discussed further in Section 3.

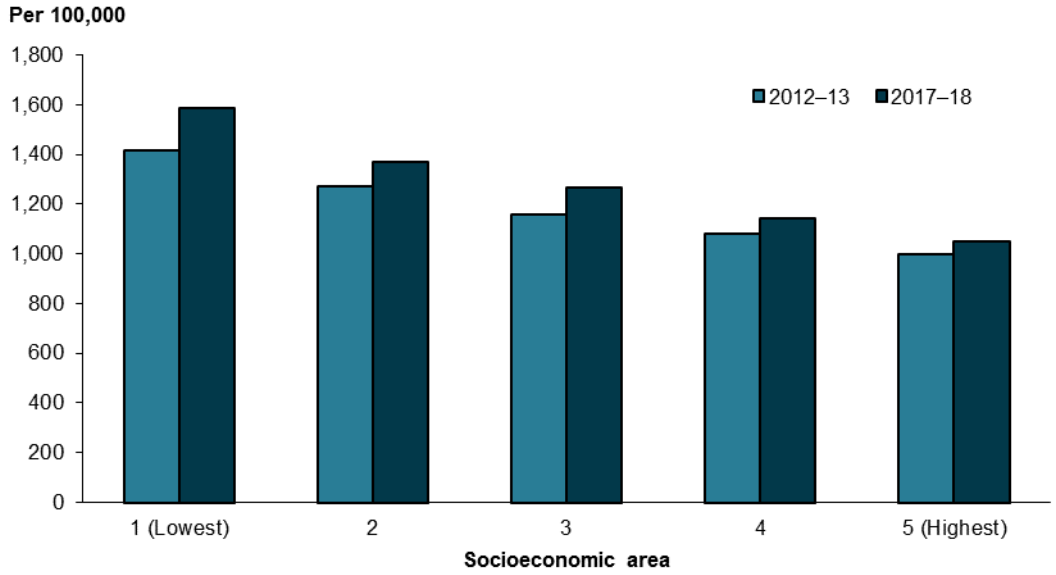
Figure 2.16: Age-standardised rates of potentially preventable hospitalisations for Acute conditions, by state/territory of residence, 2012–13 to 2017–18



Note: Results for NSW may vary slightly from those reported on the NSW HealthStats public website due to minor variations in the scope of records excluded.

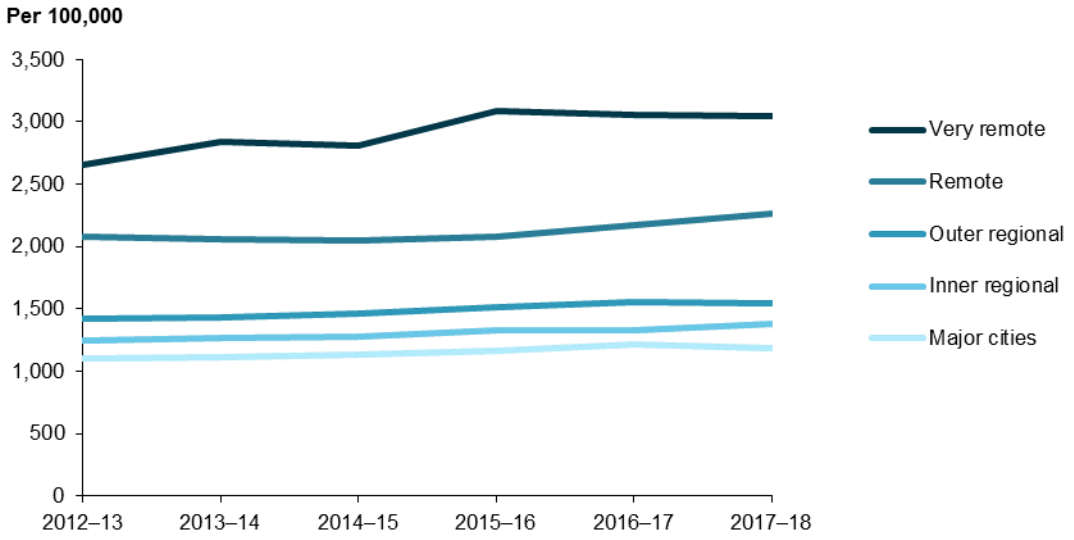
Source: AIHW National Hospital Morbidity Database.

Figure 2.17: Age-standardised rates of potentially preventable hospitalisations for Acute conditions, by socioeconomic area, 2012–13 and 2017–18



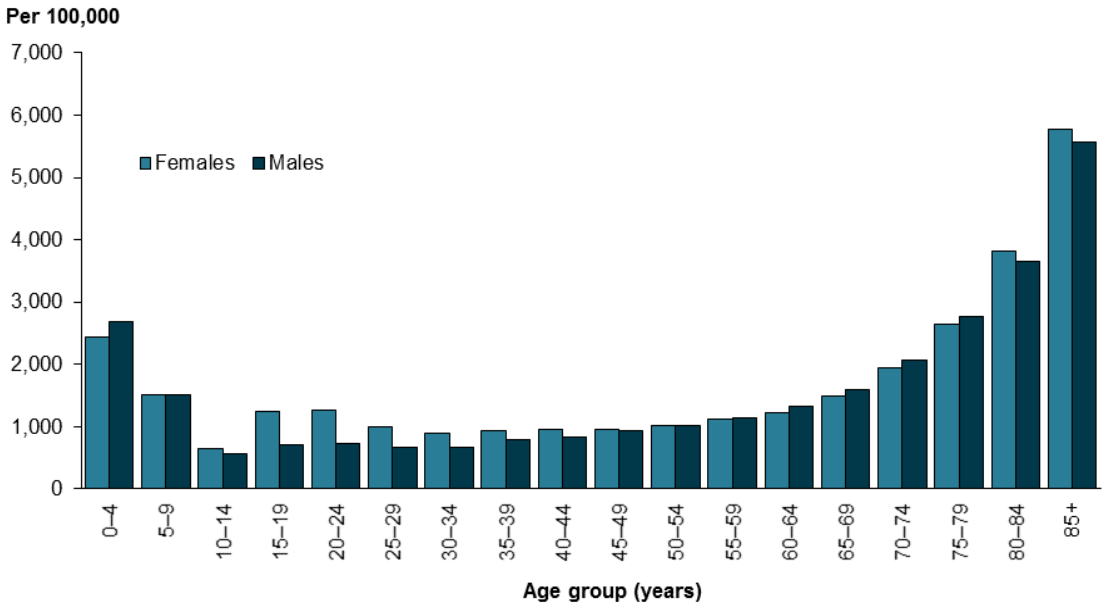
Source: AIHW National Hospital Morbidity Database.

Figure 2.18: Age-standardised rates of potentially preventable hospitalisations for Acute conditions, by remoteness area, 2012–13 to 2017–18



Source: AIHW National Hospital Morbidity Database.

Figure 2.19: Rates of potentially preventable hospitalisations for Acute conditions, by age group and sex, 2017–18



Source: AIHW National Hospital Morbidity Database.

Infections

About two-thirds of PPH for *Acute conditions* in 2017–18 were due to infections (Figure 2.20). These infections affected children (commonly *ENT infections*), young women (*UTIs*, *Pelvic inflammatory disease* (*PID)*) and older people (*Cellulitis*, *UTIs*).

Disparities in PPH rates for infections can highlight risk factors, including socioeconomic disadvantage (such as overcrowded housing, or occupational risks for skin injury), living in regional and remote areas, and poorer health literacy. Other risk factors include chronic diseases and the clustering together of vulnerable people in places such as child care centres and residential aged care facilities (ACSQHC & AIHW 2017).

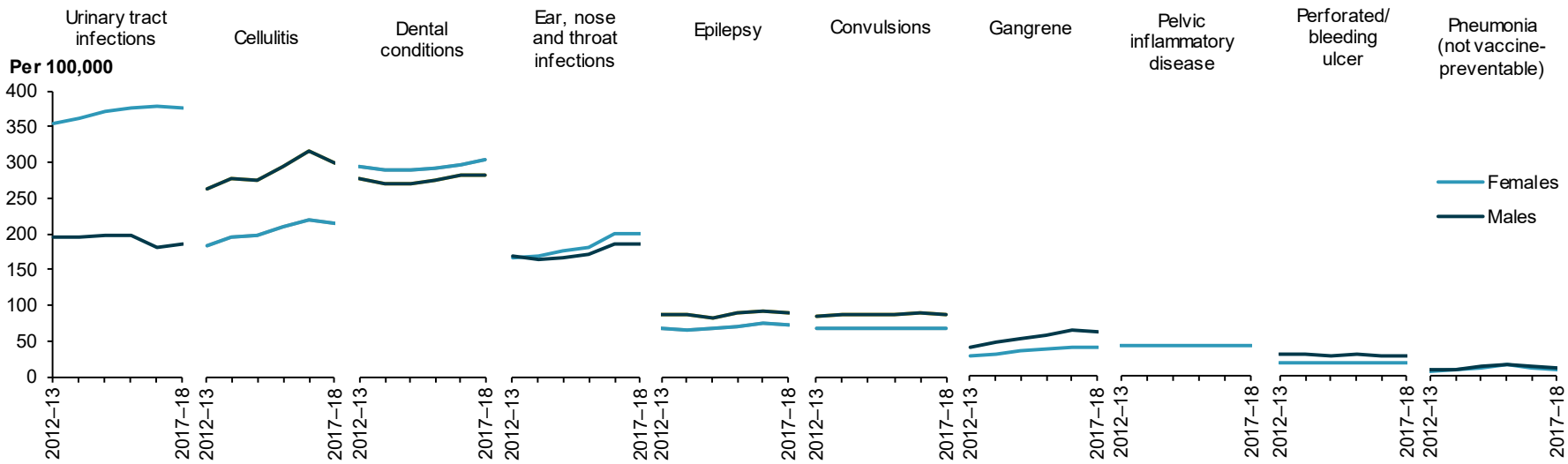
Early detection and treatment of infections may reduce the severity of disease and reduce the need for hospitalisation. Ongoing care and management of chronic diseases may also reduce the likelihood of developing serious infections in vulnerable individuals.

It should be noted that:

- Some of the PPH, particularly those for *ENT infections*, may not be truly preventable—for example, a tonsillectomy or insertion of grommets may be appropriate interventions following relevant primary care (AIHW 2018a).
- The PPH indicator for *UTI infections* also captures tubulo-interstitial nephritis, an inflammatory renal condition with a range of causes that cannot be distinguished by current coding, including infections, drug reactions and immune disorders.
- Cellulitis is an infection of the subcutaneous tissues with a range of different causes and management (ACSQHC & AIHW 2017). While not all forms of cellulitis are included in the PPH specification, a number of conditions present similarly to cellulitis, which may affect the number of PPH recorded for *Cellulitis* (Therapeutic Guidelines 2019).
- *Gangrene* is an example of an acute condition that is related to chronic disease—it is an outcome of peripheral vascular disease, often associated with diabetes.

Between 2012–13 and 2016–17, rates of PPH increased for the most common infections: *UTIs* in women, *Cellulitis* and *ENT infections*, and also for *Gangrene*, but rates were steady or decreased in 2017–18 (Figure 2.20). PPH rates for *PID* and *Perforated/bleeding ulcer* remained relatively steady, and rates of PPH for *Pneumonia (not vaccine-preventable)* were low, with a slight peak in 2015–16. Between 2012–13 and 2017–18, rates of PPH for *Cellulitis*, *Gangrene* and *Perforated/bleeding ulcer* were higher in males, while rates of PPH for *UTIs* and *ENT infections* were higher in females.

Figure 2.20: Age-standardised rates of potentially preventable hospitalisations for Acute conditions, by sex, 2012–13 to 2017–18



Source: AIHW National Hospital Morbidity Database.

Dental conditions

Dental conditions accounted for 22% of PPH for *Acute conditions*, and 10% of *Total* PPH in 2017–18. Rates of PPH for *Dental conditions* were highest for young children and the main cause of admission was 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). PPH rates were higher in females (Figure 2.20), and highest in Indigenous Australians and people living in remote areas; however, rates were similar across all socioeconomic areas, suggesting complex drivers for hospitalisation amongst different population groups (Rogers et al. 2018a).

Convulsions and epilepsy

A convulsion is a type of seizure that involves a change in brain function. Usually PPH for *Convulsions and epilepsy* are grouped together; in this report they are analysed separately due to the differing age profiles—PPH for *Convulsions* are most common in young children and the elderly, while PPH for *Epilepsy* are related to management of a long-term condition and fluctuate across all age groups. PPH for both conditions were more common in males and PPH rates remained relatively steady between 2012–13 and 2017–18 (Figure 2.20).

More information about PPH for *Acute conditions* is available in the online data and interactive graphs web report, including trends by sex and age group, Indigenous status, remoteness area, socioeconomic area, PHN and SA3 area.

2.3 Chronic conditions

Chronic conditions are long-lasting conditions with persistent effects that require ongoing management. Most illness and deaths in Australia are caused by chronic conditions (AIHW 2018e). Nearly half of Australian adults have one or more chronic diseases, increasing to 4 in 5 people aged 65 and over (ABS 2018a).

Monitoring PPH for chronic conditions provides insights into the effectiveness of preventive health actions across all stages of wellness and disease, including population health programs to limit the onset of disease, health screening for early detection and treatment of disease, and multi-disciplinary management of established disease.

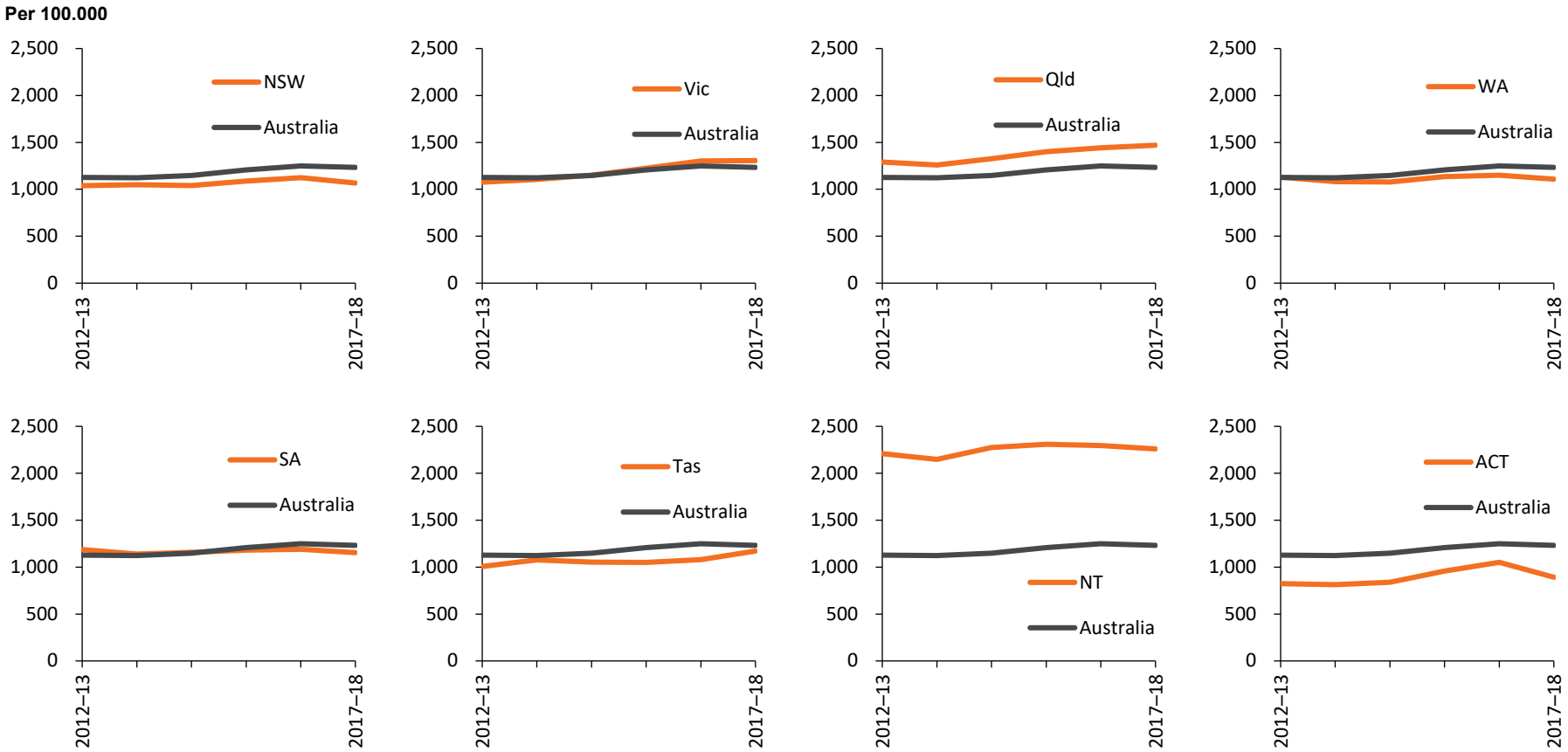
In Australia in 2017–18, there were about 343,500 PPH for *Chronic conditions*, at a rate of 1,233 per 100,000 population, accounting for 46% of *Total* PPH. PPH for *Chronic conditions* accounted for more than 1.4 million bed days—equivalent to 48% of *Total* PPH bed days. The ALOS for a *Chronic condition* PPH admission was 4.1 days, ranging from 1.4 days for *Iron deficiency anaemia* to 12.9 days for *Nutritional deficiencies*. The proportion of same-day admissions for *Chronic condition* PPH was 33%, ranging from 5.9% for *Nutritional deficiencies* to 84% for *Iron deficiency anaemia*.

Rates of PPH for *Chronic conditions* increased between 2012–13 and 2016–17, and remained steady in 2017–18. Changes in coding for rehabilitation care in July 2015 accounted for some, but not all, of the observed changes in PPH for *Chronic conditions*. Between 2015–16 and 2017–18, rehabilitation care accounted for 2.9% to 3.1% of *Chronic condition* PPH admissions (see Appendix for more details).

- In 2017–18, PPH rates for *Chronic conditions* were highest in the Northern Territory (2,260 per 100,000 people), and lowest in the Australian Capital Territory (891 per 100,000 people) (Figure 2.21).

- In 2017–18, PPH rates for *Chronic conditions* were highest for people living in the lowest socioeconomic areas (Figure 2.22). Between 2012–13 and 2017–18, PPH rates increased in these areas by 13%, compared with a 10% increase for people living in the highest socioeconomic areas.
- Between 2012–13 and 2017–18, PPH rates for *Chronic conditions* were highest for people living in *Very remote* areas (Figure 2.23). Over the 6 years, PPH rates increased for people living in *Major cities* and *Inner regional* areas, partly due to changes in coding for rehabilitation care. The increase for people living in *Very remote* areas is likely to be due to other factors, as rates of rehabilitation care are substantially lower for people living outside *Major cities* (AIHW 2019e). PPH rates for *Chronic conditions* remained steady for people living in *Outer regional* and *Remote* areas.
- In 2017–18, older age was associated with higher rates of PPH for *Chronic conditions* (Figure 2.24). Women had higher rates of PPH for *Chronic conditions* in the younger ages 15–19 to 50–54; men had higher rates in older age groups.
- Between 2012–13 and 2017–18, males and females had similar rates of PPH for *Chronic conditions* overall, although there was variation between conditions (Figure 2.25). Variation in PPH by sex is discussed further in Section 3.

Figure 2.21: Age-standardised rates of potentially preventable hospitalisations for Chronic conditions, by state/territory of residence, 2012–13 to 2017–18



Note: Results for NSW may vary slightly from those reported on the NSW HealthStats public website due to minor variations in the scope of records excluded.

Source: AIHW National Hospital Morbidity Database

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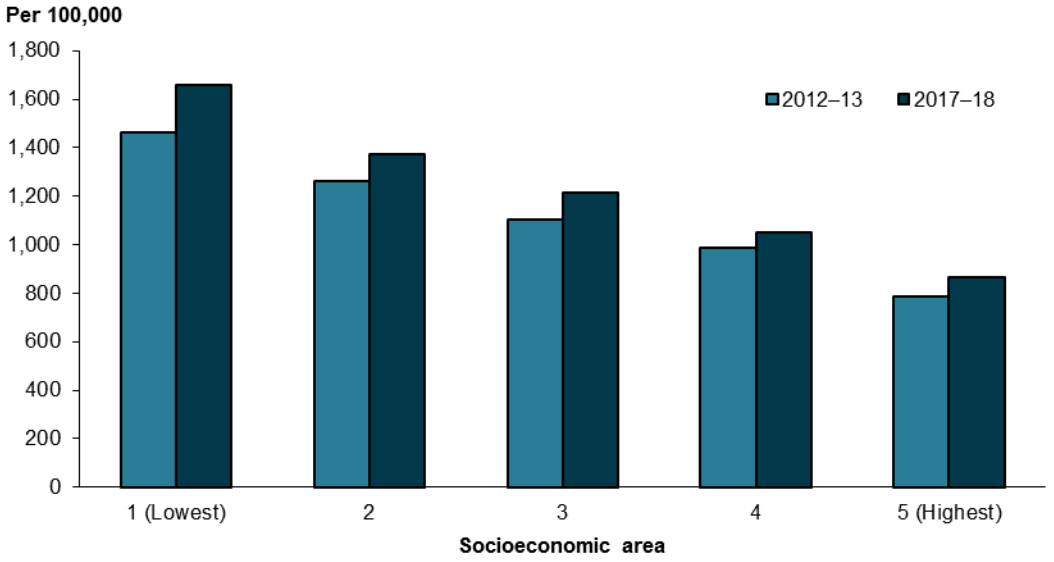
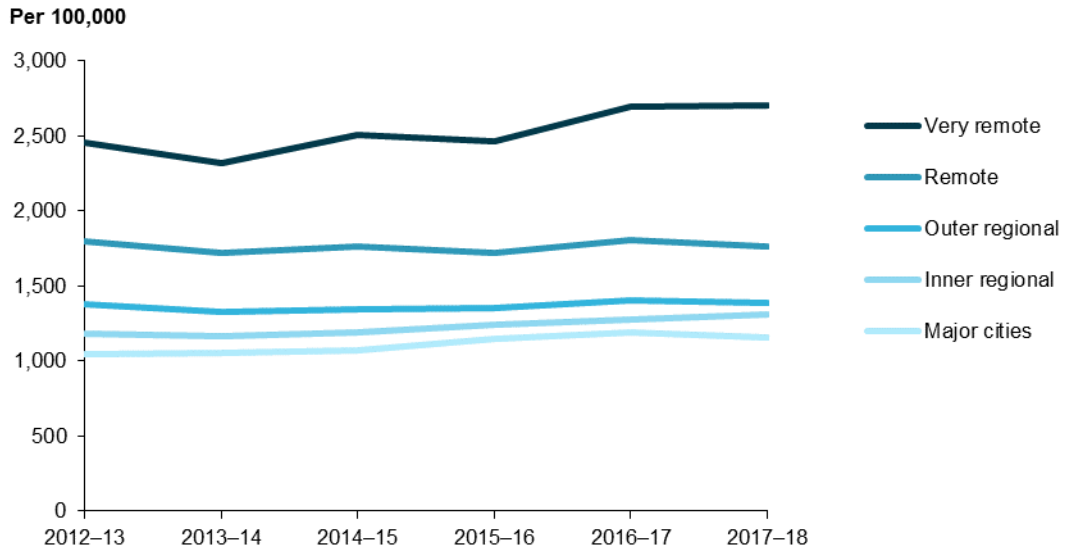
Figure 2.22: Age-standardised rates of potentially preventable hospitalisations for Chronic conditions, by socioeconomic area, 2012–13 and 2017–18



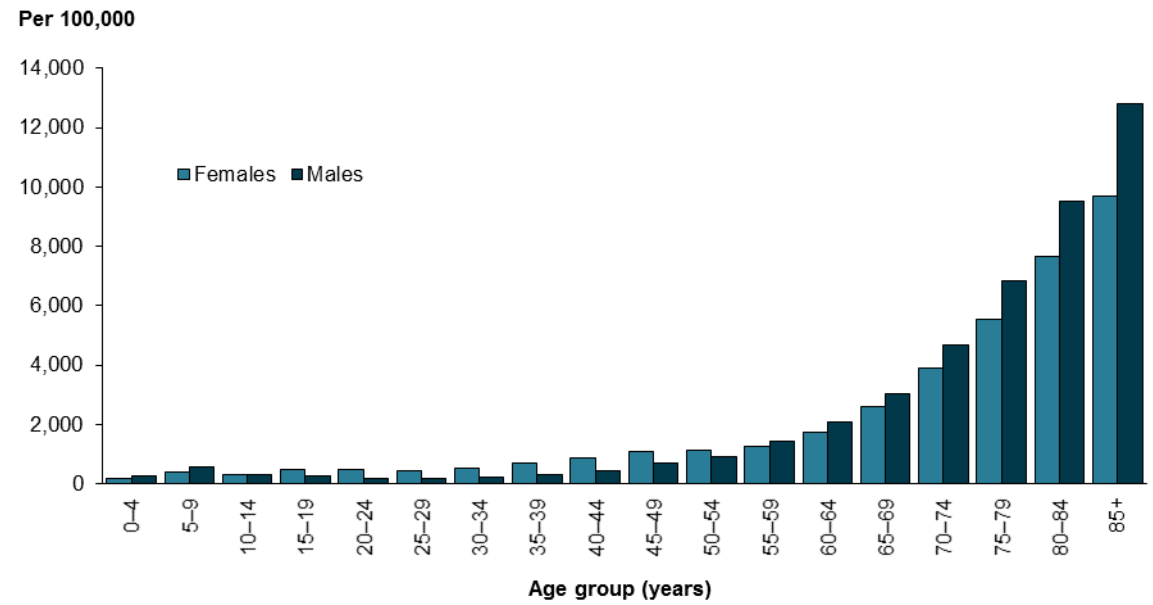
Source: AIHW National Hospital Morbidity Database.

Figure 2.23: Age-standardised rates of potentially preventable hospitalisations for Chronic conditions, by remoteness area, 2012–13 to 2017–18



Source: AIHW National Hospital Morbidity Database.

Figure 2.24: Rates of potentially preventable hospitalisations for Chronic conditions, by age group and sex, 2017–18



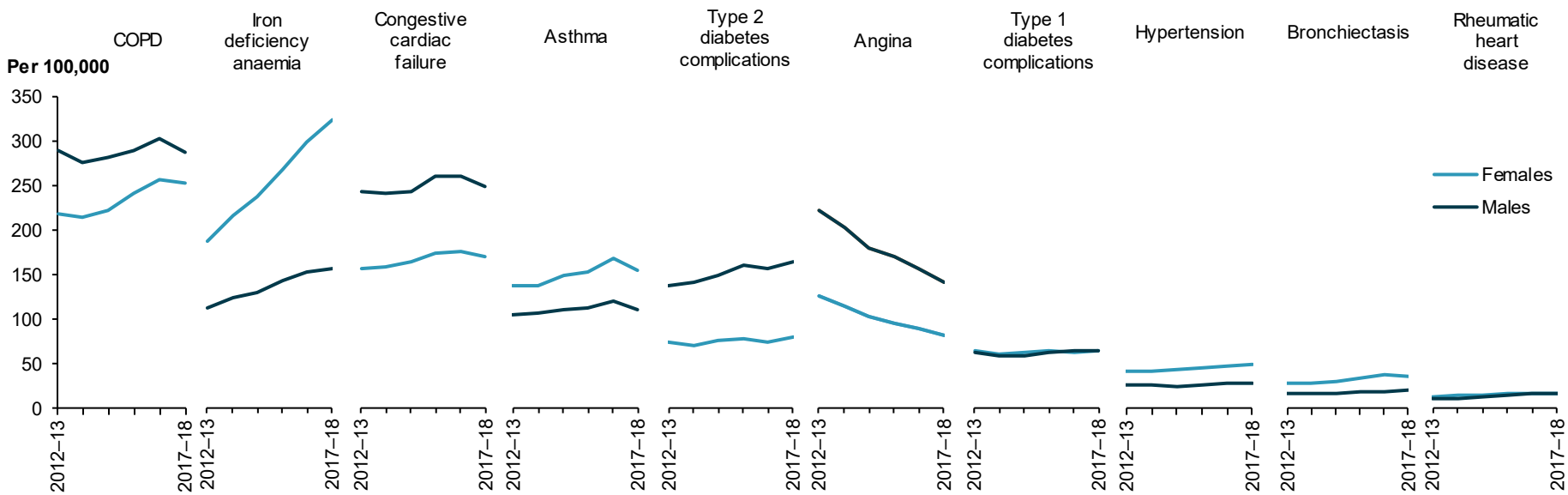
Source: AIHW National Hospital Morbidity Database.

Congestive heart failure, COPD and type 2 diabetes accounted for half of the PPH for *Chronic conditions*

Congestive cardiac failure, *COPD* and type 2 *Diabetes complications* accounted for a high proportion of *Chronic conditions* PPH in 2017–18: 50% of admissions and 71% of bed days. Between 2012–13 and 2017–18, rates of PPH for these 3 conditions fluctuated for males and females (Figure 2.25). Increasing age was associated with a rapid increase in PPH rates for *Congestive cardiac failure*, but a more gradual increase in PPH rates for *COPD* and type 2 *Diabetes complications* (Figure 2.26). Changes in coding for rehabilitation care in July 2015 accounted for some, but not all, of the observed changes: in 2017–18, rehabilitation care accounted for about 4–5% of PPH admissions for these conditions.

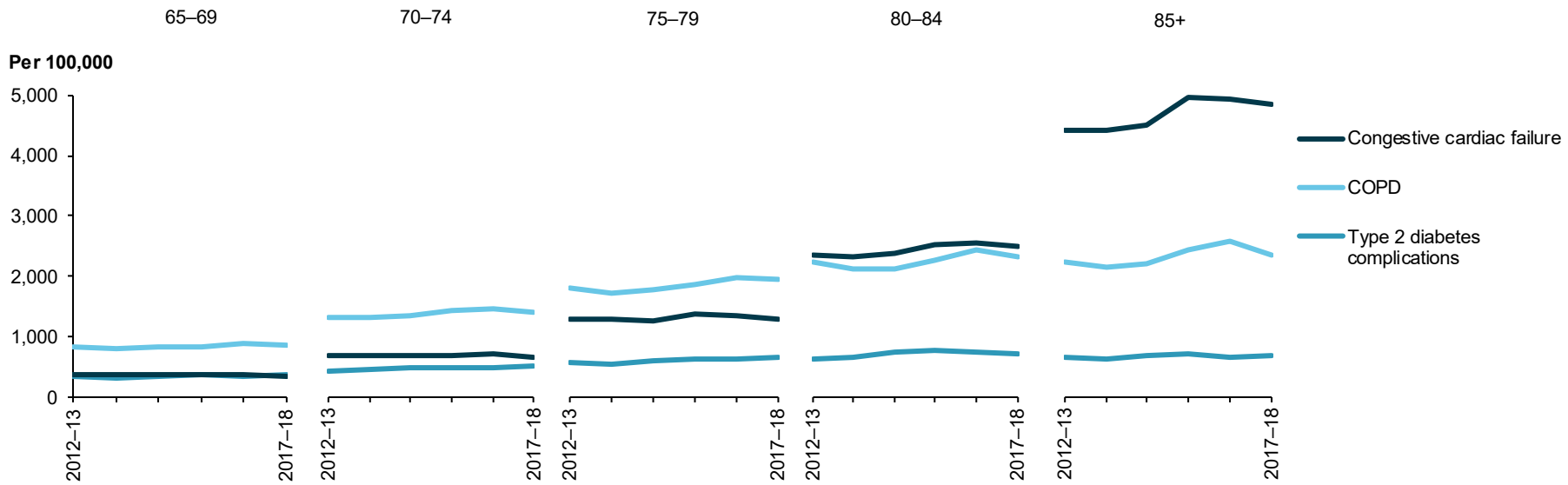
Men had higher rates of PPH for type 2 *Diabetes complications*, *Congestive cardiac failure*, *Angina* and *COPD* (Figure 2.25). Men also had higher rates of PPH for *Acute conditions* associated with diabetes, such as *Cellulitis* and *Gangrene*. However, women had higher rates of PPH for *Hypertension* and *Bronchiectasis* (Figure 2.25).

Figure 2.25: Age-standardised rates of potentially preventable hospitalisations for Chronic conditions, by sex, 2012–13 to 2017–18



Source: AIHW National Hospital Morbidity Database.

Figure 2.26: Rates of potentially preventable hospitalisations for selected Chronic conditions, by age groups 65 and over, 2012–13 to 2017–18



Source: AIHW National Hospital Morbidity Database.

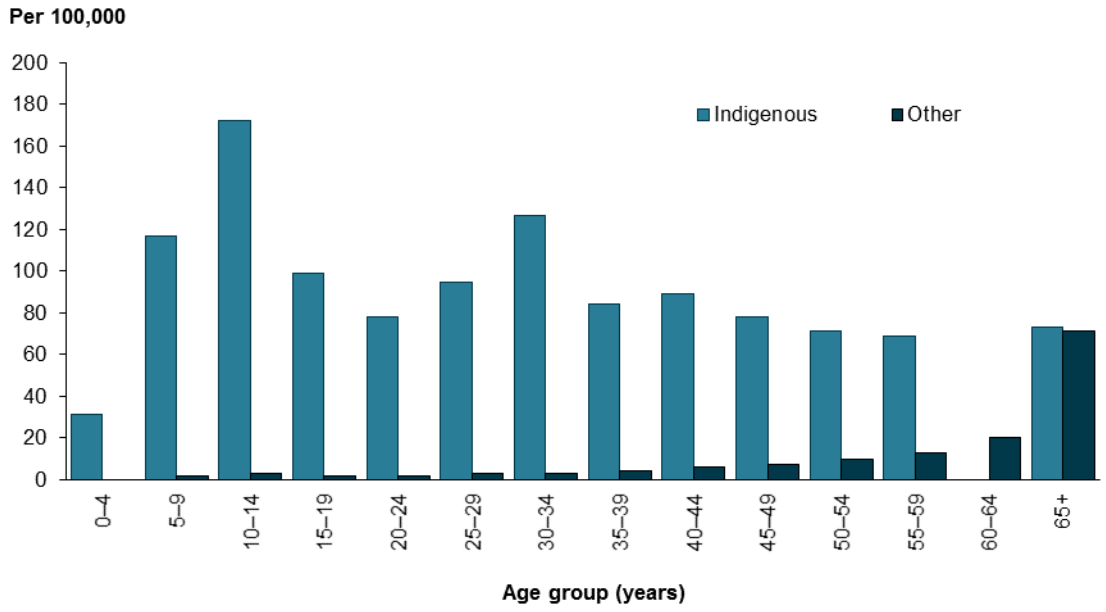
Chronic conditions in children

Asthma is the leading cause of disease burden for boys and girls aged 5–14 (AIHW 2019g). Among children, asthma is more prevalent in boys than girls; after adolescence, asthma is more prevalent in women than men, and this pattern is reflected in PPH for *Asthma* (see online data tables).

In 2017–18, rates of PPH for type 1 *Diabetes complications* peaked in teenagers aged 15–19 (see online data tables).

Rheumatic heart disease (RHD) is permanent damage to the heart caused during episodes of acute rheumatic fever (ARF). Children aged 5–14 have the highest rates of ARF and new RHD diagnoses, and Indigenous Australians make up 87% of people living with RHD (AIHW 2019h). In 2017–18, rates of PPH for *RHD* in Indigenous children aged 5–14 were 58 times as high as for Other Australians of the same age (Figure 2.27).

Figure 2.27: Rate of potentially preventable hospitalisations for rheumatic heart disease, by age group and Indigenous status, 2017–18



Notes

1. 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.
2. Data for Other Australians aged 0–4 and Indigenous Australians aged 60–64 are not published due to small numbers.

Source: AIHW National Hospital Morbidity Database.

Better management of 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 IDA—severe and prolonged iron deficiency is needed to cause anaemia. IDA is common in Australia. Treatment involves iron replacement via oral therapy or intravenous iron infusion, and management of the underlying cause of the anaemia. This may include a gastroscopy or colonoscopy to identify gastrointestinal bleeding.

National rates of PPH for *Iron deficiency anaemia (IDA)* increased by 61% between 2012–13 and 2017–18. There is evidence to suggest that the increase may partly be due to better management of people with IDA. 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 (ACSQHC 2017; National Blood Authority 2012).

However, only inpatient admissions are included in the PPH specification for *IDA*, and states and territories differ in their policies for considering same-day procedures as inpatient admissions or outpatient procedures. For example, in Victoria, which has the highest rates of PPH for *IDA*, intravenous iron infusions and certain gastroscopies and colonoscopies automatically qualify as inpatient admissions, while other jurisdictions consider them as outpatient procedures, making the interpretation of PPH rates for *IDA* difficult. Changes in PPH rates within jurisdictions may also reflect the standardisation of admission practices across hospitals over time.

Decreasing rates of PPH for angina—the effect of changing diagnostic tools

Angina is temporary chest pain or discomfort caused by insufficient flow of blood to supply the oxygen needs of the heart. National rates of PPH for *Angina* have decreased steadily over the last 20 years (AIHW 2011). In addition to likely improvements in risk factors for heart disease and in cardiac care, this decrease primarily reflects changing diagnostic tools. The introduction of high-sensitivity cardiac troponin tests has led to an increased proportion of patients with chest pain being diagnosed with acute myocardial infarction (heart attack), with a reciprocal decrease in the diagnosis of unstable angina (AIHW 2011; Roffi et al. 2016).

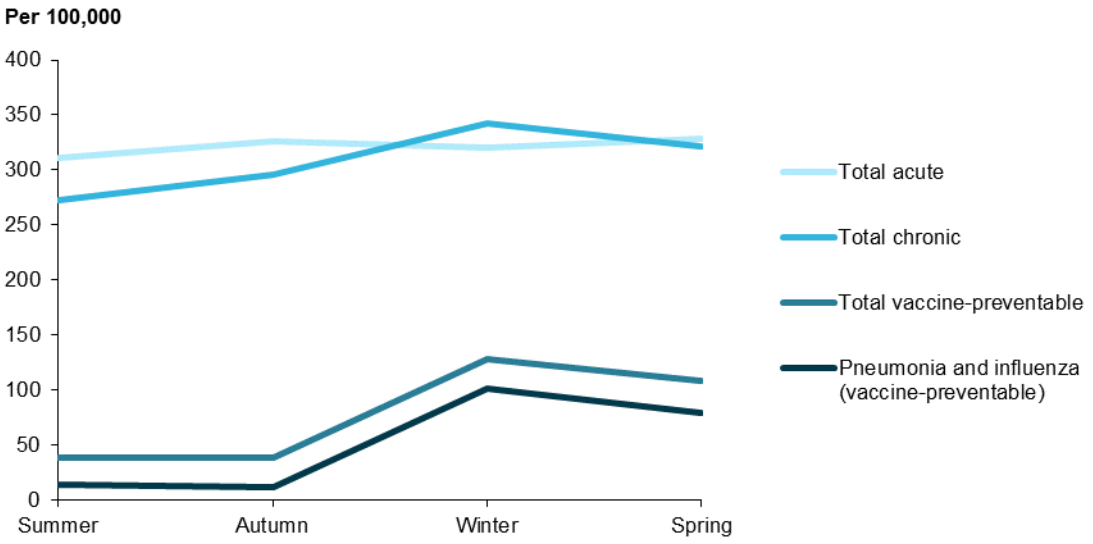
More information about PPH for *Chronic conditions* is available in the online data and interactive graphs web report, including trends by sex and age group, Indigenous status, remoteness area, socioeconomic area, PHN and SA3 area.

2.4 Seasonal variation in PPH

Many PPH conditions show a predictable seasonal pattern. Respiratory infections such as *Pneumonia and influenza (vaccine-preventable)* have a big impact on PPH rates over winter (Figure 2.28), and have a subsequent impact on other conditions including *COPD*, *Congestive cardiac failure*, *ENT infections* and *Asthma* (Figure 2.29). Conversely, the risk of other infections is higher in summer (*Cellulitis*) and autumn (*UTIs*) due to increased risk factors such as foot wounds, insect bites (Manning et al. 2018) and dehydration (Rosello et al. 2018). PPH for *Dental conditions* are at their lowest during summer.

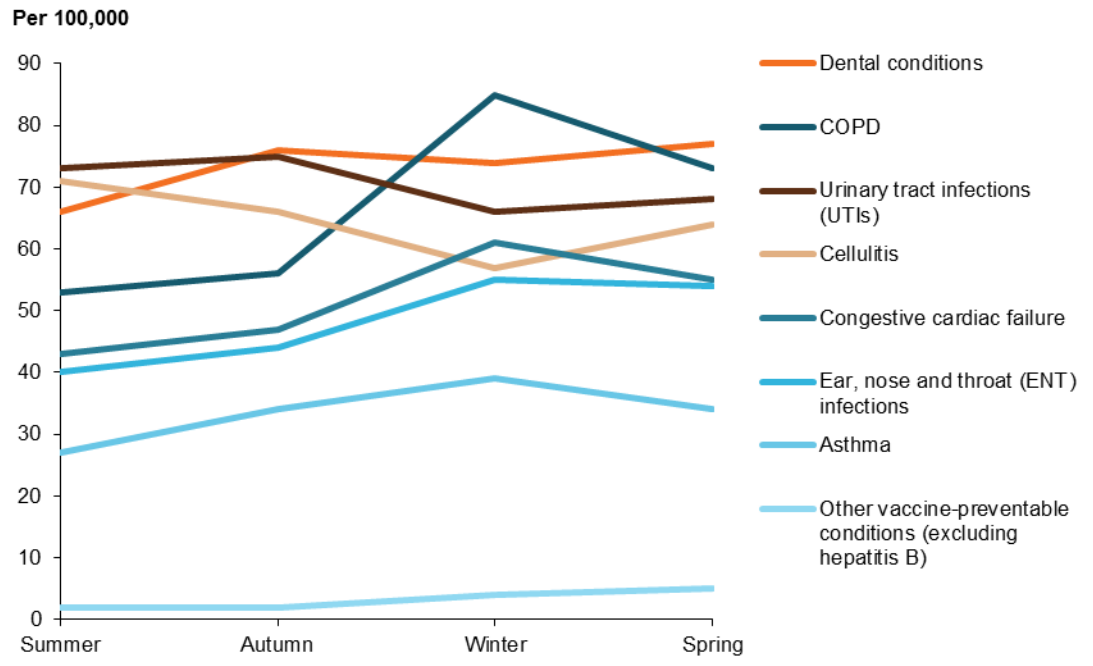
More information about seasonal variation in PPH is available in the online data tables web report.

Figure 2.28: Age-standardised rates of potentially preventable hospitalisations for Acute, Chronic and Vaccine-preventable conditions and Pneumonia and influenza (vaccine-preventable), by season, 2017–18



Source: AIHW National Hospital Morbidity Database.

Figure 2.29: Age-standardised rates of potentially preventable hospitalisations for selected conditions, by season, 2017–18



Source: AIHW National Hospital Morbidity Database.

3 Variation in potentially preventable hospitalisations by sex and age

3.1 PPH variation by sex

Men and women have different attitudes towards health and other risks, different ways of using health services, and different experiences of socioeconomic disadvantage (AIHW 2019i, 2019j). Increasingly, these differences are being recognised in the clinical setting. For example, the risk factors, presentation and treatment of cardiovascular disease varies between men and women due to biology and health behaviours: more men than women have the disease, and men typically present with the condition at younger ages and with greater severity, but an underestimation of risk in women may affect diagnosis and treatment (AIHW 2019k).

Biological factors make males or females more prone to certain conditions that may lead to a PPH. Sex hormones influence immune function, and are thought to affect susceptibility to infection (Klein 2000) and epilepsy seizures (Scharfman & MacLusky 2014).

In addition to the impact of sex hormones, women have anatomical differences that make them more vulnerable to UTIs generally, while men become more prone to UTIs as they age, due to prostate gland enlargement. Menstrual blood loss and pregnancy can contribute to *Iron deficiency anaemia*, and some PPH specifically relate to women's reproductive health (*Pelvic inflammatory disease*) and pregnancy (*Eclampsia*, see online data table). Conditions relating to male reproductive health are not included in the current PPH indicator.

Smaller airways and hormonal differences in females can lead to more complications from respiratory conditions (Almqvist et al. 2008). In 2017–18, PPH rates for *Bronchiectasis* were higher in women (Figure 2.25); women had an earlier onset of PPH for *COPD* and a longer ALOS (5.2 days compared with 4.9 days for men in 2017–18, see online data tables); and following a peak in young boys, women had higher rates of PPH for *Asthma* after adolescence (see online data tables).

Indigenous males and females have different patterns of PPH

Some disparities in PPH rates between males and females cannot be explained only by biological differences. Between 2012–13 and 2017–18, the variation in age-standardised rates of PPH between Indigenous males and females differed from that of Other Australian males and females for a number of PPH conditions.

The most striking difference was the rapid increase in rates of PPH for *COPD* in Indigenous women (38%), compared with a 13% increase in Indigenous men, so that in 2017–18, rates in Indigenous women were higher than in Indigenous men (Figure 3.1). In contrast, PPH rates for *COPD* in Other Australian women were consistently lower than in Other Australian men.

Also of note, the rate of PPH for *Congestive cardiac failure* increased by 17% in Indigenous women between 2012–13 and 2017–18, but decreased by 15% in Indigenous men, so that rates in women were higher than in men from 2015–16. PPH rates for *Congestive cardiac failure* in Other Australian women were lower than for Other Australian men and both remained comparatively steady.

In 2017–18, the difference in rates of PPH for *Convulsions and epilepsy* between Indigenous males and females (1.7 fold) was greater than that for Other Australian males and females

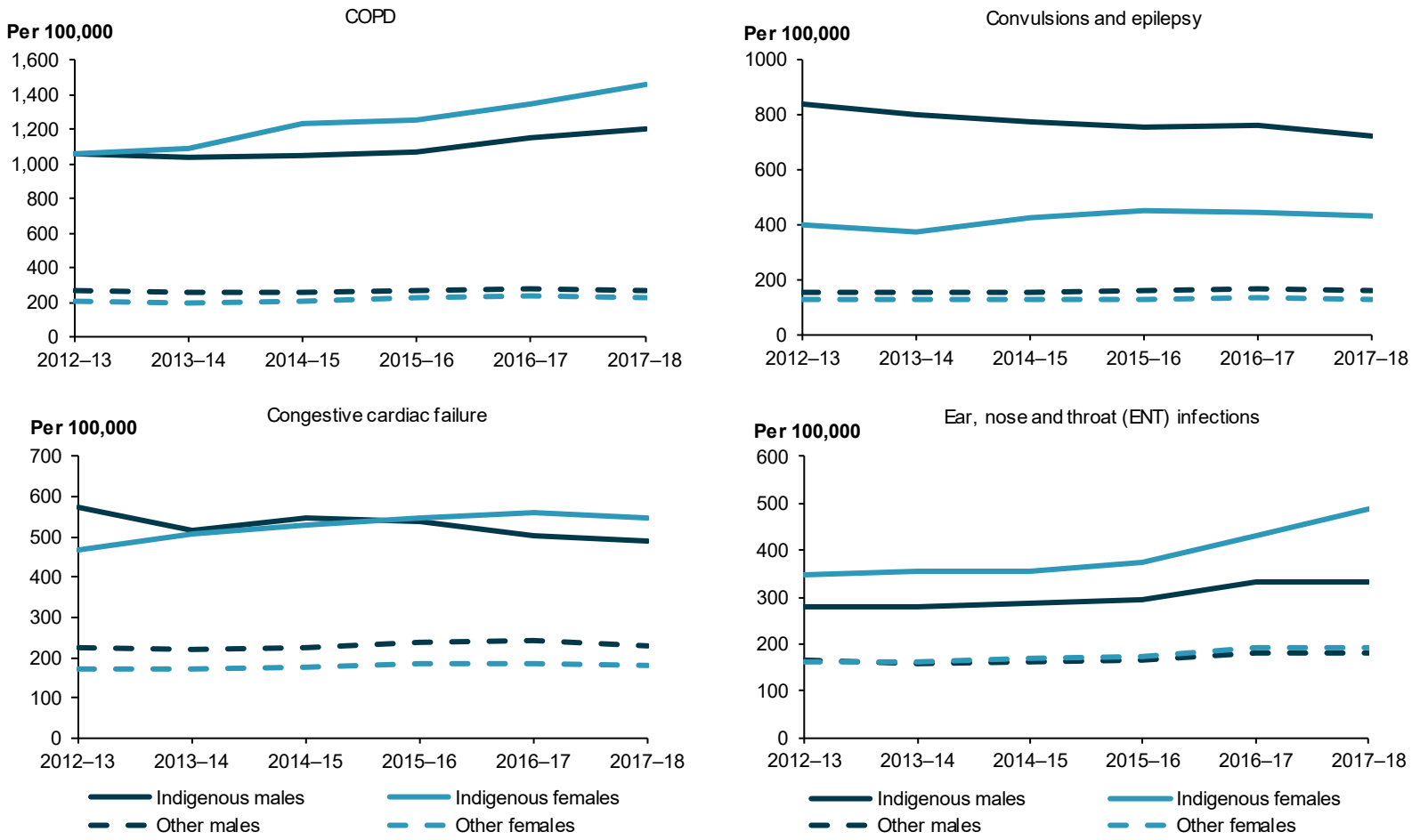
(1.1 fold) (Figure 3.1). Between 2012–13 and 2017–18, rates decreased by 14% in Indigenous males and increased by 8.8% in Indigenous females, while rates in Other Australian males and females remained relatively steady.

Between 2012–13 and 2017–18, PPH for *ENT infections* increased by 40% in Indigenous females, compared with an 18% increase in Indigenous males. Rates in Other Australian males and females remained relatively steady.

The pattern of higher rates of PPH for *Cellulitis* observed in males overall (Figure 2.20) was not seen for Indigenous Australians—rates for Indigenous females were similar to those for Indigenous males (see online data table).

More information on PPH conditions by sex and Indigenous status is available in the web report. Further analysis of PPH among Indigenous Australians is presented in Section 4.

Figure 3.1: Age-standardised rates of potentially preventable hospitalisations for selected conditions, by Indigenous status and sex, 2012–13 to 2017–18



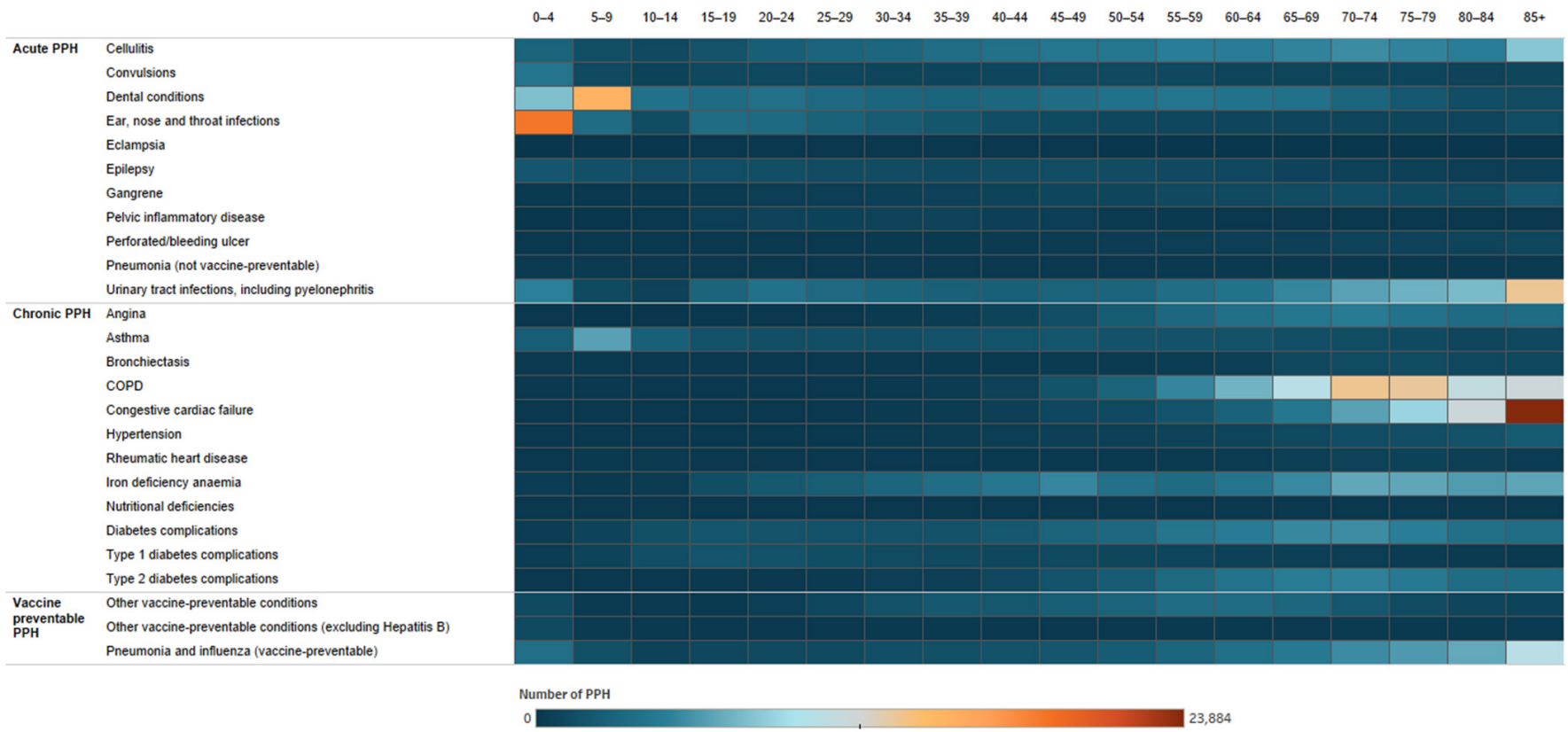
Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

3.2 PPH variation by age

The likelihood of a person having a PPH varies with age. For example, many infections affect the very young and the elderly, while chronic conditions generally have an onset from middle age. Figure 3.2 depicts the number of PPH by 5-year age groups, highlighting which PPH conditions are most common in each age group (red/orange/yellow indicating higher numbers of PPH), and how causes of PPH vary across life stages.

Figure 3.2: Number of potentially preventable hospitalisations, by condition and age group, 2017–18



Source: AIHW National Hospital Morbidity Database.

Infants and children were most likely to have PPH for acute conditions

Young people aged 0–14 comprised 19% of the Australian population in 2017 (ABS 2018b), 5.9% of all hospitalisations, and 13% of *Total* PPH in 2017–18. PPH comprised 14% of all hospitalisations in this age group.

Infants and children aged 0–14 were most likely to have PPH for *Acute conditions*—these accounted for three-quarters (77%) of PPH in this age group, and included *Dental conditions*, *ENT infections*, *Convulsions and epilepsy*, *UTIs* and *Cellulitis* (Figure 3.2). Between 2012–13 and 2017–18, there was little change in PPH rates for *Acute conditions* (Figure 3.3), with the exception of *ENT infections* (an 11% increase in 0–4 years and a 13% decrease in 5–14 years, see online data tables) and *Convulsions* (an 8.8% decrease overall). Same-day admissions increased slightly from 56% of *Acute* PPH in 2012–13 to 58% in 2017–18.

Chronic conditions accounted for 16% of PPH in this age group, most commonly *Asthma*, followed by type 1 *Diabetes complications*. Rates of PPH for both of these conditions decreased between 2012–13 and 2017–18. Same-day admissions increased from 24% of *Chronic* PPH in 2012–13 to 35% in 2017–18.

In 2017–18, 9.8% of PPH for infants aged 0–4 were due to *Vaccine-preventable conditions*; most of these (76%) were for *Pneumonia and influenza (vaccine-preventable)*.

Half of the PPH for people aged 15–64 were for acute conditions; PPH for chronic conditions became more common with increasing age

People aged 15–64 comprised 66% of the Australian population in 2017, 52% of all hospitalisations, and 41% of *Total* PPH in 2017–18. PPH comprised 5.3% of all hospitalisations in this age group.

Half (51%) of the PPH for this age group were for *Acute conditions*, particularly *Cellulitis*, *Dental conditions*, and for females, *UTIs* (Figure 3.2). Between 2012–13 and 2017–18, there was an 11% increase in PPH rates for *Acute conditions* (Figure 3.3), mainly due to infections. Same-day admissions increased slightly from 40% of *Acute* PPH in 2012–13 to 42% in 2017–18.

Chronic conditions accounted for 39% of PPH in people aged 15–64. For females, the most common *Chronic condition*s PPH were for *Iron deficiency anaemia*, *Asthma*, *Diabetes complications* and *COPD*. The most common *Chronic condition*s PPH for males were *Diabetes complications*, *COPD*, *Angina* and *Iron deficiency anaemia*. Between 2012–13 and 2017–18, there was a 19% increase in PPH rates for *Chronic conditions* (Figure 3.3), primarily relating to *Iron deficiency anaemia* (see Section 2.3). Same-day admissions increased from 36% of *Chronic* PPH in 2012–13 to 46% in 2017–18.

Vaccine-preventable conditions accounted for 12% of PPH in this age group, mainly due to *Pneumonia and influenza (vaccine-preventable)*.

Most PPH for people aged 65 and over were for chronic conditions

People aged 65 and over made up 15% of the Australian population in 2017, 42% of all hospitalisations, and accounted for nearly half (46%) of *Total* PPH in 2017–18. PPH comprised 7.3% of all hospitalisations in this age group.

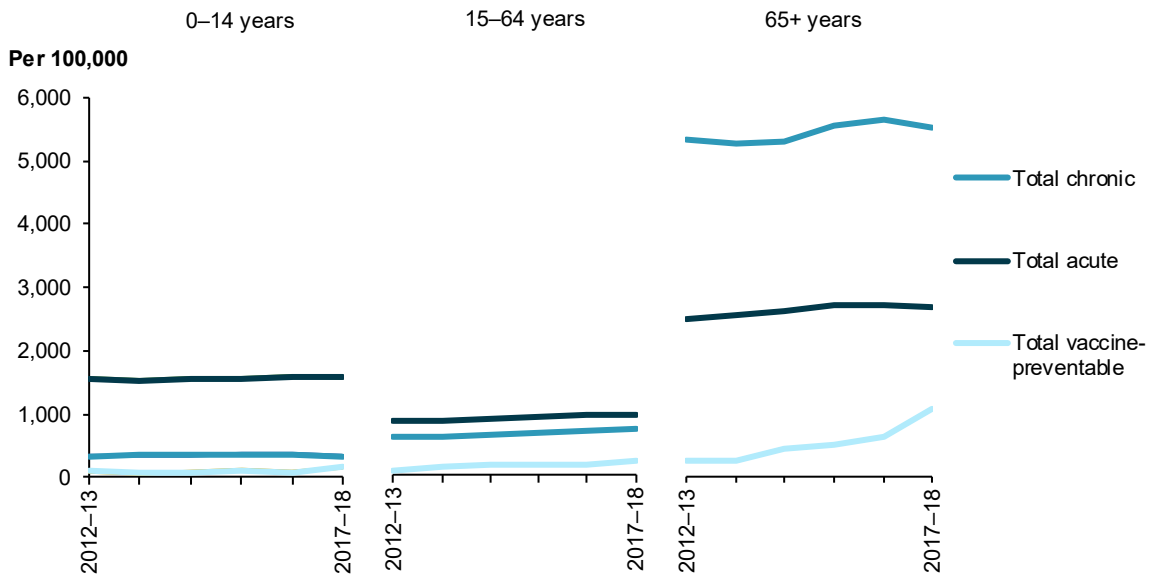
The majority (61%) of PPH for people aged 65 and over were for *Chronic conditions*, 29% were for *Acute conditions* and 12% were for *Vaccine-preventable conditions*.

The most common *Chronic conditions* PPH in males and females were *COPD*, *Congestive cardiac failure*, *Iron deficiency anaemia* and type 2 *Diabetes complications* (Figure 3.2). Since the rehabilitation coding change in July 2015, rates of PPH for *Chronic conditions* remained relatively steady (Figure 3.3). Same-day admissions increased from 20% of *Chronic* PPH in 2012–13 to 25% in 2017–18.

The most common *Acute conditions* PPH were *UTIs* and *Cellulitis* (Figure 3.2). Between 2012–13 and 2017–18, there was a 7.3% increase in PPH rates for *Acute conditions* (Figure 3.3). Same-day admissions increased slightly from 21% of *Acute* PPH in 2012–13 to 23% in 2017–18.

The biggest increase in PPH rates between 2012–13 and 2017–18 was for *Vaccine-preventable conditions* in people aged 65 and over (Figure 3.3), mainly due to *Pneumonia and influenza (vaccine-preventable)*.

Figure 3.3: Rates of potentially preventable hospitalisations, by category and age group, 2012–13 to 2017–18



Source: AIHW National Hospital Morbidity Database.

4 Indigenous Australians

Indigenous Australians experience higher rates of PPH, and hospitalisations overall, than Other Australians—3.0 times and 2.6 times as high in 2017–18, respectively (AIHW 2019d). There are likely to be many reasons for this, including historic and environmental factors, intergenerational trauma and socioeconomic disadvantage. Lack of availability and accessibility of services, including cultural safety of primary health care and hospital care, and experience with the health care system, discharge practices and transition back to community all have an impact on health outcomes for Indigenous Australians. There are also gaps in the provision of population health interventions and primary care services for early disease detection and chronic disease management, particularly for people living in remote areas (AIHW 2014; ACSQHC & AIHW 2017; Banham et al. 2017).

Indigenous Australians have higher rates of PPH in all remoteness areas (*Major cities*, *regional* and *remote*) compared with Other Australians, but remoteness has a stronger impact on the likelihood of PPH for the Indigenous population than for Other Australians (AIHW 2014; Productivity Commission 2019).

The Aboriginal and Torres Strait Islander Health Performance Framework report looks in more detail at Indigenous health status and outcomes, determinants of health and health system performance (AIHW 2019d).

The Indigenous Australian population has a young age structure compared with Other Australians: all the rates in this report are age-standardised except when referring to specific age groups.

'Other Australians' include non-Indigenous Australians and people whose identity was not stated or not known. Therefore, it is possible that the gap between Indigenous Australians and Other Australians is underestimated in this report.

4.1 Total PPH for Indigenous Australians

In 2017–18, there were nearly 45,000 PPH for Indigenous Australians. The rate of *Total* PPH for Indigenous Australians (7,989 per 100,000 people) was 3 times the rate for Other Australians (2,674 per 100,000 people) (Figure 4.1). Indigenous PPH rates were higher for all PPH categories (Figure 4.2).

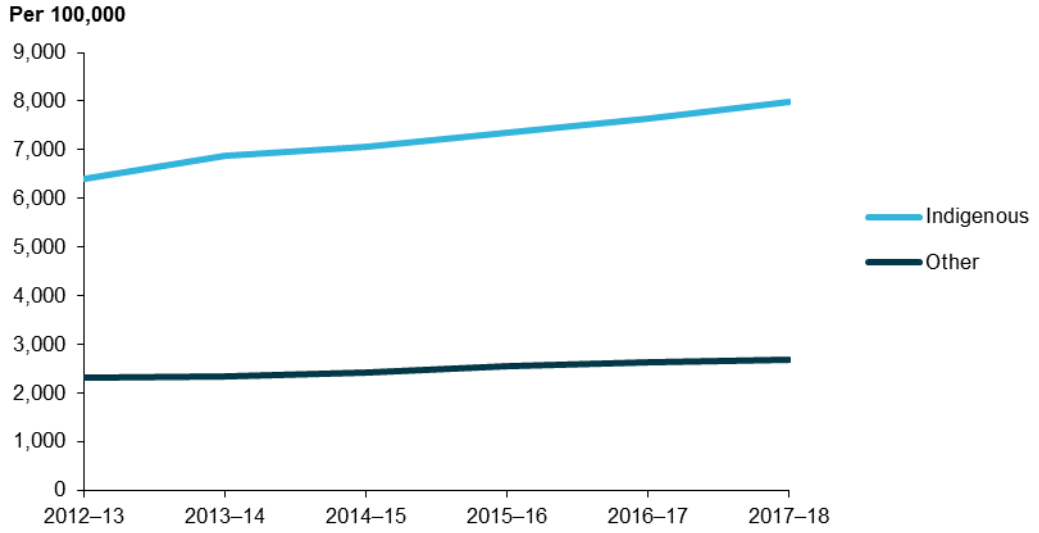
- *Vaccine-preventable conditions* accounted for 15% of *Total* PPH for Indigenous Australians (11% for Other Australians).
- *Acute conditions* accounted for 49% of *Total* PPH for Indigenous Australians (44% for Other Australians).
- *Chronic conditions* accounted for 39% of *Total* PPH for Indigenous Australians (46% for Other Australians)

Between 2012–13 and 2017–18, the rate of *Total* PPH for Indigenous Australians increased by 25%, compared with a 15% increase for Other Australians (Figure 4.1). Some of the increase between 2012–13 and 2013–14 was due to the change in coding standards for hepatitis B (see Section 2.1, Figure 2.13).

In 2017–18, Indigenous Australians experienced higher rates of *Total* PPH than Other Australians at all ages, and the difference increased with age up to 55–64 (Figure 4.3).

Between 2012–13 and 2017–18, rates of *Total* PPH for Indigenous Australians were higher in females than in males (Figure 4.4). PPH rates increased by 32% for Indigenous females and 16% for Indigenous males.

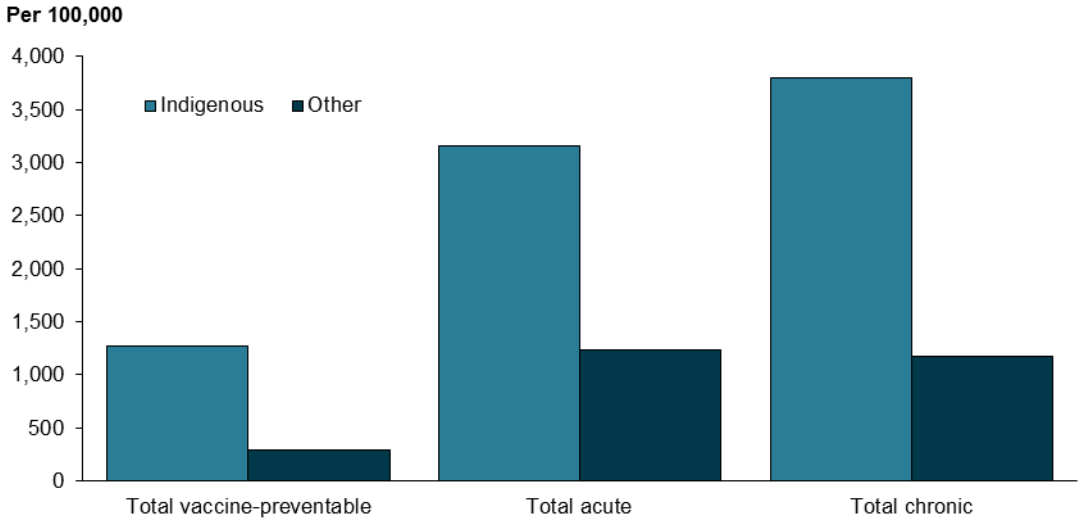
Figure 4.1: Age-standardised rates of Total potentially preventable hospitalisations, by Indigenous status, 2012–13 to 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

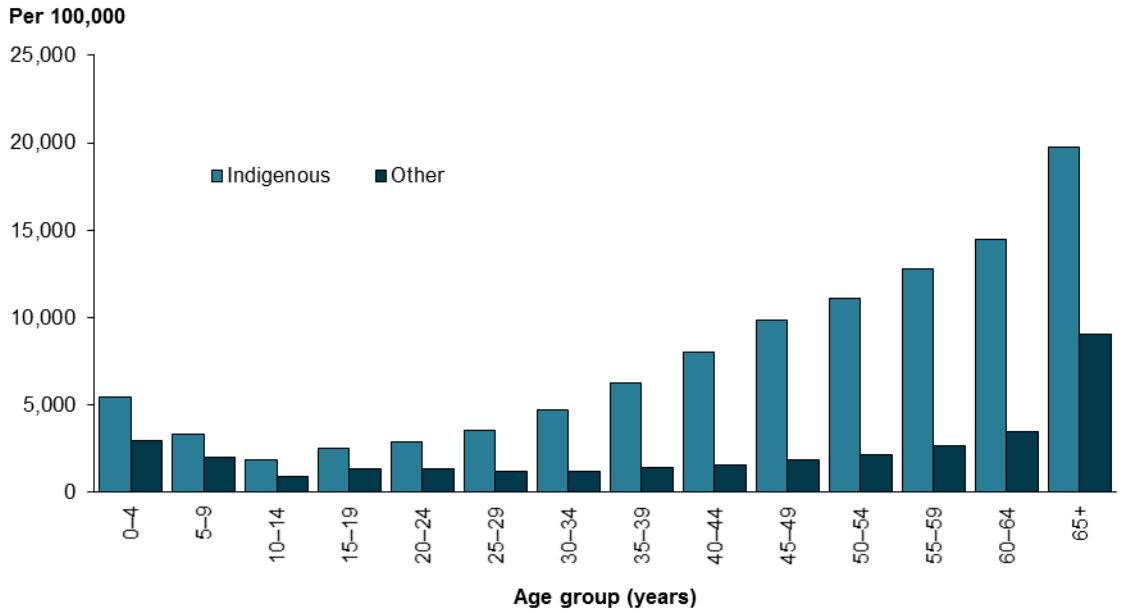
Figure 4.2: Age-standardised rates of Total potentially preventable hospitalisations, by category and Indigenous status, 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

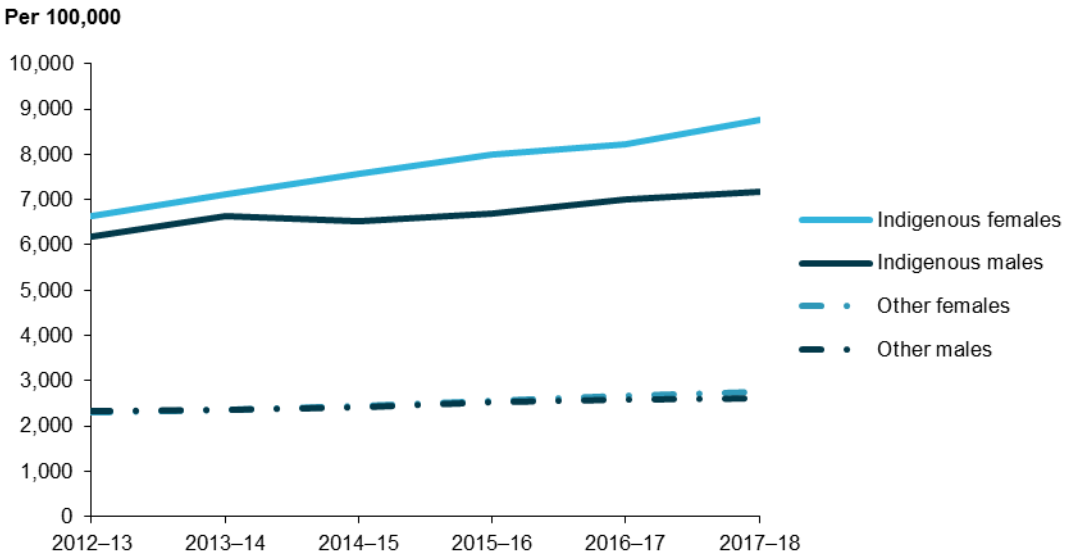
Figure 4.3: Rates of Total potentially preventable hospitalisations, by Indigenous status and age group, 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

Figure 4.4: Age-standardised rates of Total potentially preventable hospitalisations, by Indigenous status and sex, 2012–13 to 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

4.2 Vaccine-preventable conditions among Indigenous Australians

Pneumonia and influenza (vaccine-preventable)

In 2017–18, PPH rates for *Pneumonia and influenza (vaccine-preventable)* for Indigenous Australians (510 per 100,000 people) were 2.6 times those for Other Australians (200 per 100,000 people) (Figure 4.5). This gap was smaller than in previous years (average 3.4 times as high), partly due to higher numbers of Other Australians with influenza hospitalisations in 2017.

In 2017–18, Indigenous Australians had higher rates of PPH for *Pneumonia and influenza (vaccine-preventable)* at all ages (Figure 4.6).

Between 2012–13 and 2017–18, rates of PPH for *Pneumonia and influenza (vaccine-preventable)* were higher in Indigenous females than in Indigenous males, while rates were similar for Other Australian males and females (Figure 4.7).

In 2017–18, the ALOS of PPH for *Pneumonia and influenza (vaccine-preventable)* was shorter for Indigenous Australians (6.3 days) than for Other Australians (7.5 days) (Figure 4.8).

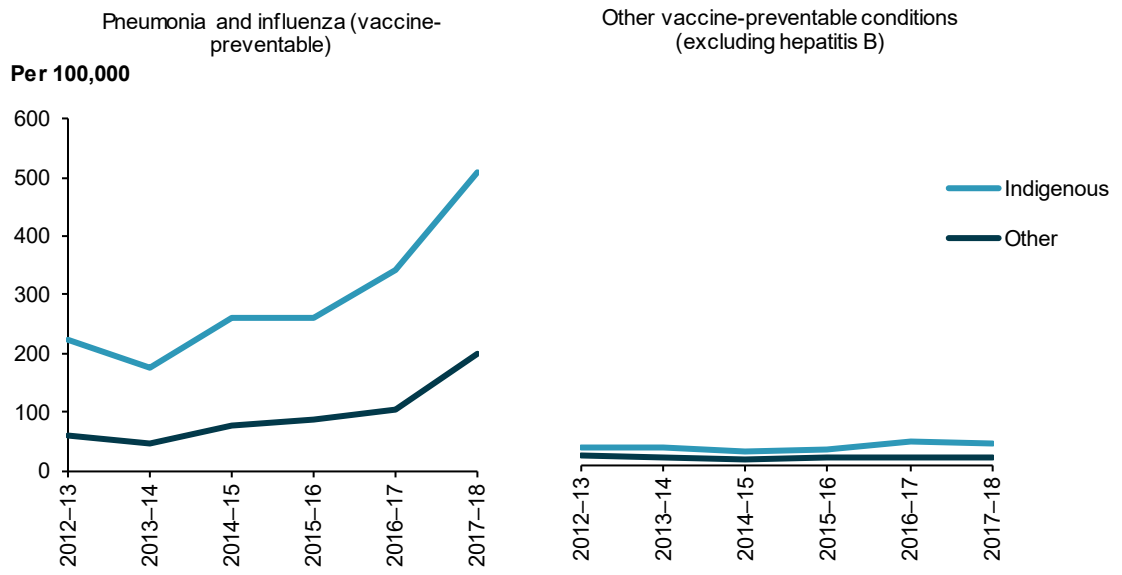
Other vaccine-preventable conditions (excluding hepatitis B)

In 2017–18, the PPH rate for *Other vaccine-preventable conditions (excluding hepatitis B)* for Indigenous Australians (36 per 100,000 people) was 2.8 times that for Other Australians (13 per 100,000 people). This represented a 24% increase for Indigenous Australians since 2012–13, while the rate for Other Australians remained steady (Figure 4.5).

Rates of PPH for *Other vaccine-preventable conditions (excluding hepatitis B)* were similar for Indigenous males and females except in 2017–18, when rates were higher in males (Figure 4.7). For children aged 0–4, who had the highest rates of PPH, the ALOS in 2017–18 for *Other vaccine-preventable conditions (excluding hepatitis B)* was higher for Indigenous Australians (7.9 days) than for Other Australians (5.9 days) (Figure 4.8).

More information about PPH for *Vaccine-preventable conditions* for Indigenous Australians, including trends by sex and age group, is available in the online data tables web report.

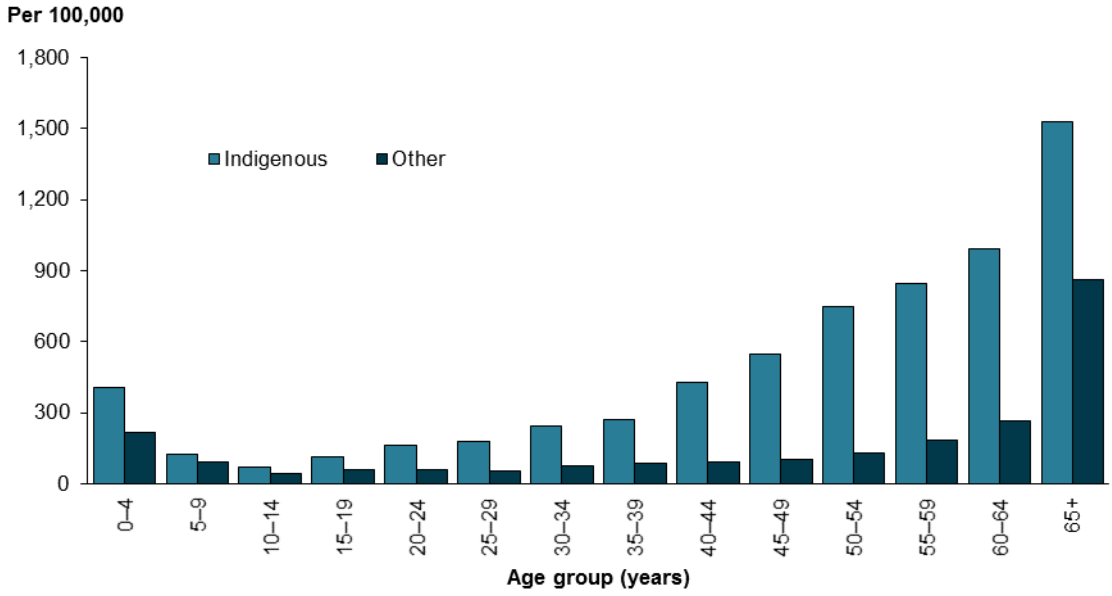
Figure 4.5: Age-standardised rates of potentially preventable hospitalisations for Vaccine-preventable conditions, by Indigenous status and condition, 2012–13 to 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

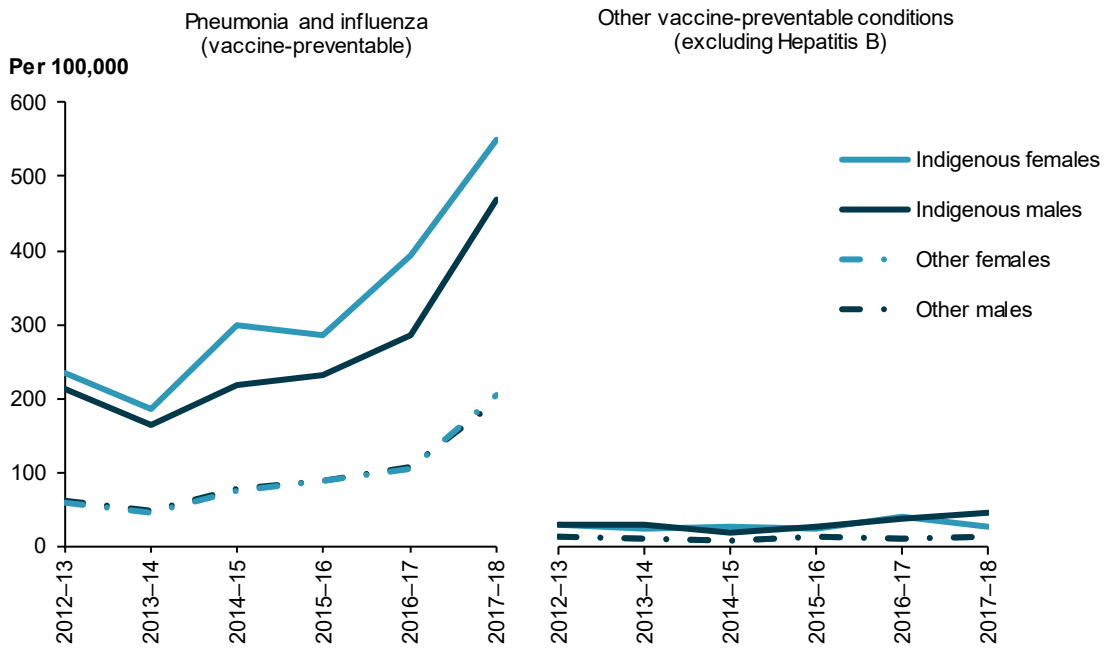
Figure 4.6: Rates of potentially preventable hospitalisations for Pneumonia and influenza (vaccine-preventable), by Indigenous status and age group, 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

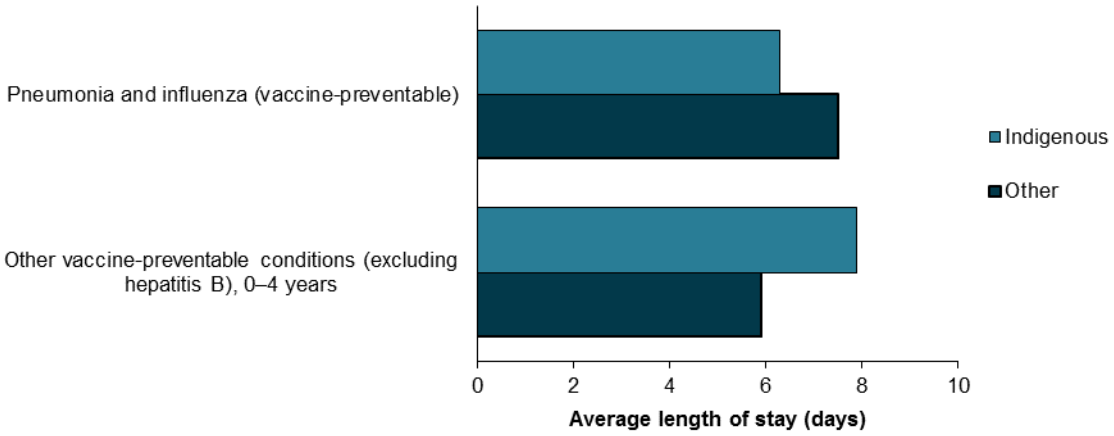
Figure 4.7: Age-standardised rates of potentially preventable hospitalisations for Vaccine-preventable conditions, by Indigenous status and sex, 2012–13 to 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

Figure 4.8: Average length of stay for potentially preventable hospitalisations for Vaccine-preventable conditions, by Indigenous status and condition, 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

4.3 Acute conditions among Indigenous Australians

In 2017–18, there were nearly 22,000 PPH for *Acute conditions* for Indigenous Australians, at a rate of 3,154 per 100,000 people (Figure 4.2), which was 2.6 times as high as for Other Australians. This represented a 15% increase for Indigenous Australians since 2012–13, compared with a 7.1% increase for Other Australians.

In 2017–18, the most common PPH for *Acute conditions* experienced by Indigenous Australians were for *Cellulitis*, *UTIs*, *ENT infections* and *Dental conditions* (Figure 4.9).

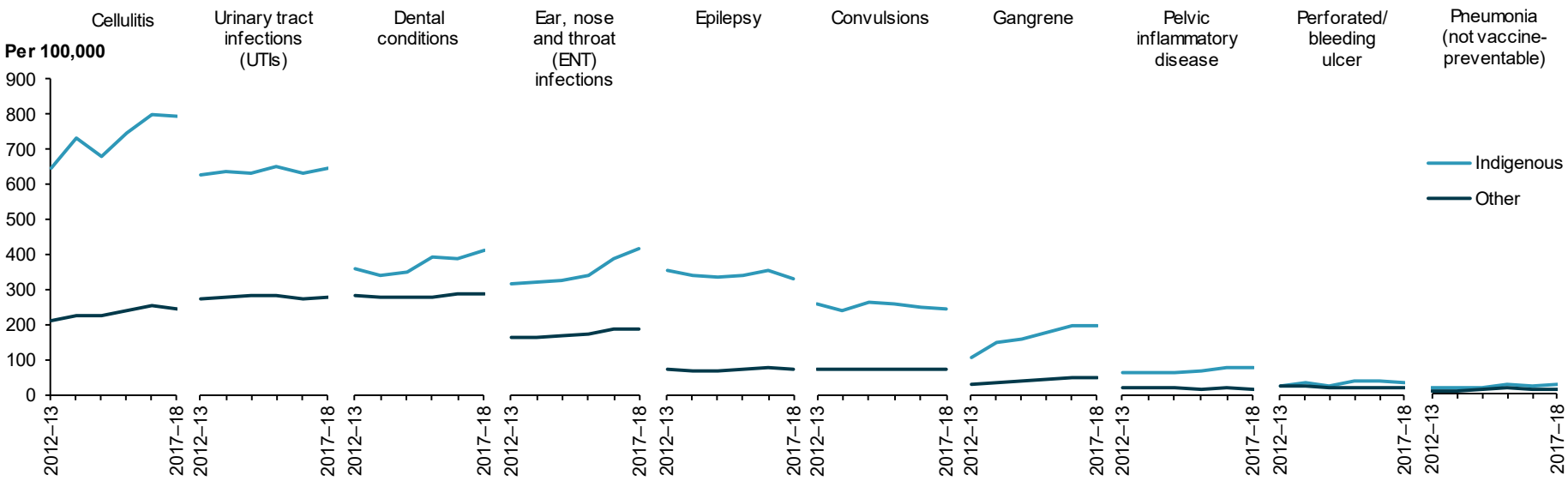
Indigenous Australians experienced higher rates of PPH for *Acute conditions* than Other Australians at all ages; the difference was greatest between 40–44 and 50–54 years (Figure 4.10).

Between 2012–13 and 2017–18, rates of PPH for *Acute conditions* were higher in females than in males, for Indigenous Australians and Other Australians (Figure 4.11). PPH rates increased by 20% for Indigenous females and 8.0% for Indigenous males, compared with a 7.7% increase for Other Australian females and a 6.4% increase for Other Australian males.

The ALOS for *Acute conditions* was shorter for Indigenous Australians than for Other Australians for all conditions except *Dental conditions*, *ENT infections* and *PID* (Figure 4.12).

More information about PPH for *Acute conditions* for Indigenous Australians, including trends by sex and age group, is available in the online data tables web report.

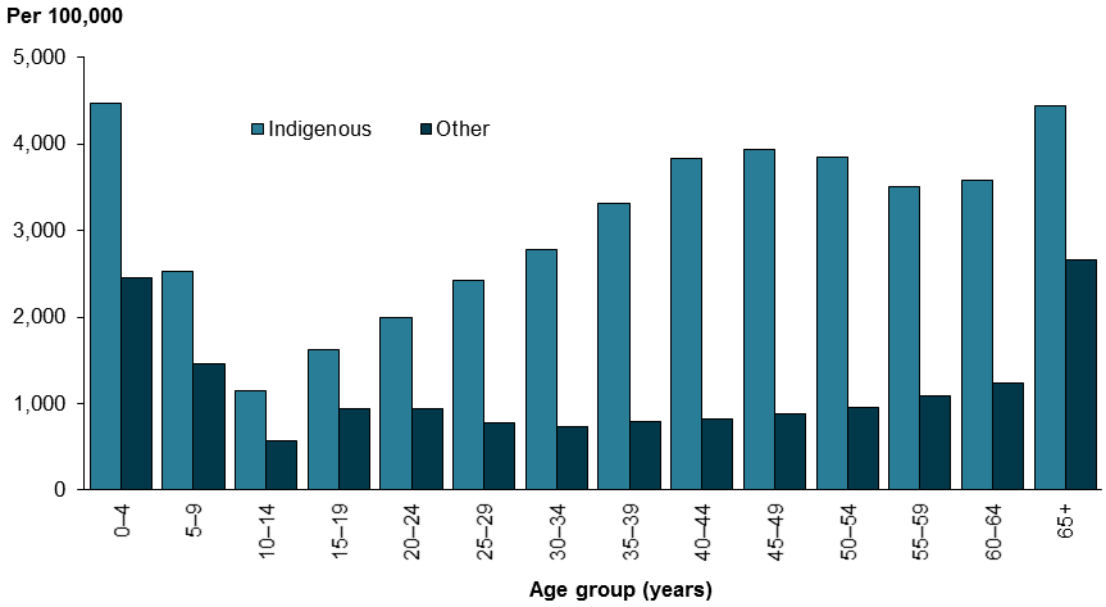
Figure 4.9: Age-standardised rates of potentially preventable hospitalisations for Acute conditions, by Indigenous status and condition, 2012–13 to 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

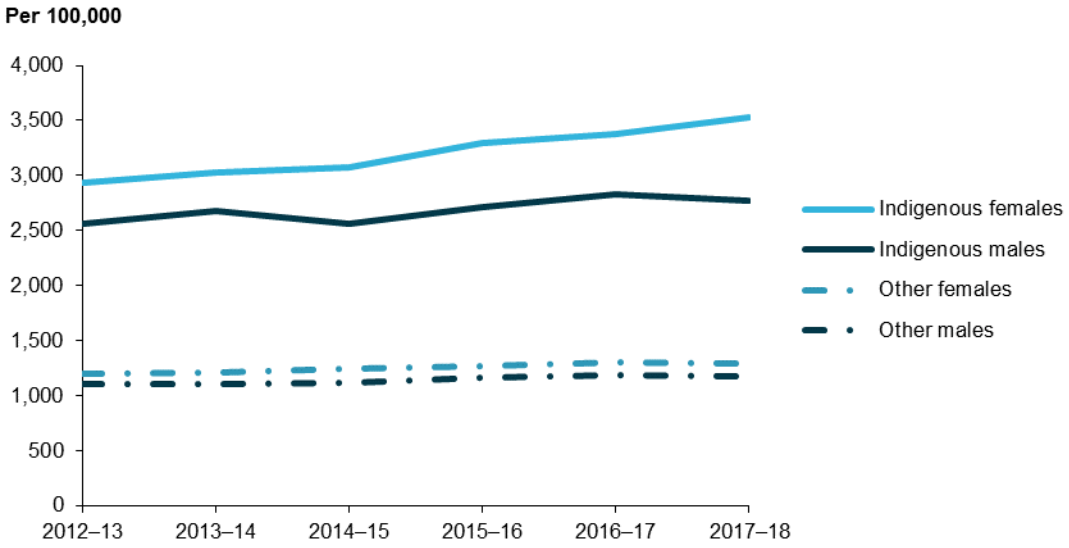
Figure 4.10: Rates of potentially preventable hospitalisations for Acute conditions, by Indigenous status and age group, 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

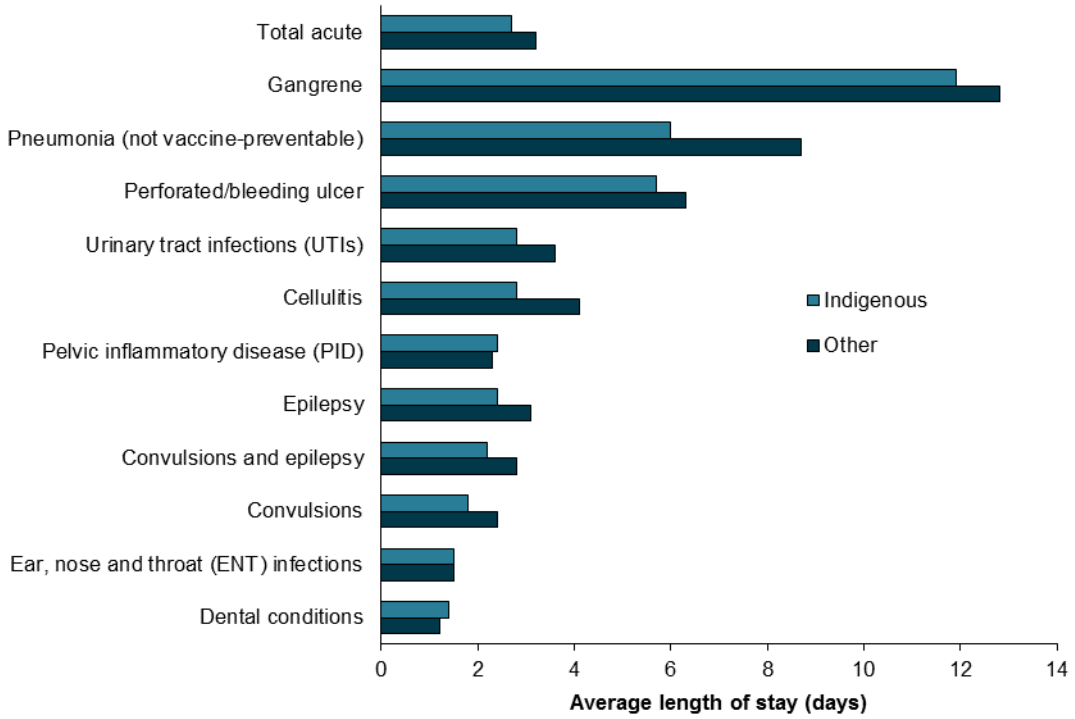
Figure 4.11: Age-standardised rates of potentially preventable hospitalisations for Acute conditions, by Indigenous status and sex, 2012–13 to 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

Figure 4.12: Average length of stay of potentially preventable hospitalisations for Acute conditions, by Indigenous status and condition, 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

4.4 Chronic conditions among Indigenous Australians

In 2017–18, there were about 17,500 PPH for *Chronic conditions* for Indigenous Australians, at a rate of 3,796 per 100,000 people (Figure 4.2), which was 3.2 times as high as for Other Australians. This represented a 13% increase for Indigenous Australians since 2012–13, compared with an 8% increase for Other Australians, mostly due to increasing rates of PPH for *COPD*.

In 2017–18, the most common PPH for *Chronic conditions* experienced by Indigenous Australians were for *COPD*, type 2 *Diabetes complications* and *Congestive heart failure* (Figure 4.13)

Indigenous Australians experienced higher rates of PPH than Other Australians for *Chronic conditions* at all ages; the difference increased between 30–34 and 60–64 years (Figure 4.14), highlighting the earlier onset of chronic disease in Indigenous Australians.

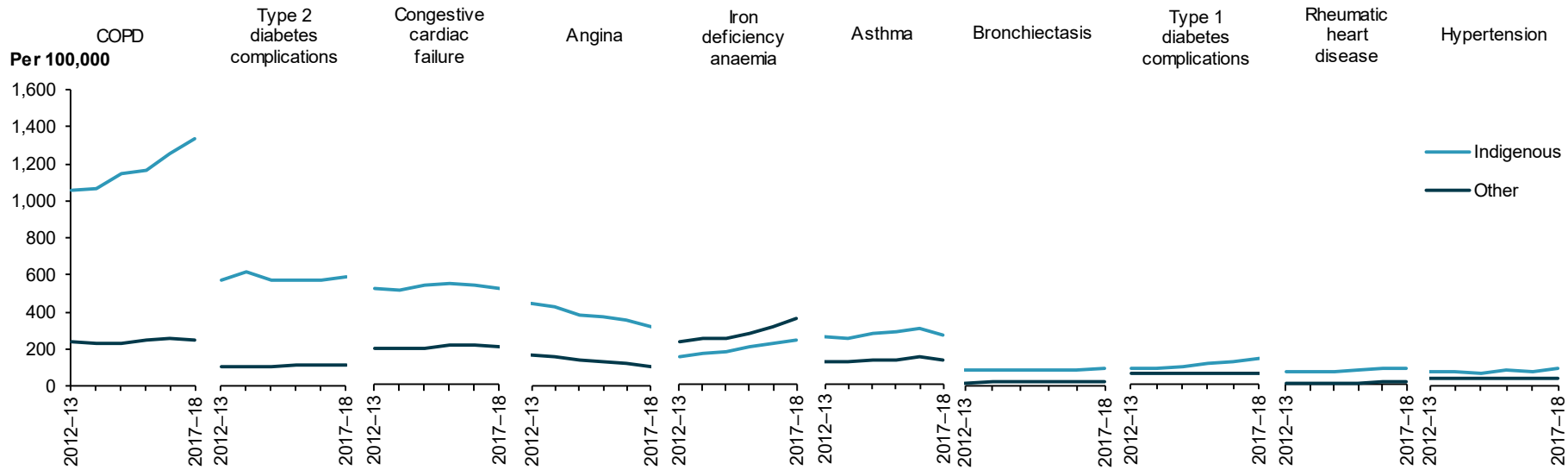
Between 2012–13 and 2017–18, rates of PPH for *Chronic conditions* increased by 21% for Indigenous females and 2.4% for Indigenous males, so that in 2017–18, the rate in females was 1.2 times the rate in males (Figure 4.15). In 2017–18, the overall rate of PPH for *Chronic conditions* in Other Australian females was similar to that in males. A number of conditions contributed to the increase in PPH for Indigenous females, including *COPD*, *Congestive cardiac failure* and *Iron deficiency anaemia*, with smaller increases for type 1 *Diabetes complications* and *RHD* (see online data tables). Rates of PPH for *Bronchiectasis*, which

were higher in females overall, were mostly higher in Indigenous males than in Indigenous females (see online data tables).

The ALOS for *Chronic conditions* was shorter for Indigenous Australians than for Other Australians for all conditions except *Diabetes complications* and *IDA* (Figure 4.16).

More information about PPH for *Chronic conditions* for Indigenous Australians, including trends by sex and age group, is available in the online data tables web report

Figure 4.13: Age-standardised rates of potentially preventable hospitalisations for Chronic conditions, by Indigenous status and condition, 2012–13 to 2017–18

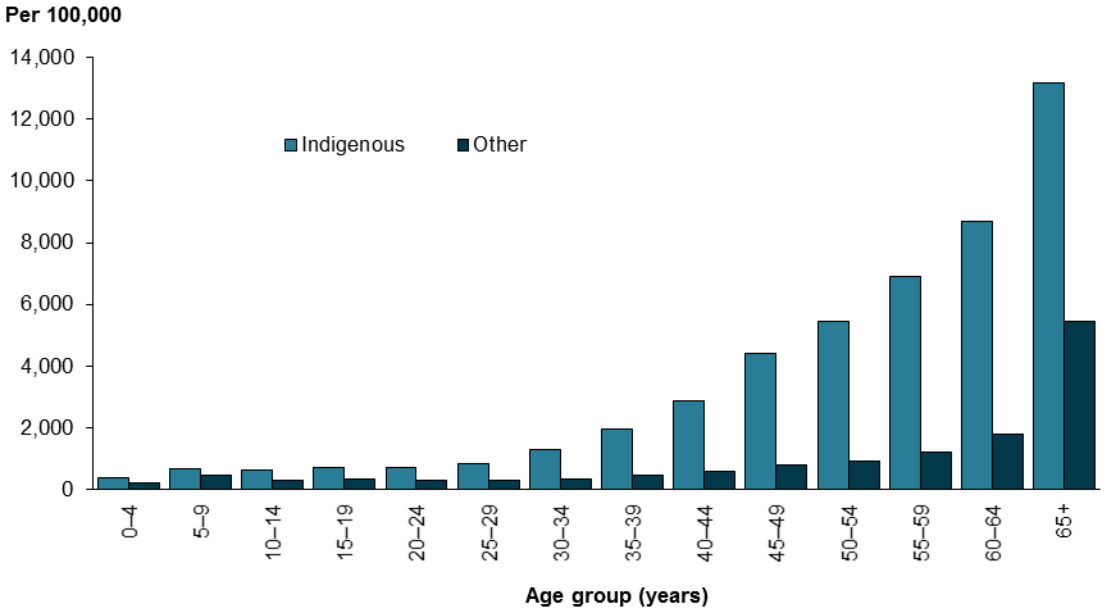


Notes

1. 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.
2. Data for *Nutritional deficiencies* for Indigenous Australians are not shown due to small numbers.

Source: AIHW National Hospital Morbidity Database.

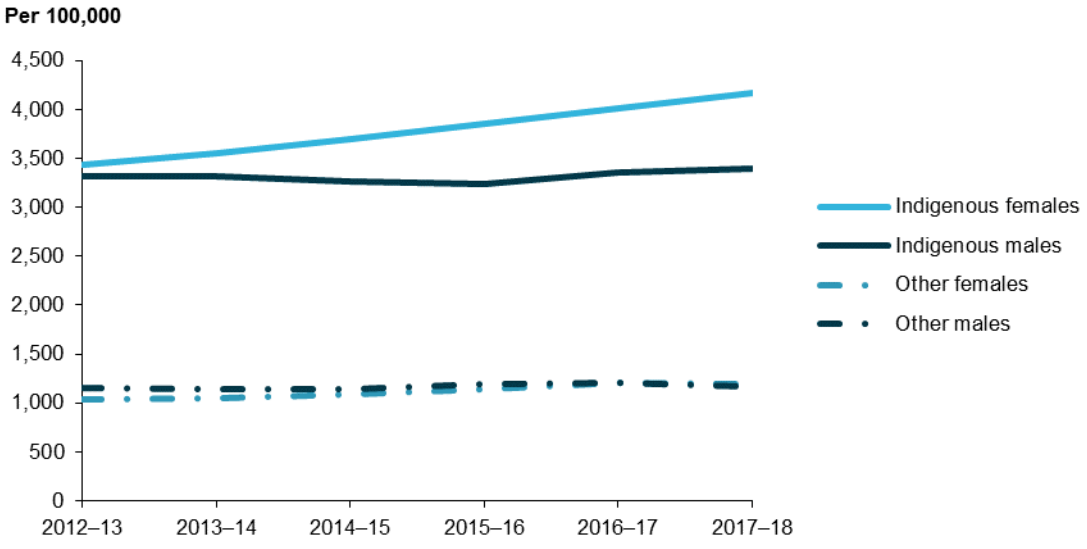
Figure 4.14: Rates of potentially preventable hospitalisations for Chronic conditions, by Indigenous status and age group, 2017–18



Note: **'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.**

Source: AIHW National Hospital Morbidity Database.

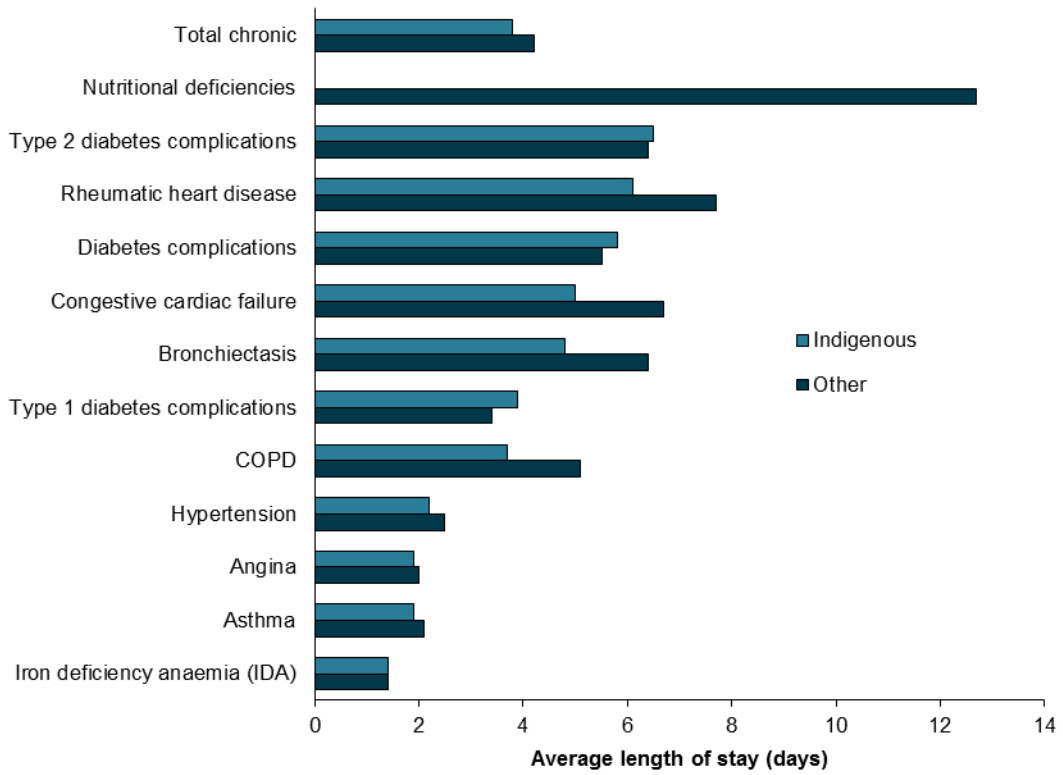
Figure 4.15: Age-standardised rates of potentially preventable hospitalisations for Chronic conditions, by Indigenous status and sex, 2012–13 to 2017–18



Note: 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

Source: AIHW National Hospital Morbidity Database.

Figure 4.16: Average length of stay of potentially preventable hospitalisations for Chronic conditions, by Indigenous status and condition, 2017–18



Notes

1. 'Other Australians' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.
2. Data for *Nutritional deficiencies* for Indigenous Australians are not shown due to small numbers.

Source: AIHW National Hospital Morbidity Database.

4.5 The health gap between Indigenous and non-Indigenous Australians

This report describes disparities in PPH rates between Indigenous Australians and Other Australians, for conditions with large numbers of admissions such as *COPD, Cellulitis, ENT infections* and *Diabetes complications*, and conditions that are less common among Other Australians such as *Rheumatic heart disease* and *Pelvic inflammatory disease*. All rates in the discussion below are age-standardised rates.

- COPD is one of the leading causes of disease burden for all Australians (AIHW 2016, 2019g), and accounted for 1 in 10 PPH admissions in 2017–18. Rates of PPH for *COPD* for Indigenous Australians were 5.4 times the rate for Other Australians in 2017–18, and increased faster among Indigenous Australians than among Other Australians between 2012–13 and 2017–18 (Figure 4.13).
- Diabetes is another of the leading causes of disease burden for Indigenous Australians (AIHW 2016; Department of Health 2015), as reflected in rates of PPH for type 2 *Diabetes complications* that were 5.2 times the rate for Other Australians in 2017–18 (Figure 4.13). Rates of PPH for *Gangrene* and *Cellulitis*, for which diabetes is an

important risk factor, increased faster among Indigenous Australians than among Other Australians between 2012–13 and 2017–18 (Figure 4.9).

- Historically, incidence rates of type 1 diabetes have been lower for Indigenous Australians than for non-Indigenous Australians, although in 2017, the rates were similar (AIHW 2019l). However, between 2012–13 and 2017–18, rates of PPH for type 1 *Diabetes complications* increased by 64% for Indigenous Australians, compared with no change for Other Australians (Figure 4.13). Awareness and management of type 1 diabetes among Indigenous Australians may be an emerging priority.
- Rheumatic heart disease (RHD) is the leading cause of cardiovascular health inequality between Indigenous and non-Indigenous Australians (AIHW 2016; Wyber et al. 2017). In 2017–18, rates of PPH for *RHD* were 6.7 times as high for Indigenous Australians as for Other Australians (Figure 4.13).
- Many of the risk factors for RHD, such as household overcrowding and poverty, are shared with ENT infections. Indigenous children in both remote and urban settings tend to suffer middle ear infections earlier, more frequently and severely, and with more serious complications than other Australian children (Jervis-Bardy et al. 2014). PPH rates for *ENT infections* were 2.2 times as high for Indigenous Australians as for Other Australians in 2017–18 (Figure 4.9).
- Pelvic inflammatory disease (PID) is caused by upper reproductive tract infection, mostly due to sexually transmitted infections such as chlamydia and gonorrhoea. In 2017–18, PPH rates for *PID* were 4.2 times as high for Indigenous Australians as for Other Australians (Figure 4.9). In 2017, notification rates for chlamydia and gonorrhoea were higher in Indigenous women than in non-Indigenous women, and notification rates for Indigenous people increased with increasing remoteness (Kirby Institute 2018).

Analysis of linked hospital admission data found that Indigenous Australians had a slightly longer length of stay for acute and chronic PPH than non-Indigenous Australians (Harrold et al. 2014), and increasing length of stay with increasing disadvantage and remoteness for chronic PPH for Aboriginal people and to a lesser extent non-Aboriginal people (Banham et al. 2017). This may be due to later diagnosis and more advanced disease, higher levels of comorbidity in Indigenous patients for which longer hospitalisations are appropriate, or reduced access to assistance with care at home or in the community.

In contrast, the data in this report suggest that in 2017–18 Indigenous Australians had a shorter ALOS than Other Australians for many PPH conditions (with *Diabetes complications* being a notable exception) (figures 4.8, 4.12, 4.16). The ALOS data in this report were not adjusted for age, so this finding may reflect the higher numbers of older non-Indigenous Australians with PPH, for whom ALOS is longer. However, it may also represent issues within an Indigenous patient's journey, including cultural obligations or a lack of cultural safety in the hospital environment, which can lead to early discharge.

It should be reiterated that the current indicator is a representative, not comprehensive, set of PPH, and does not include all conditions for which there is a large gap in disease burden between Indigenous and non-Indigenous Australians, such as chronic kidney disease or suicide (AIHW 2016). Additional measures are reported under the Aboriginal and Torres Strait Islander Health Performance Framework (AIHW 2019d).

5 Socioeconomic disadvantage and remoteness

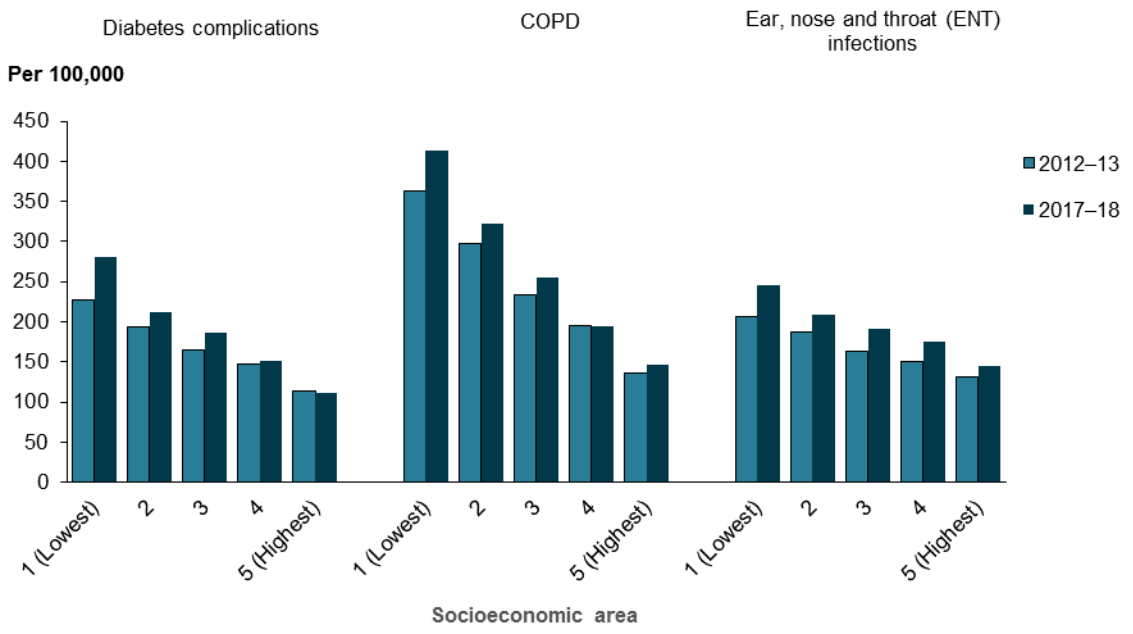
PPH rates are frequently shown to increase with increasing remoteness and socioeconomic disadvantage, and both factors disproportionately affect Indigenous Australians (Duckett & Griffiths 2016; ACSQHC & AIHW 2017).

In 2017–18, a socioeconomic gradient was observed for all PPH conditions except *Dental conditions*, and the highest rates of PPH were recorded for people living in the lowest socioeconomic areas. The gap in PPH rates (absolute difference) between people living in the lowest and highest socioeconomic areas increased for a number of PPH conditions between 2012–13 and 2017–18, particularly for *Diabetes complications*, *COPD* and *Congestive cardiac failure*, and *Acute conditions* such as *UTIs*, *ENT infections*, *Cellulitis* and *Gangrene* (Figure 5.1).

Similarly, between 2012–13 and 2017–18, PPH rates increased with increasing remoteness for most conditions, with the exception of *Iron deficiency anaemia* and type 1 *Diabetes complications*. The gap between people living in *Very remote* areas and *Major cities* widened for some conditions, including *COPD*, *Gangrene* and *Pelvic inflammatory disease* (Figure 5.2).

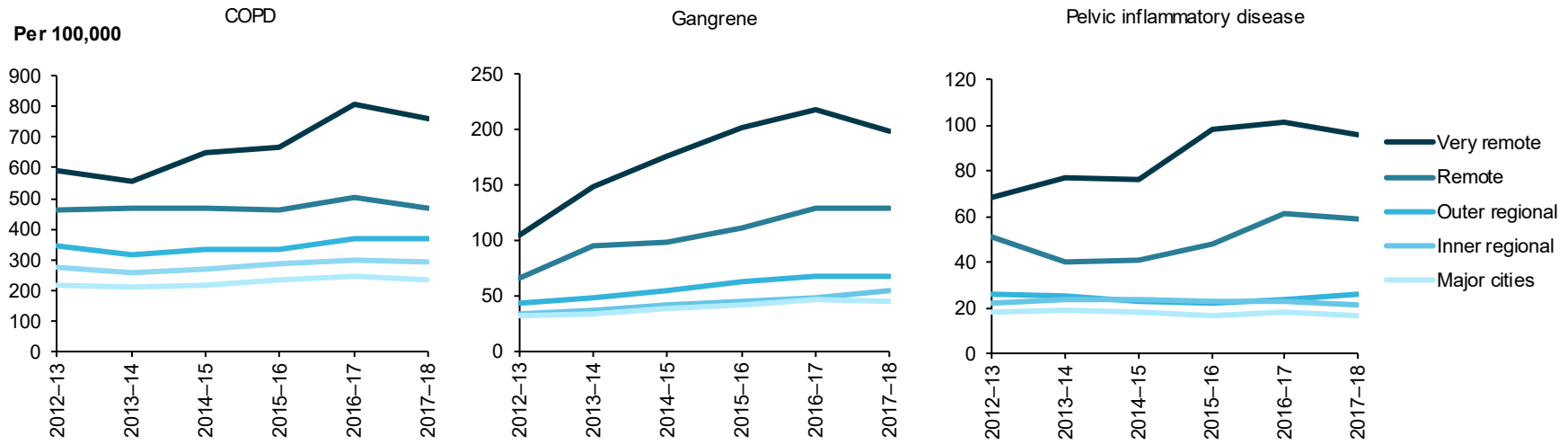
More information about socioeconomic disadvantage, remoteness and variation in rates of PPH for PHNs and SA3 regions is available in the web report for each PPH condition.

Figure 5.1: Age-standardised rates of potentially preventable hospitalisations for selected conditions, by socioeconomic area, 2012–13 and 2017–18



Source: AIHW National Hospital Morbidity Database.

Figure 5.2: Age-standardised rates of potentially preventable hospitalisations for selected conditions, by area of remoteness, 2012–13 and 2017–18



Source: AIHW National Hospital Morbidity Database.

6 Discussion and future directions

Primary and community care services are often the first point of contact for people needing health care, and are important for maintaining people's health, but there is currently a lack of readily available data to measure their effectiveness. The PPH indicator is used to provide some insight into the interface between community and hospital care. However, emerging evidence suggests that PPH as a concept may better reflect health inequality within the population, rather than just the performance of primary and community care (Duckett & Griffiths 2016; Falster et al. 2015; Mazumdar et al. 2019; Sanmartin & Khan 2011). In the face of rising hospital admissions and expenditure, knowing who is at greatest risk of a PPH may assist with the allocation of resources across the health and social services sectors.

This report has explored trends for all PPH conditions in the current indicator by state and territory, age and sex, Indigenous status, remoteness area, and socioeconomic disadvantage between 2012–13 and 2017–18.

Main findings

The report confirms findings from previous studies, showing that between 2012–13 and 2017–18:

- PPH rates were highest in older adults, with a smaller peak in young children.
- PPH rates were substantially higher for Indigenous Australians than for Other Australians.
- PPH rates increased with increasing socioeconomic disadvantage and remoteness.

This report has further observed that between 2012–13 and 2017–18:

- Hospitalisations for *Pneumonia and influenza (vaccine-preventable)* had a substantial impact on PPH rates.
- The trend of increasing rates of PPH for the most common *Acute condition* infections was not observed in the latest year, 2017–18.
- *Heart failure, COPD* and type 2 *diabetes* accounted for half of the PPH for *Chronic conditions* in 2017–18.
- Males and females had different patterns of PPH, and trends for Indigenous Australian males and females differed from those for Other Australians for some PPH conditions.
- The 'health equality gap' may have widened for some PPH conditions.
- Some PPH conditions showed predictable seasonal trends that can be incorporated into management strategies.
- Changes in hospital coding standards, admission policies and clinical practices can artificially affect PPH rates. Conditions known to be affected include hepatitis B, *Iron deficiency anaemia*, *Angina* and some conditions requiring rehabilitation care.

Issues arising from these findings are discussed in the following section.

Are hospitalisations preventable in older people?

Nearly half of PPH were experienced by older Australians: in 2017–18, 46% of PPH were for people aged 65 and over. There is continuing debate about the 'preventability' of admissions

in the older population (Longman et al. 2018), aged care residents (Hsieh et al. 2019; Unroe et al. 2018; Xu et al. 2019) and at the end of life (Robinson et al. 2015; Tran et al. 2016).

The most common PPH conditions experienced by older people include diabetes, chronic respiratory and cardiovascular conditions, and associated acute conditions such as gangrene and cellulitis. Older Australians may have multiple chronic conditions, which are themselves risk factors for other PPH conditions. For example, diabetes is a risk factor for UTIs, gangrene, cellulitis and serious complications from influenza, and is often a comorbidity in people with heart disease and respiratory disease. For this reason, some countries exclude people aged 75 and over from their PPH indicators, as hospitalisation for these complex health problems may reflect factors other than reduced access to primary care (AIHW 2018a).

However, while this may be the case, the health burden experienced by older people is potentially responsive to improved care in the community setting (Longman et al. 2018), and may be particularly important for people living in residential aged care. Indeed, there is some evidence to suggest that PPH rates for some *Acute* and *Chronic* conditions in older people have stabilised or are decreasing (figures 2.26, 3.3 and web report).

Pneumonia and influenza (vaccine-preventable) had a substantial impact on PPH rates, most notably in the elderly. Influenza can not only cause a severe respiratory disease, it can exacerbate other chronic conditions. A number of PHNs have implemented a 'Winter Strategy' to specifically target older people at high risk of being unstable, very unwell or admitted to hospital during the influenza season (Ewald et al. 2018).

Are hospitalisations preventable in children?

The relationship between socioeconomic factors, access to primary care, and PPH in children is complex. The high proportion of PPH for *Acute conditions* (77% of PPH in children aged 0–14) highlights the importance of access to early intervention in primary care settings.

However, the influence of broader social factors means that some PPH may not be preventable through primary care alone (Anderson et al. 2012; McNamara et al. 2018). For example, a tonsillectomy or insertion of grommets may be appropriate interventions for *ENT infections* following relevant primary care (AIHW 2018a). PPH rates for *Dental conditions* may be driven by a number of factors relating to the child, parent and dental provider (Rogers et al. 2018a). Conditions such as *Urinary tract infections* can have different causes in children that may not be preventable (Anderson et al. 2012). In addition, symptoms in children can be non-specific, and a PPH diagnosis on discharge from hospital may have been arrived at only after exclusion of more serious causes of illness (Anderson et al. 2012).

Disparities in PPH rates can help guide efforts to reduce modifiable health gaps. In Australia, higher rates of PPH in children are associated with increased socioeconomic disadvantage and remoteness (Ansari et al. 2012; Butler et al. 2013; Rogers et al. 2018b), and the impact is greater in Indigenous children (Falster et al. 2016; McAuley 2016). Measures of child social exclusion—including housing, education, socioeconomic factors and connectedness—have been found to have a stronger correlation with PPH rates than the availability of GPs and dentists, with children at the highest risk of social exclusion having the highest rates of PPH (Mohanty et al. 2016).

PPH among Indigenous Australians

'Indigenous Australians' are not a homogenous group, but represent many diverse cultures and communities, and the factors contributing to PPH will vary between groups across the country.

This report has highlighted the large disparities in PPH experienced by Indigenous Australians compared with Other Australians. It has also examined trends and found that the gap in PPH rates for many conditions has widened, particularly for *COPD*, *Cellulitis*, *ENT infections* and *Gangrene*.

The increase in PPH for *COPD* and *Congestive cardiac failure* in Indigenous women compared with Indigenous men highlights some of the questions that can arise from PPH data: are higher PPH rates indicative of increasing disease prevalence, poor primary care access or do they reflect increased access to appropriate treatment? Why do we see different patterns of PPH for Indigenous males and females compared with Other Australian males and females?

Regions in Australia with large Indigenous populations tend to have high rates of PPH and potentially avoidable deaths, but also high uptake rates of Indigenous health checks (AIHW 2019m). The increase in the number of Indigenous Australians who have had a follow-up service after their health check (AIHW 2019n) may result in increasing numbers of PPH that reflect appropriate care for greater health needs.

Socioeconomic disadvantage and remoteness

Sociodemographic factors, health and behavioural characteristics have been found to account for a greater amount of geographic variation in PPH than GP supply, particularly for common *Chronic conditions* such as *Diabetes complications*, *COPD* and *Congestive cardiac failure* (Falster et al. 2015). This report shows that the gap in PPH rates between people living in the highest and lowest socioeconomic areas, and people living in *Very remote* areas and *Major cities*, widened between 2012–13 and 2017–18 for some conditions.

Factors contributing to these disparities are likely to include higher rates of risk factors, greater disease severity, multiple comorbidities and poor health literacy, as well as issues concerning access to services—not only clinician supply, but also costs, transport, cultural factors and knowing when to seek health care (ACSQHC & AIHW 2017; AIHW 2019o; Katterl et al. 2012).

Many PPH conditions require multidisciplinary care across primary and acute sectors, and previous reports have highlighted the importance of an integrated primary care system, with a strong focus on coordinating care (ACSQHC & AIHW 2017; Katterl et al. 2012). This is particularly challenging in rural areas, where communication and coordination, availability of resources and location are potential barriers to continuity of care (AIHW 2018f; Street et al. 2019).

Other factors contributing to higher PPH rates for patients from regional and remote areas may include differences in the roles of smaller rural and remote hospitals and a higher likelihood of transfer to larger facilities; long distances to travel; and differences in admission thresholds (ACSQHC & AIHW 2017; Falster et al. 2019).

Future analysis

The data presented in this report raise a number of questions about how different populations interact with community-based health care services and hospital care, and how this affects their health outcomes. Future analysis will go beyond indicator reporting and look more broadly at the PPH concept. This could include using data linkage to investigate the relationships between people with PPH and disease prevalence; the use of primary and community care; use of medicines; and health outcomes. Data linkage can allow analysis of patient journeys, from primary care to hospital, including readmissions, transfers between

hospitals, and changes in care type. These variables could be analysed for different populations, including those vulnerable populations described in this report, and other groups such as people from culturally and linguistically diverse backgrounds.

Improving the utility of the PPH indicator

The ability of a health performance indicator to accurately reflect current health practices and policies needs to be balanced with the ability to compare data over time. This report examines certain factors outside the primary health care system that have had an impact on PPH rates—including changes in coding standards for hepatitis B and rehabilitation care, administrative differences and changes in clinical and diagnostic practices for *Iron deficiency anaemia* and *Angina*—that complicate the interpretation of PPH rates. Future revisions could consider this analysis in order to improve the utility of the PPH indicator.

Appendix

National Hospital Morbidity Database

Data for this report were sourced from the AIHW National Hospital Morbidity Database (NHMD) for the years 2012–13 to 2017–18. The NHMD is a compilation of episode-level records from admitted patient morbidity data collections in Australian hospitals. The database includes all episodes of care for admitted patients, including admissions for day-only care, in nearly all public and private hospitals. It does not include episodes of non-admitted patient care provided in outpatient clinics or emergency departments.

The counting units for this publication were episodes of stay (or separations), measured by financial year of separation. This may be a complete hospital stay (to discharge, transfer, or death), or a part of the stay if there was a change of care type (for example from acute care to rehabilitation). As a record is included for each separation, rather than for each patient, patients hospitalised more than once or transferred between hospitals in the financial year will have more than 1 record.

Episodes for unqualified newborn care and records of posthumous organ procurement or hospital boarders were excluded.

A data quality summary and additional information relevant to interpretation of the NHMD are available in the appendixes of *Admitted Patient Care 2017–18: Australian Hospital Statistics* (AIHW 2019e). A complete data quality statement for the NHMD is available online at https://meteor.aihw.gov.au/content/index.phtml/itemId/394352.

Comparability over time

The most recent geographical boundaries, remoteness classifications and PPH codes were used for all 6 years of data. For this reason, numbers in this report may differ slightly from those in previous PPH reports.

Information presented over time may be affected by changes to codes and coding standards defined in the International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification (ICD-10-AM) and the Australian Classification of Health Interventions. The main changes affecting the interpretation of information presented in this report are outlined below.

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*. This primarily affected the ICD-10-AM chapters S00–T98 *Injury, poisoning and certain other consequences of external causes*, and M00–M99 *Diseases of the musculoskeletal system and connective tissue*.

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. *Acute conditions* had the lowest proportions of rehabilitation admissions (1.3%), and proportions for *Chronic conditions* (2.9% to 3.1%) and *Vaccine-preventable conditions* (2.7% to 3.9%, predominantly *Pneumonia and influenza (vaccine-preventable)*) were slightly higher.

The proportion of rehabilitation admissions was higher in older people: in 2017–18, 4.2% of *Total* PPH in people aged 65 and over were rehabilitation admissions, compared with 1.0% in people aged 15–64 and less than 0.5% in children aged 0–14.

The most common PPH conditions with rehabilitation admissions were type 2 *Diabetes complications* (4.9% in 2017–18), *Pneumonia and influenza (vaccine-preventable)* (4.7%), *Congestive cardiac failure* (4.7%) and *COPD* (4.2%).

In 2017–18, rehabilitation care accounted for 0.4% of PPH admissions for people living in *Very remote* areas, compared with 2.8% for people living in *Major cities*. Similarly, rehabilitation care accounted for 0.6% of PPH admissions for Indigenous Australians, compared with 2.4% for Other Australians.

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 *Vaccine-preventable conditions* (see Section 2.1)

Principal and additional diagnoses

One or more diagnoses can be reported for each separation. The principal diagnosis is the diagnosis established after study to be chiefly responsible for occasioning the patient's episode of admitted patient care. An additional diagnosis is a condition or complaint that either co-exists with the principal diagnosis or arises during the episode of care. An additional diagnosis is reported if the condition affects patient management.

Most PPH conditions are identified from the principal diagnosis. However, 4 PPH conditions are identified using either principal or additional diagnoses. These are:

1. Pneumonia and influenza (vaccine-preventable)
2. Other vaccine-preventable conditions
3. Pneumonia (not vaccine-preventable)
4. Gangrene.

In tables presenting measures by PPH condition, some hospitalisations may account for multiple PPH conditions. As a result, conditions may not sum to categories, and categories may not sum to total PPH. For example, a hospitalisation with a principal diagnosis of *Pneumonia (vaccine-preventable)* and an additional diagnosis of *Gangrene* will be reported in the *Vaccine-preventable conditions* category to reflect pneumonia and the *Acute conditions* category to reflect gangrene.

Geography

Geography is based on area of usual residence—Statistical Local Area Level 2 (SA2)—as recorded in the NHMD.

In tables presenting measures by geographic area, individual area results may not add to national totals due to missing location data or rounding.

In order to produce rates that reflect different demographic elements such as Indigenous status or age, different denominators have been used to reflect the population of interest. As such, while the counts remain the same, the rates from different comparisons cannot be added to produce the national rate.

Population breakdowns by state, area of remoteness and Indigenous status are in tables A1–A3.

Table A1: June 2016 population estimates for states and territories, by Indigenous status

	June 2016 population			Proportion of population	
	Indigenous	Non-Indigenous	Total	Indigenous	Non-Indigenous
NSW	265,685	7,467,173	7,732,858	3.4	96.6
Vic	57,767	6,115,405	6,173,172	0.9	99.1
Qld	221,276	4,623,876	4,845,152	4.6	95.4
WA	100,512	2,455,466	2,555,978	3.9	96.1
SA	42,265	1,670,578	1,712,843	2.5	97.5
Tas	28,537	488,977	517,514	5.5	94.5
ACT	7,513	395,591	403,104	1.9	98.1
NT	74,546	171,132	245,678	30.3	69.7
Australia	798,365	23,392,542	24,190,907	3.3	96.7

Source: ABS 2018c

Table A2: June 2016 population estimates for remoteness areas, by Indigenous status

	Major cities	Inner regional	Outer regional	Remote	Very remote	Australia
June 2016 population						
Indigenous	298,430	189,414	161,792	53,507	95,222	798,365
Non-Indigenous	17,013,352	4,153,852	1,879,114	239,895	106,329	23,392,542
Total	**17,311,782**	**4,343,266**	**2,040,906**	**293,402**	**201,551**	**24,190,907**
Proportion of population						
Indigenous	1.7	4.4	7.9	18.2	47.2	3.3
Non-Indigenous	98.3	95.6	92.1	81.8	52.8	96.7

Source: ABS 2018c

Table A3: June 2016 population estimates for remoteness area, by Indigenous status and jurisdiction

	Estimated resident population June 2016			Proportion of population in remoteness area		
	Indigenous	Non-Indigenous	Total	Indigenous	Non-Indigenous	Total
NSW						
Major cities	123,099	5,677,317	5,800,416	46.3	76.0	75.0
Inner regional	91,618	1,362,319	1,453,937	34.5	18.2	18.8
Outer regional	41,229	401,230	442,459	15.5	5.4	5.7
Remote	7,311	22,848	30,159	2.8	0.3	0.4
Very remote	2,428	3,459	5,887	0.9	0.0	0.1
Total	**265,685**	**7,467,173**	**7,732,858**	**100.0**	**100.0**	**100.0**

(continued)

Table A3 (continued): June 2016 population estimates for remoteness area, by Indigenous status and jurisdiction

	Estimated resident population June 2016			Proportion of population in remoteness area		
	Indigenous	Non-Indigenous	Total	Indigenous	Non-Indigenous	Total
Vic						
Major cities	30,312	4,756,007	4,786,319	52.5	77.8	77.5
Inner regional	20,062	1,116,843	1,136,905	34.7	18.3	18.4
Outer regional and Remote	7,393	242,555	249,948	12.8	4.0	4.0
Total	**57,767**	**6,115,405**	**6,173,172**	**100.0**	**100.0**	**100.0**
Qld						
Major cities	75,148	2,998,195	3,073,343	34.0	64.8	63.4
Inner regional	49,149	911,650	960,799	22.2	19.7	19.8
Outer regional	60,402	622,781	683,183	27.3	13.5	14.1
Remote	13,281	60,143	73,424	6.0	1.3	1.5
Very remote	23,296	31,107	54,403	10.5	0.7	1.1
Total	**221,276**	**4,623,876**	**4,845,152**	**100.0**	**100.0**	**100.0**
WA						
Major cities	40,433	1,951,121	1,991,554	40.2	79.5	77.9
Inner regional	7,722	213,582	221,304	7.7	8.7	8.7
Outer regional	14,172	172,562	186,734	14.1	7.0	7.3
Remote	13,634	72,465	86,099	13.6	3.0	3.4
Very remote	24,551	45,736	70,287	24.4	1.9	2.7
Total	**100,512**	**2,455,466**	**2,555,978**	**100.0**	**100.0**	**100.0**
SA						
Major cities	21,940	1,235,765	1,257,705	51.9	74.0	73.4
Inner regional	4,582	214,918	219,500	10.8	12.9	12.8
Outer regional	9,520	167,600	177,120	22.5	10.0	10.3
Remote	1,687	42,925	44,612	4.0	2.6	2.6
Very remote	4,536	9,370	13,906	10.7	0.6	0.8
Total	**42,265**	**1,670,578**	**1,712,843**	**100.0**	**100.0**	**100.0**
Tas						
Inner regional	16,032	333,728	349,760	56.2	68.3	67.6
Outer regional	11,653	145,785	157,438	40.8	29.8	30.4
Remote and Very remote	852	9,464	10,316	3.0	1.9	2.0
Total	**28,537**	**488,977**	**517,514**	**100.0**	**100.0**	**100.0**
ACT						
Major cities	**7,513**	**395,591**	**403,104**	**100.0**	**100.0**	**100.0**

(continued)

Table A3 (continued): June 2016 population estimates for remoteness area, by Indigenous status and jurisdiction

	Estimated resident population June 2016			Proportion of population in remoteness area		
	Indigenous	Non-Indigenous	Total	Indigenous	Non-Indigenous	Total
NT						
Outer regional	17,465	129,637	147,102	23.4	75.8	59.9
Remote	16,932	31,315	48,247	22.7	18.3	19.6
Very remote	40,149	10,180	50,329	53.9	5.9	20.5
Total	**74,546**	**171,132**	**245,678**	**100.0**	**100.0**	**100.0**
Australia						
Major Cities	298,430	17,013,352	17,311,782	37.4	72.7	71.6
Inner Regional	189,414	4,153,852	4,343,266	23.7	17.8	18.0
Outer Regional	161,792	1,879,114	2,040,906	20.3	8.0	8.4
Remote	53,507	239,895	293,402	6.7	1.0	1.2
Very Remote	95,222	106,329	201,551	11.9	0.5	0.8
Total	**798,365**	**23,392,542**	**24,190,907**	**100.0**	**100.0**	**100.0**

Source: ABS 2018c.

Age-standardisation

Age-standardised rates are hypothetical rates that would have been observed if the populations studied had the same age distribution as the standard population. This facilitates comparisons between populations with different age structures. This adjustment is important because the rates of many health conditions vary with age.

All the rates in this report are age-standardised except when referring to specific age groups. They are expressed as age-standardised rates per 100,000 population. The direct method of age-standardisation was applied to the data. Age-standardised rates were derived by calculating crude rates by 5-year age groupings of 0–4 years to 85 and over. If a patient's age was recorded as over 116, they were excluded. These crude rates were then given a weight that reflected the age composition of the standard population. The current standard population is the ABS Estimated Resident Population for Australia at 30 June 2001.

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Abbreviations

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ACSC	Ambulatory care sensitive conditions
AIHW	Australian Institute of Health and Welfare
ALOS	Average length of stay
ARF	Acute rheumatic fever
CHB	Chronic hepatitis B
COPD	Chronic obstructive pulmonary disease
ENT	Ear, nose and throat
GP	General practitioner
HPV	Human papilloma virus
ICD-10-AM	International statistical classification of diseases and related health problems, 10th revision, Australian modification
IDA	Iron deficiency anaemia
IRSD	Index of Relative Socioeconomic Disadvantage
NHMD	National Hospital Morbidity Database
NSW	New South Wales
NT	Northern Territory
PHN	Primary Health Network
PID	Pelvic inflammatory disease
PPH	Potentially preventable hospitalisations
Qld	Queensland
RHD	Rheumatic heart disease
SA	South Australia
SA2	Statistical Area Level 2

SA3	Statistical Area Level 3
Tas	Tasmania
UTI	Urinary tract infection
Vic	Victoria
WA	Western Australia

Glossary

Aboriginal or Torres Strait Islander: A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander. See also **Indigenous.**

acute: Coming on sharply and often brief, intense and severe.

additional diagnosis: The diagnosis of a condition or recording of a complaint—either coexisting with the principal diagnosis or arising during the episode of admitted patient care (hospitalisation), episode of residential care or attendance at a health care establishment—that requires the provision of care. Multiple diagnoses may be recorded.

age-standardisation: Rates adjusted for age in order to take into account differences in age structures when comparing different populations or across time.

allied health professional: A health professional who is not a doctor, nurse, or dentist. Allied health professionals include (but are not limited to) Aboriginal and Torres Strait Islander health practitioners, chiropractors, occupational therapists, optometrists, osteopaths, pharmacists, physiotherapists, podiatrists, psychologists, sonographers, and speech pathologists.

angina: Temporary chest pain or discomfort when the heart's own blood supply is inadequate to meet extra needs, as in exercise.

antenatal care: A planned visit between a pregnant woman and a midwife or doctor to assess and improve the wellbeing of the mother and baby throughout pregnancy. It does not include visits where the sole purpose is to confirm the pregnancy.

asthma: A common, chronic inflammatory disease of the air passages that presents as episodes of wheezing, breathlessness and chest tightness due to widespread narrowing of the airways and obstruction of airflow.

average length of stay: The average number of **patient days** for admitted patient episodes. Patients who have an admission and a separation on the same date are allocated a length of stay of 1 day.

bed days: The sum of the number of days from admission to separation for all relevant hospitalisations. Hospitalisations where the admission and separation occur on the same date are allocated one bed day, and leave days are excluded.

bronchiectasis: An abnormal widening of the lungs' air passages (bronchi). This allows infections to develop and leads to coughing with pus and sometimes blood. It has several causes, including cystic fibrosis; reduced immune functioning; and infections such as tuberculosis, whooping cough (pertussis) and measles.

cardiovascular disease: Any disease of the circulatory system, namely the heart (cardio) or blood vessels (vascular). Includes angina, heart attack, stroke and peripheral vascular disease. Also known as circulatory disease.

cellulitis: A bacterial infection of the skin and underlying tissue, which is usually treated with antibiotics.

chlamydia: The most common sexually transmissible infection in Australia, caused by *Chlamydia trachomatis* bacteria. It is treatable and may not cause symptoms; however, it can lead to serious illness if untreated.

chronic diseases/conditions: A diverse group of diseases/conditions which tend to be long-lasting and persistent in their symptoms or development.

chronic kidney disease (CKD): A term that refers to all conditions of the kidney, lasting at least 3 months, where a person has had evidence of kidney damage and/or reduced kidney function, regardless of the specific cause.

chronic obstructive pulmonary disease (COPD): Serious, progressive and disabling long-term lung disease where damage to the lungs obstructs oxygen intake and causes increasing shortness of breath. By far the greatest cause of COPD is cigarette smoking.

colonoscopy: A procedure where the inside of the large bowel is viewed using a long flexible tube inserted through the anus.

community health services: Non-residential health services offered to patients/clients in an integrated and coordinated manner in a community setting, or the coordination of health services elsewhere in the community. Such services are provided by, or on behalf of, state and territory governments.

comorbidity: A situation where a person has 2 or more health problems at the same time. Also known as multimorbidity.

complication: A secondary problem that arises from a disease, injury or treatment (such as surgery) that makes the patient's condition worse and treatment more complicated.

congestive cardiac failure (heart failure): A condition that occurs when the heart functions less effectively in pumping blood around the body.

convulsion: A medical condition where the body shakes uncontrollably because the muscles are contracting and relaxing rapidly and repeatedly.

data linkage: The joining of information from multiple data sources which provides more detailed information than is possible from individual data sources in isolation.

dental conditions: (PPH definition) includes PPH for tooth decay, gum disease and tooth loss, cysts and other disorders affecting tooth and gum health or the oral region.

diabetes (diabetes mellitus): A chronic condition where the body cannot properly use its main energy source—the sugar glucose. This is due to a relative or absolute deficiency in insulin, a hormone produced by the pancreas that helps glucose enter the body's cells from the bloodstream and be processed by them. Diabetes is marked by an abnormal build-up of glucose in the blood; it can have serious short- and long-term effects. The 3 main types of diabetes are **type 1 diabetes**, **type 2 diabetes** and gestational diabetes.

ear, nose and throat (ENT) infections: 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).

eclampsia: A life-threatening complication of pregnancy. Eclampsia causes a pregnant woman, usually previously diagnosed with pre-eclampsia (high blood pressure and protein in the urine), to develop seizures or a coma.

epilepsy: A common, long-term brain condition where a person has repeated seizures.

gangrene: A condition that occurs when blood supply to body tissue is interrupted and causes the tissue to die.

gastroscopy: A procedure where the inside of the stomach is viewed using a flexible tube passed through the mouth.

general practitioner (GP): A medical practitioner who provides primary comprehensive and continuing care to patients and their families in the community.

gonorrhoea: A common sexually transmissible infection caused by *Neisseria gonorrhoeae* bacteria. It is treatable; however, if left untreated, it can lead to serious illness.

health inequality: differences in health status or in the distribution of health determinants between different population groups. Health equity is the notion that everyone should have a fair opportunity to attain their full health potential and that no one should be disadvantaged from achieving this potential if it can be avoided.

health literacy: The ability of people to access, understand and apply information about health and the health care system so as to make decisions that relate to their health.

health promotion: A broad term to describe activities that help communities and individuals increase control over their health behaviours. Health promotion focuses on addressing and preventing the root causes of ill health, rather than on treatment and cure.

hepatitis B: a viral infection that causes liver inflammation. It is transmitted through body fluids and can be prevented by vaccination.

hypertension/high blood pressure: Definitions can vary but a well-accepted definition is from the World Health Organization: a systolic blood pressure of 140 mmHg or more or a diastolic blood pressure of 90 mmHg or more, or if [the person is] receiving medication for high blood pressure.

immunisation: A procedure designed to induce immunity against infection by using an antigen to stimulate the body to produce its own antibodies. See **vaccination**.

Index of Relative Socioeconomic Disadvantage (IRSD): One of the set of Socio-Economic Indexes for Areas for ranking the average socioeconomic conditions of the population in an area. It summarises attributes of the population such as low income, low educational attainment, high unemployment and jobs in relatively unskilled occupations.

Indigenous: A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander. See also **Aboriginal or Torres Strait Islander**.

Indigenous status: Whether a person identifies as being of Aboriginal and/or Torres Strait Islander origin.

infection: An infection occurs when bacteria or viruses enter the human body. If the body cannot fight the infection, the person may get sick.

influenza (flu): An acute contagious viral respiratory infection marked by fever, fatigue, muscle aches, headache, cough and sore throat.

iron deficiency anaemia: occurs when a lack of iron in the body results in the blood being unable to produce enough haemoglobin to carry oxygen to meet the body's needs. Not all people who are low in iron have iron deficiency anaemia—severe and prolonged iron deficiency is needed to cause anaemia.

measles: A highly contagious infection, usually of children, that causes flu-like symptoms, fever, atypical rash and sometimes serious secondary problems such as brain damage. It is preventable by vaccination.

medical specialist: A doctor who has completed advanced education and clinical training in a specific area of medicine.

mumps: A contagious viral disease marked by acute and painful swelling of the saliva-producing glands, often similarly affecting the testicles and sometimes other parts.

non-admitted patient: A patient who receives care from a recognised non-admitted patient service/clinic of a hospital, including emergency departments and outpatient clinics.

non-Indigenous: People who have declared that they are not of Aboriginal or Torres Strait Islander descent. Compare with **Other Australians**.

nutritional deficiency (PPH definition): Conditions resulting from 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.

oral health: The health of the mouth, tongue and oral cavity; the absence of active disease in the mouth.

Other Australians: People who have declared that they are not of Aboriginal or Torres Strait Islander descent, and people whose Indigenous status is unknown. Compare with **non-Indigenous**.

patient days: The number of full or partial days of stay for patients who were admitted to hospital for an episode of care and who underwent separation during the reporting period. A patient who is admitted and separated on the same-day is allocated 1 patient day.

pelvic inflammatory disease: Pelvic inflammatory disease is an infection of the uterus and/or fallopian tubes.

perforated/bleeding ulcer: Ulcers are sores or lesions that form in the lining of the stomach or duodenum.

- A perforated ulcer is an ulcer that eats a hole in the wall of the stomach or duodenum.
- A bleeding ulcer is an ulcer that has eaten into the muscles of the stomach or duodenal wall and caused damage to blood vessels and bleeding**.**

pertussis: A highly infectious bacterial disease of the air passages marked by explosive fits of coughing and often a whooping sound on breathing in. It is preventable by vaccination. Also known as whooping cough.

pneumonia: Inflammation of the lungs as a response to infection by bacteria or viruses.

potentially avoidable deaths: Deaths among people younger than age 75 that are avoidable in the context of the present health care system. They include deaths from conditions that are potentially preventable through individualised care and/or treatable through existing primary or hospital care.

potentially preventable hospitalisation (PPH): Hospital separations from a specified range of conditions where hospitalisation could have potentially been prevented through the provision of appropriate individualised preventative health interventions and early disease management usually delivered in primary care and community-based care settings (including by general practitioners, medical specialists, dentists, nurses and allied health professionals). The PPH conditions are classified as vaccine-preventable, chronic and acute.

prevalence: The number or proportion (of cases, instances, and so forth) in a population at a given time.

primary health care: These are services delivered in many settings, such as general practices, community health centres, Aboriginal health services and allied health practices (for example, physiotherapy, dietetic and chiropractic practices) and come under numerous funding arrangements.

Primary Health Network (PHN) areas: 31 geographic areas covering Australia, with boundaries defined by the Australian Government Department of Health.

principal diagnosis: The diagnosis established after study to be chiefly responsible for occasioning an episode of admitted patient care, an episode of residential care or an attendance at the health care establishment.

procedure: A clinical intervention that is surgical in nature, carries a procedural risk, carries an anaesthetic risk, requires specialised training and/or requires special facilities or equipment available only in an acute care setting.

remoteness classification: Each state and territory is divided into several regions based on their relative accessibility to goods and services (such as to general practitioners, hospitals and specialist care) as measured by road distance. These regions are based on the Accessibility/Remoteness Index of Australia and defined as Remoteness Areas by the Australian Statistical Geographical Standard (ASGS) (from 2011 onwards) in each Census year. The 5 Remoteness Areas are: *Major cities, Inner regional, Outer regional, Remote* and *Very remote.*

rheumatic heart disease: Chronic disease from damaged heart valves caused by earlier attack(s) of rheumatic fever.

rotaviral enteritis: a mild to severe type of gastroenteritis caused by the rotavirus. It is most common in children, and is preventable by vaccination.

rubella (German measles): A communicable disease of children and young adults which has mild symptoms but which often causes serious birth defects if it occurs in a mother during the first 3 months of pregnancy. It is preventable by vaccination.

same-day patient: An admitted patient who is admitted and separated on the same date.

screening (for health): A systematic method of detecting risk factors or suspicious abnormalities among people who are symptom-free, so that health problems can be either prevented or followed up, diagnosed and treated as early as possible.

social determinants of health: The circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies and politics.

Statistical Areas Level 2 (SA2s): 2,310 geographic areas covering Australia, with boundaries defined by the ABS.

Statistical Areas Level 3 (SA3s): 333 geographic areas covering Australia, with boundaries defined by the ABS.

tooth decay: Decay of the teeth caused by caries, and progressing to cavities in the enamel and the dentine.

type 1 diabetes: A form of diabetes mostly arising among children or younger adults and marked by a complete lack of insulin. Insulin replacement is needed for survival. See **diabetes (diabetes mellitus)**.

type 2 diabetes: The most common form of diabetes, occurring mostly in people aged 40 and over, and marked by reduced or less effective insulin. See **diabetes (diabetes mellitus)**.

unstable angina: A form of **angina** that is more dangerous than normal angina but less so than a heart attack.

urinary tract infections (UTI) including kidney infections: An infection that affects part of the urinary tract. When it affects the lower urinary tract it is known as a simple cystitis (a bladder infection) and when it affects the upper urinary tract it is known as pyelonephritis (a kidney infection).

vaccination: The process of administering a vaccine to a person to produce immunity against infection. See **immunisation**.

References

Almqvist C, Worm M & Leynaert B 2008. Impact of gender on asthma in childhood and adolescence: a GA2LEN review. Allergy 63(1):47–57.

Anderson P, Craig E, Jackson G & Jackson C 2012. Developing a tool to monitor potentially avoidable and ambulatory care sensitive hospitalisations in New Zealand children. The New Zealand Medical Journal 125(1366):25–37.

Ansari Z, Carson N, Serraglio A, Barbetti T & Cicuttini F 2002. The Victorian Ambulatory Care Sensitive Conditions Study: reducing demand on hospital services in Victoria. Australian Health Review 25(2):71–7.

Ansari Z, Laditka J & Laditka S 2006. Access to health care and hospitalization for ambulatory care sensitive conditions: Medical Care Research and Review 63(6):719–41.

Ansari Z, Haider S, Ansari H, de Gooyer T & Sindall C 2012. Patient characteristics associated with hospitalisations for ambulatory care sensitive conditions in Victoria, Australia. BMC Health Services Research 12:475. doi:10.1186/1472-6963-12-475.

ABS (Australian Bureau of Statistics) 2018a. National Health Survey: first results, 2017–18. ABS cat. no. 4364.0.55.001. Canberra: ABS.

ABS 2018b. Australian Demographic Statistics, Sep 2018. ABS cat. no. 31010DO001_201809. Canberra: ABS.

ABS 2018c. Estimates of Aboriginal and Torres Strait Islander Australians, June 2016. ABS cat. no. 3238.0.55.001. Canberra: ABS.

ACSQHC (Australian Commission on Safety and Quality in Health Care) 2017. Resources for improved patient blood management. Sydney: ASCQHC. Viewed 19 August 2019, https://www.safetyandquality.gov.au/sites/default/files/migrated/National-Patient-Blood-Management-Collaborative-NPBMC-Resource-Booklet-November-2017.pdf.

ACSQHC & AIHW (Australian Institute of Health and Welfare) 2017. The second Australian atlas of healthcare variation. Sydney: ACSQHC.

Australian Dental Association, NSW 2019. ADA NSW Position on potentially preventable dental hospitalisations in children. Viewed 13 August 2019, https://www.adansw.com.au/About/PositionStatements.

AIHW 2011. Monitoring acute coronary syndrome using national hospital data: an information paper on trends and issues. Cat. no. CVD 57. Canberra: AIHW.

AIHW 2013. Indigenous identification in hospital separations data: quality report. Cat. no. IHW 90. Canberra: AIHW.

AIHW 2014. Australia's health 2014. Australia’s health no. 14. Cat. no. AUS 178. Canberra: AIHW.

AIHW 2016. Australian Burden of Disease Study: impact and causes of illness and death in Aboriginal and Torres Strait Islander people 2011. Australian Burden of Disease Study series no. 6. Cat. no. BOD 7. Canberra: AIHW.

AIHW 2018a. A potentially preventable hospitalisation indicator specific to general practice. Cat. no. HSE 214. Canberra: AIHW.

AIHW 2018b. Potentially preventable hospitalisations in Australia by small geographic areas (web). Cat. no. HPF 36. Canberra: AIHW.

AIHW 2018c. Vaccine-preventable diseases fact sheets. Cat. no. PHE 236. Canberra: AIHW.

AIHW 2018d. Tracking progress against the Implementation Plan goals for the Aboriginal and Torres Strait Islander Health Plan 2013–2023 (data update). Cat. no. IHW 201. Canberra: AIHW.

AIHW 2018e. Australia's health 2018. Australia's health no. 16. Cat. no. AUS 221. Canberra: AIHW.

AIHW 2018f. Survey of Health Care: selected findings for rural and remote Australians. Cat. no. PHE 220. Canberra: AIHW. Viewed 23 October 2019, https://www.aihw.gov.au/reports/rural-remote-australians/survey-health-care-selected-findings-rural-remote.

AIHW 2019a. Developing a National Primary Health Care Data Asset: consultation report. Cat. no. PHC 1. Canberra: AIHW.

AIHW 2019b. National Healthcare Agreement: PI 18—Selected potentially preventable hospitalisations, 2019. Available at https://meteor.aihw.gov.au/content/index.phtml/itemId/698904.

AIHW 2019c. Australian Health Performance Framework. Cat. no. HPF 47. Canberra: AIHW.

AIHW 2019d. Aboriginal and Torres Strait Islander Health Performance Framework (HPF) report 2017. Cat. no. IHW 194. Canberra: AIHW. Viewed 31 July 2019, https://www.aihw.gov.au/reports/indigenous-australians/health-performance-framework.

AIHW 2019e. Admitted patient care 2017–18: Australian hospital statistics. Cat. no. HSE 225. Canberra: AIHW.

AIHW 2019f. Improving Indigenous identification in mortality estimates. Cat. no. IHW 215. Canberra: AIHW.

AIHW 2019g. Australian Burden of Disease Study: impact and causes of illness and death in Australia 2015. Australian Burden of Disease Study series no. 19. Cat. no. BOD 22. Canberra: AIHW.

AIHW 2019h. Acute rheumatic fever and rheumatic heart disease 2016–17. Cat. no. CVD 86. Canberra: AIHW.

AIHW 2019i. The health of Australia's females (Batch 1). Cat. no. PHE 240. Canberra: AIHW.

AIHW 2019j. The health of Australia's males (Batch 1). Cat. no. PHE 239. Canberra: AIHW.

AIHW 2019k. Cardiovascular disease in Australian women—a snapshot of national statistics. Cat. no. CDK 10. Canberra: AIHW.

AIHW 2019l. Incidence of insulin-treated diabetes in Australia. Cat. no. CDK 11. Canberra: AIHW. Viewed 31 July 2019, https://www.aihw.gov.au/reports/diabetes/incidence-insulin-treated-diabetes-australia-2017.

AIHW 2019m. Regional variation in uptake of Indigenous health checks and in preventable hospitalisations and deaths. Cat. no. IHW 216. Canberra: AIHW.

AIHW 2019n. Indigenous health checks and follow-ups. Cat. no. IHW 209. Canberra: AIHW. Viewed 31 July 2019, https://www.aihw.gov.au/reports/indigenous-australians/indigenous-health-checks-follow-ups.

AIHW 2019o. Rural & remote health. Cat. no. PHE 255. Canberra: AIHW. Viewed 23 October 2019, https://www.aihw.gov.au/reports/rural-remote-australians/rural-remote-health.

ATAGI (Australian Technical Advisory Group on Immunisation) 2018. Australian immunisation handbook. Canberra: Department of Health. Viewed 29 July 2019, www.immunisationhandbook.health.gov.au.

Banham D, Chen T, Karnon J, Brown A & Lynch J 2017. Sociodemographic variations in the amount, duration and cost of potentially preventable hospitalisation for chronic conditions among Aboriginal and non-Aboriginal Australians: a period prevalence study of linked public hospital data. BMJ Open 7(10). doi:10.1136/bmjopen-2017-017331.

Beckwith K & Glover J 2019. Potentially preventable hospitalisations in Australia: variations by sociodemographic characteristics and geographic areas, with a focus on Aboriginal and Torres Strait Islander people, 2012/13 to 2014/15.

Beard F, Hendry A & Macartney K 2019. Early success with room for improvement: influenza vaccination of young Australian children. Medical Journal of Australia 210(11):484–486.

Billings J, Zeitel L, Lukomnik J, Carey T, Blank A & Newman L 1993. Impact of socioeconomic status on hospital use in New York City. Health Affairs (Project Hope) 12(1):162–73.

Busby J, Purdy S & Hollingworth W 2015. A systematic review of the magnitude and cause of geographic variation in unplanned hospital admission rates and length of stay for ambulatory care sensitive conditions. BMC Health Services Research 15(1):324.

Butler D, Thurecht L, Brown L & Konings P 2013. Social exclusion, deprivation and child health: a spatial analysis of ambulatory care sensitive conditions in children aged 0–4 years in Victoria, Australia. Social Science & Medicine 94:9–16.

Department of Health 2015. Australian National Diabetes Strategy 2016–2020. Canberra: Department of Health.

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

Dyda A, Karki S, Hayen A, MacIntyre CR, Menzies R, Banks E et al. 2016. Influenza and pneumococcal vaccination in Australian adults: a systematic review of coverage and factors associated with uptake. BMC Infectious Diseases 16(1):515. doi:10.1186/s12879-016-1820-8

Ewald D, Carter B, Ewald B, Wheeler M, White S, Wilson C et al. 2018. Northern NSW Winter Strategy 2017 evaluation report. Viewed 6 August 2019, https://ncphn.org.au/wp-content/uploads/2018/11/2017-Northern-NSW-Winter-Strategy-Evaluation-1.pdf.

Falster K, Banks E, Lujic S, Falster M, Lynch J, Zwi K et al. 2016. Inequalities in pediatric avoidable hospitalizations between Aboriginal and non-Aboriginal children in Australia: a population data linkage study. BMC Pediatrics 16(1):169. doi:10.1186/s12887-016-0706-7.

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.

Falster M, Jorm L, Douglas K, Blyth F, Elliott R & Leyland A 2015. Sociodemographic and health characteristics, rather than primary care supply, are major drivers of geographic variation in preventable hospitalizations in Australia. Medical Care 53(5):436–45.

Falster M, Jorm L & Leyland A 2016. Visualising linked health data to explore health events around preventable hospitalisations in NSW Australia. BMJ Open 6(9). doi:10.1136/bmjopen-2016-012031.

Falster M, Leyland A & Jorm L 2019. Do hospitals influence geographic variation in admission for preventable hospitalisation? A data linkage study in New South Wales, Australia. BMJ Open 9(2). doi:10.1136/bmjopen-2018-027639.

Harrold T, Randall D, Falster M, Lujic S & Jorm L 2014. The contribution of geography to disparities in preventable hospitalisations between Indigenous and non-Indigenous Australians. PloS One 9(5). doi:10.1371/journal.pone.0097892.

Health Performance Council SA 2017. Hotspots of potentially preventable hospitalisations in South Australia's public hospitals. Government of South Australia. Viewed 5 December 2018, https://www.hpcsa.com.au/statistics/potentially-preventable-hospitalisations.

Hodgson K, Deeny S & Steventon A 2019. Ambulatory care-sensitive conditions: their potential uses and limitations. BMJ Quality & Safety 28(6):429–433. doi:10.1136/bmjqs-2018-008820.

Hsieh V, Hsieh M-L, Chiang J, Chien A & Hsieh M-S 2019. Emergency department visits and disease burden attributable to ambulatory care sensitive conditions in elderly adults. Scientific Reports 9(1). doi:10.1038/s41598-019-40206-4.

Hull B, Hendry A, Dey A, Brotherton J, Macartney K & Beard F 2018. Annual immunisation coverage report 2017. Sydney: The National Centre for Immunisation Research and Surveillance.

ICD-10-AM (International statistical classification of diseases and related health problems, 10th revision, Australian modification) 2019. Australian Coding Standard 0104 Viral hepatitis. Viewed 18 June 2019.

Jervis-Bardy J, Sanchez L & Carney AS 2014. Otitis media in Indigenous Australian children: review of epidemiology and risk factors. Journal of Laryngology and Otology 128(S1):S16–27.

Katterl R, Anikeeva O, Butler C, Brown L, Smith B & Bywood P 2012. Potentially avoidable hospitalisations in Australia: causes for hospitalisations and primary health care interventions. Primary Health Care Research & Information Service (PHCRIS) Policy Issue Review. Adelaide: PHCRIS.

Kirby Institute 2018. Bloodborne viral and sexually transmissible infections in Aboriginal and Torres Strait Islander people: annual surveillance report 2018. Sydney: Kirby Institute, The University of New South Wales.

Klein SL 2000. The effects of hormones on sex differences in infection: from genes to behavior. Neuroscience & Biobehavioural Reviews 24(6):627–38.

Longman J, Passey M, Ewald D, Rix E & Morgan G 2015. Admissions for chronic ambulatory care sensitive conditions—a useful measure of potentially preventable admission? BMC Health Services Research 15, article 472. doi:10.1186/s12913-015-1137-0.

Longman J, Rix E, Johnston J & Passey M 2018. Ambulatory care sensitive chronic conditions: what can we learn from patients about the role of primary health care in preventing admissions? Australian Journal of Primary Health 24(4). doi:10.1071/py17191.

Manning L, Cannon J, Dyer J & Carapetis J 2018. Seasonal and regional patterns of lower leg cellulitis in Western Australia. Internal Medicine Journal Jul 09. doi: 10.111/imj.14034.

Mazumdar S, Chong S, Arnold L & Jalaludin B 2019. Spatial clusters of chronic preventable hospitalizations (ambulatory care sensitive conditions) and access to primary care. Journal of Public Health (Oxford, England). doi:10.1093/pubmed/fdz040.

McAuley K, McAullay D, Strobel N, Marriott R, Atkinson D, Marley J et al. 2016. Hospital utilisation in Indigenous and non-Indigenous infants under 12 months of age in Western

Australia, prospective population based data linkage study. PloS One 11(4):e0154171. doi:10.1371/journal.pone.0154171

McNamara B, Gubhaju L, Jorm L, Preen D, Jones J, Joshy G et al. 2018. Exploring factors impacting early childhood health among Aboriginal and Torres Strait Islander families and communities: protocol for a population-based cohort study using data linkage (the Defying the Odds study). BMJ Open 2018;8:e021236. doi:10.1136/bmjopen-2017-021236.

Mohanty I, Edvardsson M, Abello A & Eldridge D 2016. Child social exclusion risk and child health outcomes in Australia. PloS One 11(5), p.e0154536.

National Blood Authority 2012. Blood Management Guidelines. Canberra: National Blood Authority. Viewed 19 August 2019, https://www.nba.gov.au/pbm-guidelines.

National Blood Authority 2019. Treating anaemia and managing iron. Canberra: National Blood Authority. Viewed 18 November 2019, https://www.blood.gov.au/treating-anaemia-and-managing-iron.

National Influenza Surveillance Committee 2017. Australian Influenza Surveillance Report—2017 Season Summary. Canberra: Department of Health. Viewed 12 August 2019, https://www1.health.gov.au/internet/main/publishing.nsf/Content/ozflu-surveil-2017-final.htm.

Productivity Commission 2019. Report on Government Services 2019—primary and community health. Canberra: Productivity Commission. Viewed 14 August 2019, https://www.pc.gov.au/research/ongoing/report-on-government-services/2019/health/primary-and-community-health.

PHIDU (Public Health Information Development Unit) 2019. Social Health Atlases of Australia. Adelaide: Torrens University. Viewed 14 August 2019, http://www.phidu.torrens.edu.au/social-health-atlases.

Robinson J, Boyd M, O'Callaghan A, Laking G, Frey R, Raphael D et al. 2015. The extent and cost of potentially avoidable admissions in hospital inpatients with palliative care needs: a cross-sectional study. BMJ Supportive & Palliative Care 5(3):266–72.

Roffi M, Patrono C, Collet JP, Mueller C, Valgimigli M, Andreotti F et al. 2016. 2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: Task Force for the Management of Acute Coronary Syndromes in Patients Presenting without Persistent ST-Segment Elevation of the European Society of Cardiology (ESC). European Heart Journal 37(3):267–315.

Rogers J, Delany C, Wright C, Roberts-Thomson K & Morgan M 2018a. What factors are associated with dental general anaesthetics for Australian children and what are the policy implications? A qualitative study. BMC Oral Health 18(1). doi:10.1186/s12903-018-0638-8.

Rogers J, Adams G, Wright F, Roberts-Thomson K & Morgan M 2018b. Reducing potentially preventable dental hospitalizations of young children: a community-level analysis. JDR Clinical and Translational Research 3(3):272–278.

Rosello A, Pouwels K, Domenech De Cellès M, Van Kleef E, Hayward A, Hopkins S et al. 2018. Seasonality of urinary tract infections in the United Kingdom in different age groups: longitudinal analysis of The Health Improvement Network (THIN). Epidemiology and Infection 146(1):37–45.

Sanmartin C & Khan S 2011. Hospitalizations for Ambulatory Care Sensitive Conditions (ACSC): The factors that matter. Ottawa: Statistics Canada.

Scharfman H & MacLusky N 2014. Sex differences in the neurobiology of epilepsy: a preclinical perspective. Neurobiology of disease 72 Pt B:180–92.

Solberg L 2015. Preventable hospital admissions: are they? Family Practice 32(3):245–6.

Queensland Health 2018. Dare to compare. Reducing unwarranted variation for potentially preventable hospitalisations 30 November–1 December 2017. Queensland Clinical Senate meeting report. Viewed 4 December 2018, www.health.qld.gov.au/clinical-practice/engagement/clinical-senate/default.asp

Street T, Somoray K, Richards G & Lacey S 2019. Continuity of care for patients with chronic conditions from rural or remote Australia: a systematic review. Australian Journal of Rural Health 27(3):196–202.

Swerissen H, Duckett S & Wright J 2016. Chronic failure in primary care. Melbourne: Grattan Institute.

Therapeutic Guidelines 2019. eTG complete: Cellulitis and erysipelas. Melbourne: Therapeutic Guidelines Ltd. Viewed 26 June 2019, www.tg.org.au.

Tran B, Falster M, Douglas K, Blyth F & Jorm L 2014. Health behaviours and potentially preventable hospitalisation: a prospective study of older Australian adults. PLoS One 9(4), e93111. doi:10.1371/journal.pone.0093111.

Tran B, Falster M, Girosi F & Jorm L 2016. Relationship between use of general practice and healthcare costs at the end of life: a data linkage study in New South Wales, Australia. BMJ Open 6(1). doi:10.1136/bmjopen-2015-009410.

Unroe K, Carnahan J, Hickman S, Sachs G, Hass Z & Arling G 2018. The complexity of determining whether a nursing home transfer is avoidable at time of transfer. Journal of the American Geriatrics Society 66(5):895–901.

Vuik SI, Fontana G, Mayer E & Darzi A 2017. Do hospitalisations for ambulatory care sensitive conditions reflect low access to primary care? An observational cohort study of primary care usage prior to hospitalisation. BMJ Open 7(8). doi: 10.1136/bmjopen-2016-015704.

WAPHA (Western Australia Primary Health Alliance) 2017. Lessons of location: potentially preventable hospitalisation hotspots in Western Australia 2017. Perth: Government of Western Australia Department of Health.

Weinberger M, Oddone E & Henderson W 1996. Does increased access to primary care reduce hospital readmissions? Veterans Affairs Cooperative Study Group on Primary Care and Hospital Readmission. New England Journal of Medicine 334:1441-7.

Wyber R, Katzenellenbogen JM, Pearson G & Gannon M 2017. The rationale for action to end new cases of rheumatic heart disease in Australia. Medical Journal of Australia 207(8):322–3.

Xu D, Kane R & Arling G 2019. Relationship between nursing home quality indicators and potentially preventable hospitalisation. BMJ Quality & Safety 28(7):524–33.

List of tables

List of figures

Related publications

The following AIHW publication relating to potentially preventable hospitalisations may be of interest:

- ACSQHC (Australian Commission on Safety and Quality in Health Care) and AIHW (Australian Institute of Health and Welfare) 2017. The Second Australian Atlas of Healthcare Variation. Sydney: ACSQHC.
- AIHW 2018. A potentially preventable hospitalisation indicator for general practice: consultation paper. Cat. no. HSE 214. Canberra: AIHW.
- AIHW 2018. Aboriginal and Torres Strait Islander Health Performance Framework 2017. Cat. no. IHW 194. Canberra: AIHW.
- AIHW 2019. Regional variation in uptake of Indigenous health checks and in preventable hospitalisations and deaths. Cat. no. IHW 216. Canberra: AIHW.
- Falster M & Jorm L 2017. A guide to the potentially preventable hospitalisations indicator in Australia. Sydney: Centre for Big Data Research in Health, University of New South Wales, in consultation with the ACSQHC and AIHW.

Please see www.aihw.gov.au/publications-catalogue/ to access a complete list of AIHW publications relating to Australia's health and welfare. The website also includes information on ordering printed copies of related reports.

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.

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