

Potentially avoidable hospitalisations in Australia: Causes for hospitalisations and primary health care interventions

Authors:

Rachel Katterl
Olga Anikeeva
Caryn Butler
Lynsey Brown
Bradley Smith
Petra Bywood

Primary Health Care Research & Information Service
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Expert Review

This Policy Issue Review has been reviewed by Dr Zahid Ansari, Manager of the Health Intelligence Unit, Prevention and Population Health, Victorian Department of Health. Dr Ansari has extensive expertise in the area of avoidable hospitalisations, having published multiple reports and peer-reviewed articles. PHC RIS would like to thank Dr Ansari for his valuable comments in the preparation of this review.



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Executive summary

The Australian Institute of Health and Welfare (AIHW)¹ described potentially avoidable hospitalisations (PAHs) as “admissions to hospital that could have potentially been prevented through the provision of appropriate non-hospital health services”. The AIHW¹ classify PAHs into three main types: Vaccine-preventable, chronic and acute conditions. In 2009-10, PAHs related to chronic conditions were the most common, due mainly to the high rates of hospitalisations for diabetes complications (24% of all PAHs).¹ Moderately high rates of PAHs were also reported for chronic obstructive pulmonary disease (COPD), dehydration and gastroenteritis, and dental conditions (9-10% of all PAHs).

Several independent groups of researchers have shown that poor access to primary health care is strongly related to higher rates of PAHs.^{2,3,4,5} In Australia, data on PAHs are collected routinely by the AIHW⁶ and used as an indicator of primary health care accessibility and effectiveness.^{7,8}

However, it is important to note some limitations and caveats pertaining to PAHs data and interpreting analyses:

- ⇒ *Accuracy of PAHs estimates.* In an extensive review of the literature, the Agency for Healthcare Research and Quality (AHRQ)⁹ stated that it is often difficult to accurately determine the extent to which PAHs are avoidable, particularly in chronic conditions where there is inevitable physical deterioration.
- ⇒ *Variations in coding for PAHs.* The statistical reliability of data on PAHs varies due to differences in the way data are coded across hospitals.^{6,10}
- ⇒ *Reliability of PAHs as an indicator of primary health care access.* The AHRQ suggest that PAHs should be analysed and interpreted as a set, rather than in specific disease groups as statistical analyses becomes less reliable where there are small numbers of people with a particular condition.⁹
- ⇒ *Level of access to primary health care.* Weinberger et al.¹¹ cautioned that higher rates of hospitalisation are not necessarily due to *poor* access to primary care, but may reflect *better* access. That is, hospitalisation may occur as a result of better detection of impairments in the primary health care setting.
- ⇒ *Role of other factors.* Beyond access to primary health care, socioeconomic disadvantage,¹² rurality,¹ comorbidities¹³ and certain immutable factors, such as age,¹⁴ gender¹⁵ and ethnicity¹⁶ are also associated with high rates of PAHs.

Reducing the rates of PAHs in Australia is a key objective in several important Australian Government health care agreements: Australia’s National Health Performance Framework¹⁷, the National Strategic Framework for Aboriginal and Torres Strait Islander Health (NSFATSIH).¹⁸ and the Council of Australian Governments (COAG) National Healthcare Agreement.¹⁹ To address this objective, a number of initiatives have been implemented in States and Territories and nationally, with varying degrees of success.

This report reviews the available research evidence on the impact of initiatives to reduce PAHs. While many health reform policies and initiatives have been implemented, only those that have been evaluated for their effectiveness in reducing PAHs have been included in this report.

Initiatives to reduce potentially avoidable hospitalisations (PAHs)

An extensive review conducted by the Clinical Epidemiology & Health Service Evaluation Unit²⁰ in Melbourne reported that most large-scale initiatives focused on reducing PAHs in people with

chronic conditions. However, although the AHRQ⁹ recommended that PAHs should be treated as a set if they are to be used as an indicator of primary health care access, evidence from a systematic review²¹ suggests that interventions to reduce PAHs are more effective when they target specific conditions, rather than taking a large-scale policy approach.

This report focused on interventions for three of the most common conditions (identified by AIHW²²) that resulted in PAHs: diabetes complications, COPD and dental problems. Table 1 provides a summary of the risk factors for PAHs and effective programs to reduce PAHs in patients with diabetes complications or COPD.

Table 1 Summary of risk factors for PAHs and initiatives for diabetes and COPD

	Diabetes complications	COPD
Risk factors for PAHs	Low SES Rural/remote location Indigenous background Comorbidity Depression	Low SES Rural/remote location Indigenous background Male
Effective programs: ↓ PAHs ↓ ED admissions ↓ bed-days	HARP ²³ Diabetes Netcare (US) ²⁴ Disease management programs ^{25,26,27,28} Telehealth ²⁹ Specialist diabetes clinics ³⁰	HARP ³¹ Restoring Health program ³² Chronic Care Model ^{33,34} NSW Community Acute Post-Acute Care (CAPAC) service ³⁵ Specialist rehabilitation clinics ^{36,37}
Common characteristics of successful initiatives to reduce PAHs	Multidisciplinary team care Disease management Individually tailored care Integrated care Continuity of care Patient self-management	Multi-faceted approach Patient-centred care Integrated care Continuity of care Patient self-management

Dental conditions

Dental health is integral to overall health status and dental conditions underlie approximately nine per cent of all PAHs in Australia. There is a strong relationship between poor oral health and socioeconomic disadvantage. Although there was no available evidence pertaining to the effectiveness of primary dental care and reductions in PAHs, there was evidence to indicate that poor access to dental care was related to increased hospital admissions for preventable facial infections.³⁸ A suite of oral health initiatives have been proposed and some have commenced (See Appendix D *Oral health initiatives*); however, evaluations are not yet available.

Populations with high rates of PAHs

It is well-accepted that Indigenous Australians and people from low socioeconomic backgrounds often have difficulty accessing primary health care, have poorer overall health, and higher rates of hospital admissions, particularly PAHs.^{39,40,41} However, research evaluating the effectiveness of interventions designed to reduce PAHs in these populations is scarce. Some research indicates that the likelihood of hospitalisations can be reduced using multifactorial approaches^{42,43} as listed in Table 2.



Table 2 Summary of approaches to reduce PAHs in Indigenous populations and people with low SES

Approach to reduce PAHs	Details
Early detection, early treatment and symptom management	Screening Indigenous patients at risk of PAHs ⁴⁴ Managing risk factors and preventing development of comorbidities ^{42,43}
Creating supportive environment	Developing social and disease management capacity in individuals' support network ^{42,43} "Homelands" program for Indigenous population ⁴⁵
Self-management support	Developing individually tailored disease management plans ^{42,43} Patient education and communication, including language and literacy-appropriate materials ⁴⁴
Service delivery and coordination	Evidence-based interventions, care coordination and improved access to care ^{42,43} Comprehensive discharge planning ⁴⁴
Local liveability	Focus on healthy environment, with good air quality and accessibility to primary health care ^{42,43} Primary health care delivered locally in community controlled organisations ⁴⁵
Socioeconomic opportunity	Having adequate resources, income and employment opportunities ^{42,43}

Avoidable hospital readmissions

Readmissions to hospital are also common, costly and often avoidable.⁴⁶ Some research suggests that initiatives involving enhanced discharge and follow-up procedures (to primary health care and community settings) may contribute to lower rates of avoidable readmissions.⁴⁷

While the research evidence in this area is sparse and relatively weak, the common characteristics of some promising interventions to reduce avoidable hospital readmissions include:^{47,48}

- ⇒ *Algorithm to identify high-risk patients*: eg. LACE Index⁴⁶, Patients At Risk of Readmission (PARR) algorithm⁴⁹
- ⇒ *Patient education*: eg. tailored instructions; Teachback technique to confirm patients' understanding of care plan
- ⇒ *Comprehensive discharge planning*: pre- and post-discharge communication with patient's provider and caregivers
- ⇒ *Scheduled follow-up*: telephone communication with patients post-discharge; follow-up appointments.

Conclusions

Targeting reduction in PAHs is a specific objective of health care reform in Australia, with the aim of improving patients' outcomes, reducing pressure on hospitals and enhancing health system efficiency and cost-effectiveness.

This review identified several promising programs to reduce PAHs in chronically ill Australians. Common characteristics of effective initiatives included:

- ⇒ early identification of patients who are at risk of hospitalisation
- ⇒ care coordination and integration of services
- ⇒ enhanced access to primary health care and focus on equity
- ⇒ multidisciplinary care team
- ⇒ disease management, particularly for medium to long-term.



Importantly, it should be noted that reductions in PAHs are not necessarily associated with improved clinical outcomes. In addition, where hospital admissions decrease, the burden on primary health care may increase and resources will be needed to support the demand.



Introduction

The Australian health care system is currently experiencing increased demand due to an ageing population, increase in chronic conditions, and higher expectations regarding service delivery.⁵⁰ In the short term, this is manageable. However, projections indicate that managing the demands on the health care sector in the long term presents a significant challenge.

One approach to reduce this unsustainable health care service demand (and associated costs) is to shift the service delivery focus from the acute to the primary health care sector, thus avoiding costly hospitalisations.¹⁹ A stronger focus on primary health care will not only reduce costs and demand on hospitals, but will also alleviate the significant distress that patients experience when they are hospitalised for a condition that has reached a level requiring an acute care response.⁵¹

This report focuses on the use of potentially avoidable hospitalisations (PAH) as an indicator of primary health care accessibility and effectiveness. It reviews the relevancy of PAHs as an indicator of primary care effectiveness and the key contributors to PAHs in Australia. Finally, the report reviews interventions, programs and initiatives that mitigate PAHs in Australia and internationally. Although reducing PAHs is a key aim of a range of different health reforms, from the policy level through to clinical settings, this review included only the initiatives that have been evaluated in terms of their effectiveness in reducing PAHs.

Rationale for PAHs as an indicator of primary health care efficiency and effectiveness in Australia

The idea of measuring PAHs as a litmus test for the efficiency and effectiveness of the primary health care sector was introduced in the early 1990s. Since then, PAHs have attracted a high level of interest from researchers and policy makers alike, most recently in Australia. Currently, PAHs are included in the objectives of Australia's National Health Performance Framework¹⁷ and the National Strategic Framework for Aboriginal and Torres Strait Islander Health (NSFATSIH).¹⁸

Australia's commitment to reducing the rates of PAHs has been articulated most recently in a Council of Australian Governments (COAG) agreement.¹⁹ This COAG agreement set nine performance benchmarks for the National Healthcare Agreement. The seventh of these aims to reduce the proportion of PAHs by improving primary health care so that it equates to 8.5 per cent of total hospital admissions by 2014-15.¹⁹



Method

This report followed a 'rapid review' format. Rapid reviews are short literature reviews that focus on research evidence, with a view to facilitating evidence-based policy development. Due to the short timeframe for this review (8 weeks), searches and critical appraisal of the literature were not systematic or comprehensive. In order to obtain the most relevant material quickly, search terms varied across different databases. Consequently, replication of this review may result in a different literature base.

The issue under investigation centred on interventions to decrease the rates of PAHs. Specifically, this review sought to address the following:

What does the local and international research literature tell us about hospital admissions that are potentially avoidable related to improved primary health care service delivery, including measures of success, causation and pathways?

The literature search was not limited by time period, as much of the research on PAHs was conducted in the early 1990s. Likewise, no limits were placed on location or setting, though research undertaken in notably different environments such as the US, or within Health Maintenance Organisations have been flagged as such. Only initiatives that were evaluated for their impact on reducing PAHs were included. Both grey and peer reviewed literature were included in this report.

A range of definitions have been used for PAHs depending on the context and country. Examples include "ambulatory care sensitive conditions", "potentially preventable hospitalisations" or "potentially avoidable hospitalisations".^{52a} The approach used in Australia (including the Health Performance Framework and AIHW)¹⁷ is based on the "potentially avoidable hospitalisations" framework. While there may be some differences in definitions, most research uses the terms interchangeably. Therefore, for consistency throughout this report, we have used PAHs, which are defined as:

*... certain conditions for which hospitalisation is considered potentially avoidable through preventive care and early disease management, usually delivered in a primary care setting, for example by a general medical practitioner, or at a community health centre.*⁵³

Although the search strategy for this review did not specifically include avoidable hospital readmissions, there was some overlap in the literature and some evidence to suggest that readmissions to hospital may be prevented through appropriate primary health care post-discharge. Therefore, a brief section on avoidable hospital readmissions has been included in this report.

Full details of the methods used in this review are available in Appendix A *Expanded methods*.

^a Although these terms have different meanings, a comprehensive explanation of the differences is beyond the scope of this review. For more information on the difference between these definitions see⁵²



PAHs and their prevention

The concept of PAHs

Early research on PAHs originated in the US in the 1990s, when two groups of researchers developed disease- and condition-based lists of PAHs. First, Weissman and colleagues proposed a set of 12 conditions for PAHs in 1992.⁵⁴ One year later, Billings developed an expanded set of 28 conditions for PAHs,⁵⁵ which included those in Weissman's classification. Billings⁵⁵ conceptualisation is used most widely in the research literature, as well as in the Australian policy environment (such as the Health Performance Frameworks). Regardless of the classification system, both sets were confirmed by a panel of physicians.^{54,55} Each definition stipulates that certain disease-specific hospitalisations are avoidable if patients receive appropriate primary health care,^{9,17} particularly by:

- ⇒ immunisation
- ⇒ preventing the onset of a condition
- ⇒ early detection
- ⇒ controlling a condition
- ⇒ managing an ongoing chronic condition
- ⇒ appropriate interventions of an acute condition.

PAHs^b are categorised broadly into three types:⁵⁶

- ⇒ Vaccine-preventable: good access to health care services may reduce the incidence of preventable diseases.
- ⇒ Acute: timely and appropriate primary health care may reduce morbidity and pain and prevent a condition from worsening and leading to hospitalisation.
- ⇒ Chronic: effective primary health care management may reduce effects of chronic disease and prolong life.

Most PAHs are relatively common hospital admissions, such as influenza, asthma and diabetes complications.⁹ A summary of conditions included in the National Performance Framework is shown below in Table 3, with a full list of conditions provided in Appendix B *Avoidable hospitalisations included in the Australian Health Performance Framework*.

Table 3 Summary of PAHs used in the Australian Health Performance Framework¹⁷

Vaccine-preventable	Acute
Influenza and pneumonia	Dehydration and gastroenteritis
Other vaccine-preventable	Pyelonephritis
Chronic	Perforated/bleeding ulcer
Asthma	Pelvic inflammatory disease
Congestive heart failure	Cellulitis
Chronic obstructive pulmonary disease	Pelvic inflammatory disease
Angina	Ear, nose and throat infections
Iron deficiency anaemia	Dental conditions
Hypertension	Appendicitis with generalised peritonitis
Nutritional deficiencies	Convulsions and epilepsy
Rheumatic heart disease	Gangrene

[Source: AIHW, 2011]

^b Classification for ACSCs (Ansari, 2007). For consistency and to avoid confusion, PAHs are used here.



Trends in rates of PAHs

Increasingly, PAHs are seen as an important indicator of primary health care accessibility and effectiveness. This has led to regular data collection that allows for examination of trends and regional comparisons. Over time, the numbers of PAHs have decreased from a peak in the 2007-08 period, where 33.3 (per 100,000) hospital separations were attributable to PAHs (see Figure 1 below).^{1c}

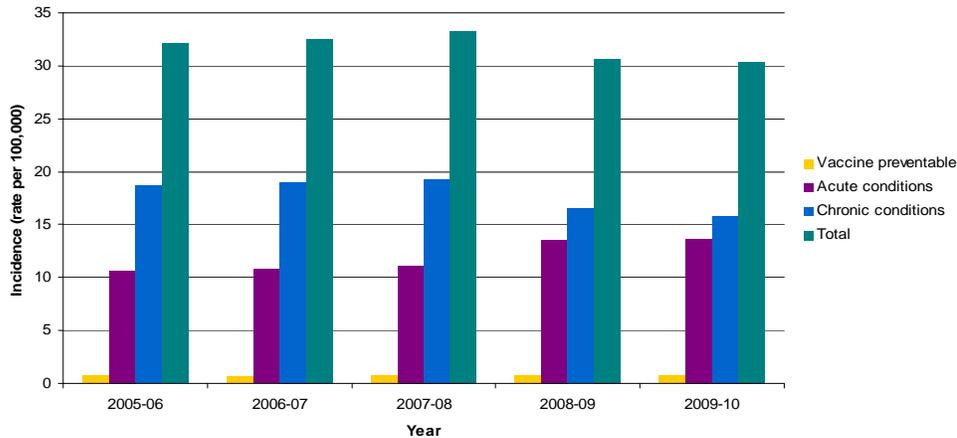


Figure 1 Changes in the rates of PAHs over time in Australia⁶

The rates of PAHs are also affected by geographical location. Remote areas experience much higher rates for all types of PAHs, as shown below in Figure 2.

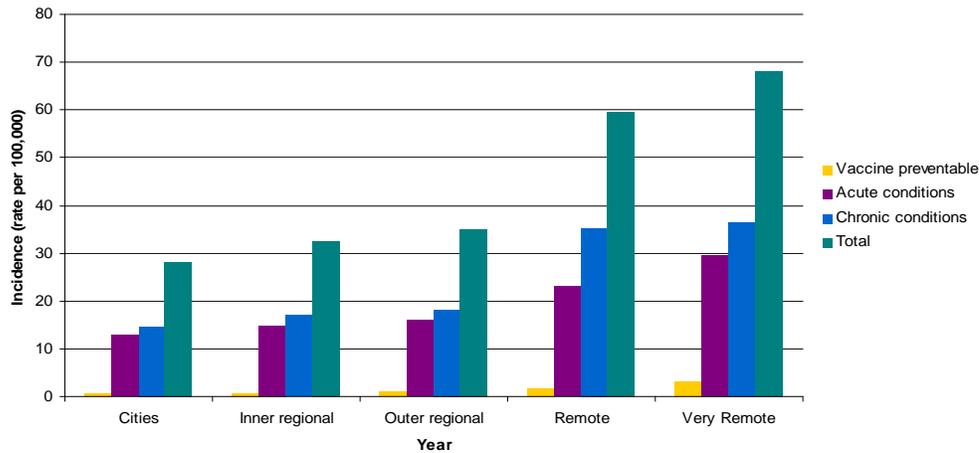


Figure 2 Changes in the rates of PAHs based on rurality⁶

^c The Productivity Commission⁶ issued the following statement regarding longitudinal comparisons of diabetes data “Caution should be used in comparing these data to earlier years as changes between ICD-10-AM 5th edition and ICD-10-AM 6th edition and the associated Australian Coding Standards apparently resulted in decreased reporting of additional diagnoses for diabetes, and increased reporting of gastroenteritis (chronic and acute categories, respectively).”



There is also substantial variation between the States and Territories of Australia. Western Australia has the highest proportion of PAHs, whereas the Australian Capital Territory has the lowest rate (see Figure 3).

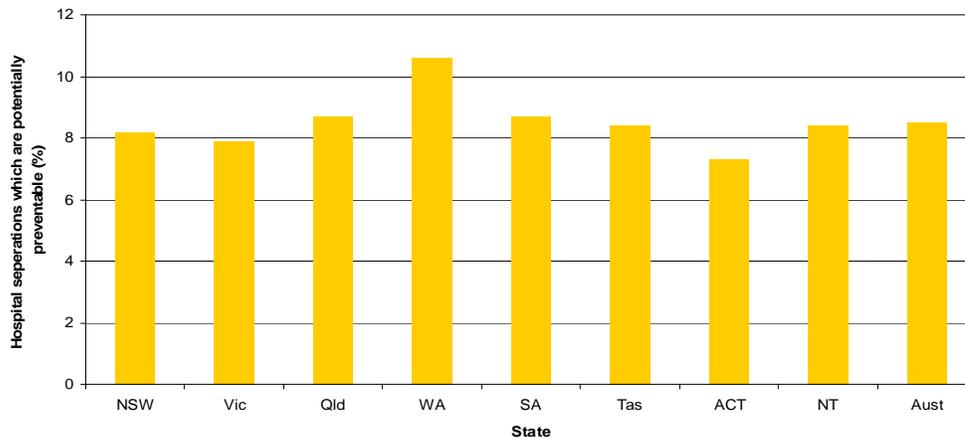


Figure 3 Proportion of hospitalisations that are avoidable, disaggregated by State and Territory⁶

PAHs as an indicator for primary health care effectiveness

PAH is often used as an indicator of access to primary health care,^{14,57,58} particularly at an area level.⁵⁹

General caveats

The extent to which PAHs are avoidable is difficult to measure or estimate.⁹ It must be noted that events that are classified as PAHs are not always avoidable. Indeed, in some cases where there is inevitable physical degeneration, such as in COPD, it may be appropriate for hospitalisation to occur.⁹ A full discussion of this issue is addressed in the following section on *Factors that promote or inhibit rates of PAHs*.

Given the number of factors that can affect rates of PAHs (beyond accessibility to primary health care), the interpretation of statistics regarding rates of hospitalisation should be treated with caution. An extensive US review of PAHs as an indicator of primary health care effectiveness recommended that PAHs should be interpreted as a *set* rather than examined as individual, disease-specific groups.⁹ This is due in part to statistical unreliability that occurs when there are small numbers with a particular disease.⁹ This review also suggested that most indicators should be adjusted for demographic factors, such as the age of the population in a particular area as both older age and rurality are risk factors for PAHs.^{9,60} In particular, all vaccine-preventable and most acute PAHs should be treated as a set, with a view to developing targeted interventions delivered at the local level.⁵⁹

It is also worth noting that higher rates of hospitalisation for PAHs are not always indicative of poorer access to primary health care. Higher rates of hospitalisation may represent *better* levels of primary health care, rather than deficiencies, as more impairments may be detected in the community.¹¹



Caveats in Australia

Data on PAHs are collected by the Australian Institute of Health and Welfare (AIHW)⁶ from almost all public hospitals and most private hospitals in Australia. Data are coded according to the patient's usual address, and exclude emergency department presentations and services provided on an outpatient basis.

The validity of data for this indicator depends on the way in which patients' illnesses or conditions are coded on admission to hospital. Differences in the way that clinicians code these admissions, both within and across hospitals, result in variations in reported statistics.^{6,10} In addition, hospitals differ in their admission policies, and this may also affect the rates of reported PAHs.⁶¹

Factors that promote or inhibit rates of PAHs

Accessibility of primary health care services

Rates of PAHs are often used as an indicator of the accessibility of primary health care.^{7,8} As Gresenz notes: "While a range of factors contributes to [PAH] rates, evidence suggests that a key determinant is the availability of primary care."⁶²

Indeed, many studies show that access to primary health care is strongly associated with the rates of hospitalisation for avoidable conditions.² Evidence supporting the link between accessibility to primary health care and rates of PAHs come from a number of different sources, including higher rates of avoidable hospitalisation when there is:

- ⇒ Poorer self-reported access to medical care^{3,63}
- ⇒ Higher costs for the consumer⁵
- ⇒ Lower ratios of GPs to population^{4,8}
- ⇒ Increasing socioeconomic disadvantage^{2,8}
- ⇒ Lower numbers of GP consultations^{2,8}
- ⇒ Greater remoteness.^{2,8}

However the degree to which PAHs are actually avoidable differs according to the timeliness and appropriateness of interventions in primary health care.^{8,64} In addition, a range of factors beyond access to primary health care services may promote or inhibit the rates of avoidable hospitalisation.

Other factors

While it is acknowledged by most researchers that there are numerous factors other than accessibility that lead to an avoidable hospitalisation, models to test the combination of factors have not been articulated in the peer-reviewed literature.⁴² Research has focused primarily on single factors and their association to the rates of PAHs. These factors are described in Table 4.

Each of these factors interacts to produce multilayered risk or protective factors.^{14,42} It is also difficult to separate the many factors that act as proxies. For example, air quality is associated with higher rates of PAHs.⁶⁵ However, given that air quality tends to be lower in more disadvantaged areas, it is difficult to separate the effects of air quality versus SES on PAHs.



Table 4 Factors that are associated with inhibiting or increasing rates of PAHs

Category	Factor	Details	Degree of effect	Strength of evidence
Individual level variables	Age ^{9,14,66,67,68,69,70,71}	Over 65s and, to a lesser degree, young people/children (especially neonates) have higher rates of hospitalisation.	Strong	Very strong
	Gender ^{15,71,72,73,74}	Men are more likely than women to be hospitalised, though this may be moderated by stress. Women have more hospitalisations for asthma.	Moderate, but many confounding factors	Moderate
	Socioeconomic status ^{12,75,76,77,78}	Lower socioeconomic status is associated with higher rates of hospitalisations. Most pronounced effect is on the elderly.	Strong	Very strong
	Ethnicity, including Aboriginal and Torres Strait Islander people ^{16,79,80,81,82,83,84}	Minority groups are more likely to be hospitalised, though it is difficult to separate the contribution of ethnicity from socioeconomic status.	Very strong	Strong
	Social support ^{85,86,87}	People who have a low level of familial support are at greater risk for hospitalisation.	Moderate	Moderate
	Living arrangements ^{71,81,88,89,90}	Higher risk for crowding, though this may be confounded by SES. Overall, the results were inconclusive.	Strong for crowding; overall inconclusive	Weak
	Medication ^{89,91}	Use of drugs is associated with higher hospitalisations, because of its use in more serious cases of chronic disease. Non-adherence is associated with higher rates of hospitalisation.	Moderate	Weak.
	Health status ^{73,92}	Lower self-rated quality of life and functioning was associated with higher rates of hospitalisation.	Moderate	Very strong
	Mental health ^{93,94}	Poor mental health leads to higher hospitalisations, though the relationship interacts with many factors including the nature of the mental and physical health conditions and rurality.	Moderate	Moderate
	Comorbidity ^{13,66,67,95}	The chance of hospitalisation increases exponentially with every comorbid chronic condition However, evidence from Australian studies shows that comorbidities make no significant contribution to rates of PAHs. ^{2,8,96} Poorly recorded data, involving coding errors that omit comorbidities, limit interpretation of these findings. ⁸	Very strong	Very strong
Severity of health condition ⁹⁷	Severity of health condition	Moderate	Weak	



Health service system factors	Prior hospitalisation ^{67,81,98,99}	Prior hospitalisation is a significant predictor of PAHs. Particularly strong evidence for respiratory conditions.	Moderate	Strong
	Availability of GP services ^{4,71,88,100}	More GPs per 100 000 is associated with fewer PAHs. This holds even after controlling for income, though does not control for disease prevalence.	Moderate	Strong
	Availability of hospital beds ⁶⁷	More hospital beds are associated with greater PAHs. This is confounded by socioeconomic and lifestyle risk factors.	Moderate	Weak
	Coordination of care or integrated services ^{101,79,102,103,104}	Good continuity of care is associated with lower hospitalisations.	Weak-moderate	Very strong
	Physician characteristics ^{9,67}	Experienced physicians have a lower rate of hospitalisations. Inconclusive results for the use of guidelines in clinical practice, particularly because they are confounded by socio-demographic factors.	Weak	Weak
	Self-management supports ^{79,90,98,104}	Self-management is associated with lower rates of hospitalisation, though most research has been conducted with asthma.	Weak	Weak
Environ-mental factors	Air quality ^{65,68,88,105}	Temperature, air pollutants (ozone, carbon monoxide, sulphur dioxide and nitrogen dioxide) and allergens are associated with higher hospitalisations for respiratory PAHs.	Weak	Moderate
	Distance to hospital topographical factors ¹² and rurality ^{1,22,77,106,107}	Contradictory findings: Some studies reported that as distance to hospitals increased, hospitalisations decreased. Other research showed increasing rurality increased hospitalisations; those living very close and very far from hospitals had high hospitalisations, and people living a moderate distance had the lowest rates.	Moderate-Strong	Moderate



Initiatives to reduce PAHs

Overview

The AIHW¹ identified three sub-types of PAHs: vaccine-preventable, acute, and chronic conditions. In 2009-10, chronic conditions were the most common type of PAH. This was largely due to high rates of diabetes complications, which comprised approximately 24 per cent of all PAHs. Other conditions for which there were high rates of hospitalisation included COPD, dehydration and gastroenteritis, and dental conditions. Table 5 shows the numbers of PAHs in Australia in 2009-10.

Table 5 Numbers of hospitalisations for avoidable conditions in Australia 2009-10^{d1}

Type	Number
Vaccine-preventable	17 895
Influenza and pneumonia	13 905
Other Vaccine-preventable conditions	4 018
Acute conditions	309 864
Appendicitis with generalised peritonitis	4 254
Cellulitis	40 181
Convulsions and epilepsy	33 241
Dehydration and gastroenteritis	66 259
Dental conditions	60 251
Ear, nose and throat infections	34 870
Gangrene	5 438
Pelvic inflammatory disease	4 635
Perforated/bleeding ulcer	5 279
Pyelonephritis	55 616
Chronic conditions	371 126
Angina	33 469
Asthma	39 166
Chronic obstructive pulmonary disease (COPD)	62 179
Congestive cardiac failure	45 805
Diabetes complications	166 126
Hypertension	6 393
Iron deficiency anaemia	28 385
Nutritional deficiencies	236
Rheumatic heart disease	2 607
Total potentially preventable conditions	695 560

[Source: AIHW, 2010]

The following sections present evidence of effectiveness for two types of approaches:

- 1 *Large-scale initiatives*: Interventions that have been implemented generally to people with a chronic disease or acute condition
- 2 *Disease-specific initiatives*: Interventions that have targeted populations with a specific condition.

^dNote that the totals are not the sum of the counts of the PAHs. It is believed that this is due to numerical randomisation initiated by AIHW to preserve patient confidentiality. AIHW was contacted for further information but no further information could be obtained.



Other approaches, which may be implemented as a secondary means to avoiding hospitalisation, involve improving access to primary health care and health promotion. A discussion of these approaches is provided in Appendix F *Other approaches to reduce PAHs*.

Large-scale health interventions to reduce PAHs

A number of policies that have been developed at the national and State or Territory levels directly or indirectly aim to reduce the rates of PAHs. These policies differ in the extent to which they identify reduced hospitalisation for PAHs as a successful outcome of the policy.

Policies or initiatives also differ in the type of PAHs they target: vaccine-preventable conditions, chronic conditions or acute conditions. In a large research project, the CEHSU²⁰ interviewed key informants and conducted a search to identify policies or initiatives aimed at reducing PAHs. The types of PAHs these policies and initiatives target are shown in Table 6. A full list of the policies can be found in Appendix C *Policies that focus on reducing PAHs*.

Table 6 National and State or Territory initiatives that focus on reducing PAHs

	PAH Condition types			
	Vaccine	Chronic	Acute	General
National	✓	✓		✓
Australian Capital Territory	✓	✓		✓
New South Wales	✓	✓	✓	✓
Northern Territory	✓	✓		
Queensland		✓		✓
South Australia		✓		✓
Tasmania		✓		✓
Victoria	✓	✓		✓
Western Australia	✓	✓		✓

[Source: CEHSU, 2009]

It is worth noting that many of these initiatives may have articulated avoiding PAHs as the rationale for the policy, however they did not evaluate them as an outcome measure. Those that did use rates of PAHs as an outcome measure are presented below in Table 7, including results of the evaluations.



Table 7 Policies or programs that focus on reducing PAHs

Policy/Program ^e	Target population	Key features of the program or policy	Evaluation findings ^f
NSW Chronic Care Program ³³	General population with chronic disease (and their carers)	<ul style="list-style-type: none"> • Patient-centred approach to service delivery • Build patient self-management capacity • Focus on timely access to care • Promote health service integration for patient continuity of care • Develop systems to promote long-term management of care. 	<p>As a proportion of all NSW admissions, data showed:</p> <ul style="list-style-type: none"> • Heart failure admissions were significantly lower for October, November and December in 2004 than for the same months in 2003. • COPD admissions were significantly lower in November and December 2004 than for the same months in 2003, though in May and October there were significant differences in the opposite direction.
NSW Community Acute Post-Acute Care (CAPAC) Service ³⁵	General population with selected acute and chronic conditions	<ul style="list-style-type: none"> • Multidisciplinary clinical care to people in the community to manage their condition at home and prevent deterioration • Clinical care to patients who have had an operation and can be discharged early to recover at home rather than in hospital. It is generally only for the short term (5-14 days). • "Hospital in the Home" Initiative. 	<ul style="list-style-type: none"> • Approximately 45 000 patients per annum were treated through the CAPAC program at half the cost of inpatient treatment. • For some medical conditions, length of stay was reduced for an average of 2 days. • In a metropolitan Sydney hospital with an established CAPAC program, 30% of cellulitis presentations to the ED were seen by the CAPAC service, avoiding admissions to hospital which equated to 741 bed days saved. • For acute complex respiratory conditions, admissions reduced from 4 per annum to less than 1 per annum. Length of stay reduced from 6.9 days to 4.2 days.
HealthOne NSW ¹⁰⁸	General population with chronic conditions	<ul style="list-style-type: none"> • Integrated care provided by general practice and community health services (and other services – allied health, specialists) • Multidisciplinary team care (eg. GPs, practice nurses, allied health professionals, health educators) • Continuum of care from prevention to management of complex/chronic conditions • Client and community involvement 	<p>This is currently being evaluated by Professor Steven Leeder, University of Sydney. Anecdotal evidence suggests the model is successful - pending the outcome of the evaluation.</p>

^e Only programs that have been evaluated, or are being evaluated, are included here.

^f Note: only the avoidable hospitalisation findings are reported here. See evaluations for the full results.



NSW Healthy at Home ¹⁰⁹	Frail older people in the community, aged over 65 years (over 45 years for Indigenous people)	<ul style="list-style-type: none"> • Referral Information Centre • Rapid response health service teams • Case management services • Case managed package of care for up to 6 weeks. 	<p>Promising results were reported. However, the quality of the evaluation was poor, due largely to a lack of planning for evaluation at the outset of the program, and an inability to obtain patient data (including hospitalisation data).</p> <p>It was estimated that 79% of clients would have been hospitalised had they not been referred to this program.</p>
Victoria: Hospital Admission Risk Program Chronic Disease Management (HARP CDM) ²³	People with chronic heart disease, chronic respiratory disease, diabetes, complex psychosocial needs and older people with complex needs	<p>HARP was implemented through a series of competitively funded community and hospital based projects and comprises a range of prevention initiatives that have the potential to affect hospital emergency demand. These include:</p> <ul style="list-style-type: none"> • Comprehensive assessment and individualised care planning • Comprehensive transition and discharge planning • Secondary preventive care • Ongoing monitoring and review • Specialist medical and GP management • Self-management advice • Other specialist and allied services where needed. • After-hours support • Multidisciplinary team care • Carer involvement 	<p>Overall HARP has resulted in:</p> <ul style="list-style-type: none"> • 35% fewer ED attendances • 52% fewer ED admissions • 41% fewer days in hospital <p>The reduced need for hospital services was equivalent to approximately one ED attendance, 2 ED admissions, and 6 days spent in hospital each year for every HARP patient.</p> <p>HARP patients with multimorbidity experienced:</p> <ul style="list-style-type: none"> • 49% fewer ED attendances • 61% fewer ED emergency admissions • 57% fewer days in hospital. <p>There was no difference in the pattern of ongoing hospital use (presentations, admissions and number of nights spent in hospital) for both HARP and non-HARP patients with CHF.</p>
Victoria: Early Intervention in Chronic Disease in Community Health (EliCD) ¹¹⁰	General population with chronic conditions who are at high risk of hospitalisation in medium to long-term	<p>This program developed a set of models, with leadership from community health services and Divisions of General Practice that target people with chronic conditions.</p> <ul style="list-style-type: none"> • Multidisciplinary care team • Patient education • Care coordination • Self-management support • Flexible service delivery and models of care tailored to needs of local population. 	<p>Patient self-reported health care utilisation (in 12 month prior) was collected, and showed that hospital admissions decreased slightly from 199 (30.0%) at baseline to 88 (27.2%) at 6 months; but had increased slightly for chronic disease admissions from 58.7% to 63.6%.</p>



<p>Most States and Territories have programs that provide hospital care in the home: Hospital in the Home^g (HITH)^{111,112}</p>	<p>General population with selected acute and chronic conditions</p>	<p>A multidisciplinary team of health care providers (eg. doctors, nurses, physiotherapists) provide treatment services for patients in their own homes. Patients may be eligible for the program without being admitted to hospital; or they may be discharged early to receive ongoing treatment at home.¹¹³</p>	<p>Evidence from systematic reviews suggested that mortality, morbidity and hospital readmissions were not significantly different between HITH and hospital care. HITH patients had:</p> <ul style="list-style-type: none">• Decreased length of hospital stay• Higher levels of satisfaction• No increase in carer burden <p>No evidence of lower cost-effectiveness.¹¹⁴</p>
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^g Also known as Hospital at Home or Home-based primary health care.



Disease-specific initiatives

As stated previously, the ARHQ⁹ recommends that avoidable hospitalisation statistics should not be interpreted on a disease-by-disease basis, as the indicator was developed to measure access to primary care. However, many interventions to reduce PAHs respond well to condition-specific interventions and lack of disease or population specificity is a key criticism of large-scale policy approaches to reducing PAHs.²¹

PAHs for diabetes complications

Hospitalisations for people experiencing diabetes complications are problematic in Australia and around the world.^{115,116,117} In Australia, diabetes is the most common condition for which hospitalisation may be avoided.^{1,22,64,106} Patients who are hospitalised due to diabetes are also more likely to have extended hospital stays, and multiple hospitalisations.¹¹⁸

Responsibility for the care of people with diabetes has shifted from hospitals to primary care, with multiple studies demonstrating that care in primary health care settings can be as good as hospitals, improve disease status,^{119,120} and reduce PAHs.¹²¹ While diabetes complications were the most common presentation in Australia,¹ most research on diabetes and PAHs is from overseas, with some Australian studies undertaken in Victoria.^{2,59} Diabetes complications accounted for 23.8 per cent of all PAHs across Australia. Although the number of avoidable hospitalisations has steadily decreased from 9.9 (per 1 000) reported in 2005-06 to 7.1 (per 1 000) in 2009-10, there have been changes in the coding of diabetes in the ICD, and this decrease should be treated with caution as it may not represent a real drop in admissions.^h

Certain factors are likely to increase the likelihood of presenting to hospital for diabetes complications. These are shown in Table 8.

Table 8 Factors associated with an increased risk for diabetes PAHs

Factor	Explanation
Rurality ^{1,122}	PAHs were much lower in major cities compared to more rural areas. Admission rates for diabetes complications were higher in rural areas compared to metropolitan Melbourne ¹²³
Socioeconomic status ^{1,122}	PAHs in the lowest SES group were more than twice as likely as in the highest SES group.
Comorbidity ⁹⁵	Comorbidity complicates the diagnosis and treatment of diabetes and other complications, particularly in the elderly.
Depression ^{124,125}	Depression is associated with a high risk of hospitalisation, even when controlling for age, gender and other demographics. Treating depression reduces this risk through improved self-management.
Socioeconomic status or disadvantaged subpopulations ^{77,126}	Diabetes hospitalisations show a clear association with the socioeconomic gradient.
Indigenous status ¹⁸	From July 2006 to June 2008, diabetes complications were the most common type of ambulatory care sensitive condition among Indigenous Australians, who were hospitalised at around eight times the rate of other Australians.

^h The Productivity Commission⁶ issued the following statement regarding longitudinal comparisons of diabetes data “Caution should be used in comparing these data to earlier years as changes between ICD-10-AM 5th edition and ICD-10-AM 6th edition and the associated Australian Coding Standards apparently resulted in decreased reporting of additional diagnoses for diabetes, and increased reporting of gastroenteritis (chronic and acute categories, respectively).”



The following section reviews interventions that have been investigated for their potential to reduce PAHs in individuals with diabetes.

Comprehensive disease management programs

Comprehensive disease management programs are “care-based programmes managed by multidisciplinary teams of physicians (primary care and specialist physicians in some cases), and nurses (including nurse practitioners)”.¹²⁷

An Australian initiative, the *Restoring Health Program*, has shown promising results using a multifaceted approach to diabetes management, heart failure and COPD.³² Established at St Vincent’s Hospital in Melbourne, the *Restoring Health Program* is a multi-disciplinary model of care that incorporates a number of key elements: hospital-based key contact liaisons, community-based outreach nursing and allied health staff, outpatient disease-specific rehabilitation programs, and a rapid access outpatient clinic for urgent medical assessment. Emergency department presentations, hospital admissions and length of stay decreased significantly between six months pre-recruitment and six months post-recruitment for all three disease groups.³²

A number of studies were carried out in health maintenance organisations (HMOs).ⁱ One large US initiative, entitled *Diabetes Netcare*, was evaluated in a group of 7 000 individuals with diabetes.²⁴ This program was based on a landmark multicentre trial (the Diabetes Control and Complications Trial)^j, which showed beneficial outcomes for the diabetes population. However, the earlier program was expensive and the study was criticised for the way in which the sample was selected. Therefore, *Diabetes NetCare* aimed to offer a more cost-effective option with a representative sample of diabetes patients.

Using a population-based approach, which distinguishes it from other diabetes management programs, *Diabetes NetCare* had unrestricted access to their diabetes patients, including all care they receive, and their clinical information.²⁴ This allowed the HMO to manage all aspects of medical care, working with patients and their GPs to encourage best practice care procedures, and self-management behaviour in their patients. Patients and GPs received training specific to their needs, according to available GP performance data and patient care information. Nursing case managers were responsible for coordinating health care needs and facilitating service integration at the patient level.

Hospital admissions for members with diabetes decreased by 18 per cent over the trial period, and bed days fell by 21 per cent.²⁴ This was associated with a significant increase in the processes of care, such as foot and eye examinations, cholesterol tests and HbA1c monitoring. Over the period of the study, this resulted in savings of USD\$50 per patient per month; and when broken down by source, savings were attributed primarily to the decrease in hospitalisations. However, some costs increased, particularly in relation to prescriptions.

ⁱ Programs delivered within HMOs have the benefit of contracting medical and allied health practitioners under performance management agreements, which is not possible in fee-for-service environments like Australia. They are able to offer more integrated services due to this direct contractual relationship with providers.²⁴ It is also worth noting that HMOs must consider short term financial returns due to member turnover and competitive pressures.²⁴ For this reason, efficiency is a key part of these program evaluations.

^j Cited in Rubin et al. (1998)²⁴



Another comprehensive US disease management program for adults with diabetes involved two-hourly group meetings with a range of allied health professionals (overseen by two diabetologists) for a period of six months.²⁵ Patients also received support and ongoing management and telephone reviews with a nurse at least twice a month. The program successfully reduced HbA1c levels, improved patients' ability to manage their own illnesses and significantly reduced the rates of hospitalisations and emergency department use. The rates of hospitalisations were around 80 per cent higher in people who did not use the program, compared to those who did.

A number of other managed care programs have been developed with similar positive results. These include programs for young people²⁷ and the general population.^{26,28} Lower rates of hospitalisations were also observed in Aboriginal Australians participating in a disease management program that included a visiting specialist service and upskilling of Aboriginal Health Workers.¹²⁸

In contrast, several high quality studies that examined diabetes management programs resulted in no reduction in hospitalisations. One example is a randomised controlled trial¹²⁹ of 169 patients from a Kaiser Permanente HMO. Patients met with a nurse-care manager to establish goals; they attended group sessions once a week for four weeks; and received telephone calls to manage medications and self-care activities. Although there were significant improvements in medical outcomes for the patients compared to usual care group, there were no significant changes in emergency room visits, or days of hospitalisation between the two groups. Importantly, the improvements occurred without increasing physician visits.

Telehealth or ehealth programs

Telehealth or ehealth programs are "applications or interventions that included use of telephones, modems, or other modes of distance communication as a primary means of health care provision".²¹ Although a number of research projects examined the impacts of different forms of telehealth interventions, most of them did not use PAHs as an outcome measure.

One study that did assess PAHs focused on diabetes management in the US Department of Veterans affairs using a telephone-based, nurse-coordinated service.¹³⁰ Each day over a period of 24 months, patients completed a scripted survey regarding diabetes control and general health status. Nurse care coordinators monitored responses daily and made clinical judgements about whether patients should phone or make an appointment with their physician. The program was successful, with the treatment group exhibiting a statistically significant reduction in the likelihood of hospitalisations, both diabetes and non-diabetes related. It also resulted in fewer primary care clinic visits initiated by the care coordinator.

Specialist clinics

In some situations, it can be difficult to meet the needs of patients with diabetes in brief problem-focused office visits. Specialised diabetes clinics can potentially achieve better outcomes than usual generalist care as they can target the needs of diabetic patients. A number of high quality randomised controlled trials have been conducted to evaluate the use of specialist clinics for avoiding hospitalisations, with varying results.

Edward Wagner (who famously developed the Chronic Care Model) and his colleagues²⁹ conducted a high quality trial for adults with diabetes. Practices were recruited to deliver half-day chronic care clinics for groups every 3-6 months. Each clinic consisted of an individual assessment, primary care physician, nurse, and pharmacist, as well as group education support. Intervention patients had slightly more primary care visits, but significantly fewer speciality and emergency room visits. At



24-month follow-up, specialist visits decreased significantly and hospital admissions decreased for both the intervention and control group, but this was not statistically significant.

Specialist outpatient clinics were more successful in reducing hospitalisations for diabetes. In the UK, Mahto and colleagues³⁰ reconfigured a specialist inpatient diabetes clinic for use as an outpatient setting. This was an interesting intervention as it dealt with cases of varying complexity, promoted integration between the primary and acute care setting, and patients were triaged to see a diabetes nurse, GP, or specialist depending on their case. This approach reduced the number of inpatients by around 35 per cent, which included both diabetes and general admissions.

Whilst not strictly primary care, a similar study,¹³¹ which investigated the effect of a specialist diabetes team visiting hospitalised patients, may be applied in a primary health care environment. The team, consisting of an endocrinologist, diabetes nurse, social worker and dietitian, visited the patient daily. Compared to those who received no treatment, significantly fewer diabetes patients in the intervention group were readmitted for treatment; and importantly the length of hospital stay was reduced in those who were admitted. The high level of patient contact may be a key factor in the success of these studies.

Despite these reported successes, evidence (including a systematic review) suggests that while specialist clinics conducted by specialist diabetic nurses or physicians decreased the rates of hospital admissions in the short term, this was not maintained in the long term.^{132,133}

One example of a specialist clinic for complex diabetes care in Australia is the Inala Primary Care beacon practice in Queensland. Using the Primary Care Amplification Model^k of practice, Inala has significantly improved access to primary health care and patient outcomes, particularly for Indigenous patients with diabetes complications.¹³⁴ However, it is unknown whether this model of practice has reduced the rate of PAHs for diabetes complications in this population.

System level approaches

Few projects that focused on systems level approaches measured hospitalisations as an outcome. Systems level interventions include “all interventions that were targeted at the level of health care delivery systems”.²¹

A large survey of general practices in the UK¹³⁵ found that patients attending practices with more facilities and more organised care had fewer hospital admissions. The kinds of facilities they measured were extensive, and ranged from technical skills, infrastructure, specialist GP skills, and the presence of allied health professionals relevant to diabetes management, such as dietitians and podiatrist. While the difference in hospitalisations between practices with and without facilities was statistically significant, the practical significance of this difference is minimal.

Summary of interventions for diabetes

In essence, high quality care for diabetes is based on proper prevention, coordination of care among a multidisciplinary team of health care professionals, enhanced patient-provider relationships, and patient self-management skills.

^k PCAM is an extended general practice model that unites local general practices around a ‘beacon’ practice, and integrates with services, such as nursing, allied health, and specialist, according to local needs.¹³⁴



Given the small number of studies, it is difficult to make definitive statements about the effectiveness of diabetes interventions for reducing hospitalisations. Despite this, a number of trends have appeared in the research reviewed for this report. These are shown in Table 9.

Table 9 Summary of approaches to avoiding hospitalisations

Approach	Key points
Disease management	<ul style="list-style-type: none"> Individually tailored programs (for both the patient and practitioner) are successful Multidisciplinary approaches are successful, and potentially less costly There may be a dose-response effect in terms of patient contact time, and the success of an initiative A long-term perspective may be necessary for the success of diabetes interventions Self-management per se is not sufficient to produce changes in hospitalisation.
Telehealth	<ul style="list-style-type: none"> There is some evidence of success with veterans, though more research is required to substantiate the findings There is some reduction in hospitalisations for diabetes as well as comorbidities.
System level	<ul style="list-style-type: none"> More facilities and focus on diabetes in practices results in less hospitalisations, though this evidence is weak. Specialist diabetes clinics appear to have success. These seem to be successful with both endocrinologists and GPs, though the latter is more cost effective.

There are a few important factors that may help explain why some studies did not find significant reductions in avoidable hospitalisations. Firstly, interventions may only have small gains for some populations, particularly in elderly populations with multiple chronic diseases. This improvement may compound over time, as many of these interventions only looked at improvements over the short term.

Secondly, studies may vary in their definition of an avoidable hospitalisation, and also in the sample used (eg. age, comorbidities). This makes comparisons difficult. Specific interventions mentioned in this report were more helpful for some groups compared to others. For example, telemedicine was more useful for older people, but not for young people; and some interventions were not effective for some disadvantaged groups.^{21,130} Overall, education and self-management programs alone were not effective.

PAHs for Chronic Obstructive Pulmonary Disease

Chronic obstructive pulmonary disease (COPD) is a progressive and disabling disease, where destruction of lung tissue and narrowing of air passages leads to shortness of breath and reduced capacity for activity and exercise.¹³⁶ The most important risk factor for COPD is cigarette smoking.^{136,137,138} Other risk factors include certain genetic characteristics and occupational exposure to dust and fumes; indoor and outdoor air pollution; and passive smoking may also play a role.^{136,137,138} COPD mortality decreased between 1997 and 2007 by 65 per cent. This may reflect reduced tobacco consumption followed by change in deaths due to COPD approximately 15 to 20 years later.¹³⁶

Females recorded a higher prevalence of 31 per 1 000 compared to males (27 per 1 000).¹³⁶ There is increasing prevalence in older age-groups, with those aged 50-54 recording a prevalence of 32 per 1 000 individuals, while individuals aged 75 to 79 recorded a prevalence of 78 per 1 000.¹³⁶ The disease is more prevalent among Indigenous Australians, with hospitalisation rates for Indigenous Australians nearly five times higher than non-Indigenous Australians.¹⁸



COPD is the second leading cause of PAHs in Australia.¹³⁷ In 2006-07, there were 52 560 hospitalisations where COPD was the primary diagnosis, which accounted for 0.7 per cent of total separations in that year.¹³⁶ Higher hospitalisation rates occur among males, those living in rural and remote areas, Indigenous Australians, people from an English-speaking background and those living in lower socioeconomic status areas.^{96,139}

Comprehensive disease management programs/coordinated care

As part of the Department of Human Services *Hospital Admissions Risk Program* (HARP)¹, a group of acute and community based health care providers located in the western suburbs of Melbourne formed a consortia to reduce the demand on hospital emergency services and improve health outcomes.³¹ Patients recruited to the project were assessed by “care facilitators”, who identified unmet health needs and provided information, advice and education for the patient concerning their condition and self-management. COPD participants in *HARP* significantly reduced their emergency presentations, admissions and hospital inpatient bed days by 10, 25 and 18 per cent, respectively. These patients also reported a significant reduction in symptoms.³¹ This program emphasises the importance of integrated care that is patient-focused, promotes greater self-management through education and delivers a continuum of care through the acute and community health sectors.³¹

A number of other studies that investigated comprehensive disease management interventions found no effect.^{140,141,142} However, these studies either had a low frequency of patient contact, only taught self-management skills, which other studies have shown to be ineffective when used alone^{141,142}, or they sampled from a population who were potentially at high risk of hospitalisation.

A review of published evidence regarding the cost-effectiveness of multi-component COPD programs showed that programs that used three (decision support, self-management and delivery system design) or all four components of the *Chronic Care Model* (see Figure 4) showed statistically significant lower rates of hospitalisation.¹⁴²

¹ The HARP program is discussed earlier in *Large-scale health interventions to reduce PAHs* and described in Table 7.

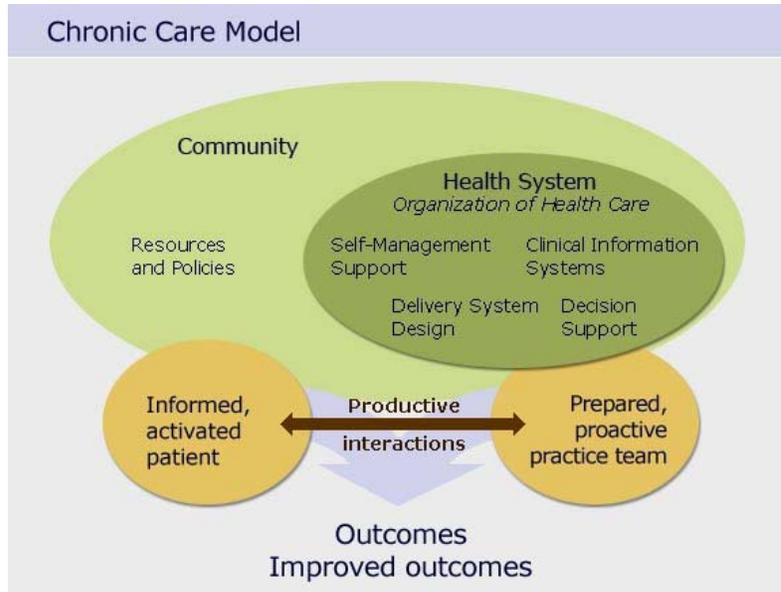


Figure 4 The Chronic Care Model³⁴

The success of multifaceted approaches has been validated by other studies.¹⁴³ However, this review notes that there is a lack of economic evaluations, and some of these interventions are very costly.¹⁴²

The *Restoring Health Program*,³² which is described in detail in the section above on *Comprehensive disease management programs* for diabetes, has also shown positive results for those with COPD.

Further supporting the contention that singular approaches to disease management are not effective is a systematic review that was carried out to assess the effectiveness of self-management programs on COPD. Self-management education had no effect on hospital admissions, emergency room visits, days lost from work, and lung function.¹⁴⁴ Similarly, an evidence based patient education tool found no effect on any measures, including hospitalisation.¹⁴⁵

Specialist clinics - Rehabilitation and physiotherapy

Two studies were identified that used outpatient rehabilitation and physiotherapy clinics. A simple pulmonary rehabilitation program based in the outpatient physiotherapy department at a district general hospital (Fairfield Hospital, Sydney) employed a physiotherapist under the supervision of a medical practitioner.³⁶ This program led to improved exercise endurance, improved quality of life ratings, and lower rates of hospitalisation and length of hospitalisations among participants.³⁶ This occurred despite the fact that there were no improvements in lung function.³⁶ Similar pulmonary rehabilitation programs have been shown to be effective.³⁷ Although substantial evidence supports respiratory rehabilitation as part of COPD management, most studies did not assess the effect of rehabilitation on rates of PAHs.¹⁴⁶

In the UK, a community based COPD management program, which was led by a respiratory physiotherapist to improve home management of COPD,¹⁴⁷ showed no reduction in length of stay, admission frequency or adjusted total hospitalisation days with COPD. However, patients with more severe COPD benefitted with a significant reduction in both length of stay and total hospitalisation days.¹⁴⁷



Summary of interventions for COPD

Overall, while the evidence was sparse, the most effective interventions to reduce COPD-related PAHs were *HARP*, the *Restoring Health Program*, and programs that implemented at least three of the four components of the *Chronic Care Model*. Specialist clinics for rehabilitation and/or physiotherapy for patients with COPD also reported some reductions in PAHs, though the evidence was not strong. Common features of successful approaches included a multidisciplinary care team, coordinated and integrated care, good continuity of care, a patient-centred focus and patient self-management.

Hospitalisations for dental conditions

Public health care programs have the potential to markedly reduce the incidence and prevalence of acute dental conditions, as these conditions are largely preventable and, when they occur, may be treated in the primary care setting. However, of all acute conditions, dental conditions make the largest contribution to hospitalisation; and they are the fourth leading cause of PAH (7.9%) after diabetes, COPD and angina.⁵³ PAHs for dental conditions are particularly high in children under 15 years (24%); and in those aged 15-44 years (13%).⁵³ The current high rate of hospitalisation for acute dental conditions suggests that patients are not receiving timely and effective diagnoses and interventions in the primary setting. Hence, it is likely that PAHs for acute dental conditions represents a lack of access to, or uptake of, primary dental health care. In addition, PAHs for dental conditions in Bendigo in 2004-05 were associated with lack of fluoridation, low SES and rurality.¹⁴⁸ After fluoridated water was provided, the rates of hospitalisation for dental conditions in young children decreased significantly (by 50%).¹⁴⁹

Dental health refers to the health status of the oral tissues and structures.^{150,151} Poor dental health generally manifests in dental decay, gum disease or tooth loss, but may also include oral cancer and trauma.¹⁵² These conditions may be caused or exacerbated by diet, poor oral hygiene, tobacco, alcohol, other medical conditions, medications and trauma.¹⁵¹

Dental health is an integral aspect of general health, and may have significant ramifications for overall health status.¹⁷ Most oral diseases are not life-threatening; however, in 2006 a total of 613 patients died due to oral cancer, accounting for 0.5 per cent of all deaths during that period.¹⁷ Gum disease has been implicated recently in the development of various systemic diseases, including cardiovascular diseases, preterm delivery of low birth weight babies, diabetes, respiratory diseases and osteoporosis.¹⁵³

Additionally, poor dental health represents a significant financial burden on the Australian health system. Dental services were ranked eighth in the overall number of separations from public and private hospitals during 2007-08.¹⁵⁴

Dental diseases are largely preventable through population-level interventions, good oral hygiene and preventive dental care.¹⁵² Factors associated with disparities in access to dental health include geographical location, socioeconomic status, Indigeneity, disability and illness. People living outside of capital cities have less access to dental care and water fluoridation than those who live in capital cities.¹⁵⁵ During 2004-06, tooth loss and poor oral health were more prevalent among people living outside of capital cities than in capital city residents.¹⁵⁵ Aboriginal and Torres Strait Islander peoples are more likely than other Australians to have lost all their teeth, have gum disease, and receive less treatment. They are also less likely to have received preventive dental care and more



likely to have untreated dental disease.¹⁵⁶ Additionally, a recent report found that the likelihood of having private dental insurance was higher in people living in major cities (59%) than in those living in inner regional (47%) or outer regional areas (46%); and those with dental insurance visited a dentist more regularly and had better oral health than the uninsured.¹⁵²

People who utilise public dental care are likely to be socioeconomically disadvantaged, as they may be low income earners who are unable to afford private health insurance.^{154,157} A survey providing information on dental services received by 14 123 Australians showed that private patients received more preventive treatment than public patients, while public patients received more fillings, extractions and x-rays than private patients.¹⁵⁸ The delivery of different service types for public and private dental patients may reflect public sector resource limitations, but may also suggest a greater reliance on emergency, rather than preventive, care.¹⁵⁴ Adults with lower levels of household income and education may be more likely to suffer tooth loss and experience a greater social impact of dental conditions on their quality of life.¹⁵⁸

System level approaches

In April 2006, the National Health Service (NHS) in the United Kingdom amended the system of remuneration for NHS dentists.³⁸ The traditional fee-per-item payment was changed to a banding system, whereby clinicians received payment of a single fee for the most expensive treatment provided. One study reviewed hospital admission rates for serious facial infections during the three years before and after the implementation of the new remuneration system.³⁸ This study noted that post-2006 access to primary dental care had been reduced, and that this led to an increase in patients presenting to hospital in a severe condition (see Table 10).

Table 10 Number of patients admitted to the Royal London Hospital for surgical treatment of a facial infection³⁸

	2003	2004	2005	2006	2007	2008
Adult men	27	36	59	44	61	74
Adult women	22	23	43	38	49	74
Total adults	49	59	102	82	110	148
Children	21	5	2	5	18	32

In the three years following the remuneration system amendment, an additional 157 adults required admission and operation for spreading facial infections, which represented a 62 per cent increase. Additionally, there was a 66 per cent increase in the number of children presenting with facial spreading infections. Burnham and colleagues³⁸ noted that facial infection should be considered a preventable disease in children, as good primary care should prevent the need for emergency admission to hospital.

Summary of interventions for dental conditions

No evidence was available to inform on the effectiveness of primary dental health care in reducing avoidable hospital admissions. However, one study clearly showed that reduced access to dental health led to an increased number of hospital admissions for preventable facial infections.³⁸

The Australian Government has introduced and maintained a number of programs and initiatives that aim to improve national dental health care. These are described briefly in Appendix D *Oral health initiatives*. However, as no effectiveness data are yet available, it is difficult to assess their impacts. Current national and international clinical practice guidelines prescribe broadly similar recommendations relating to primary dental health care, and these recommendations are generally



well-supported by systematic review evidence. These can be found in Appendix E *Clinical practice guidelines for dental conditions*.

Populations with high rates of PAHs

Certain population groups consistently show elevated rates of PAHs. Characteristic of these groups is the fact that they tend to be overrepresented in the lower end of the socioeconomic spectrum. This section will focus on two key populations that show elevated rates of PAHs: People from low socioeconomic backgrounds and Indigenous Australians.

People from low socioeconomic backgrounds

There is consistent Australian and international evidence that shows individuals from low socioeconomic backgrounds have difficulties accessing primary health care, have poor health service utilisation and high rates of hospital admissions, particularly PAHs.^{39,40,41,43,55,75,81,159,160,161,162,163} Trends also indicate that overall health status, post-hospitalisation outcomes and life expectancy are worse among socio-economically disadvantaged individuals.^{41,159,162,164,165,166,167}

The terminology around this social determinant of health varies, with overlap between terms describing groups as 'low income', 'low social class', 'low socio-economic status (SES)', 'impoverished', or 'disadvantaged'. These terms are defined by a range of criteria, including education, occupation, employment status, income or economic resources, population density and residential location^{8,162,166,167}, with measures often based on area-level or individual-level data, postcodes, quintiles, gradients and/or national records (eg. the Australian Census). In an Australian review of PAHs, the Clinical Epidemiology and Health Service Evaluation Unit²⁰ found that among the 23 studies analysed, most identified at least one of the socioeconomic factors as being linked to PAHs.

It must be noted that SES overlaps with a number of vulnerable population groups, with low SES commonly recorded among ethnic minority groups, rural and remote area residents, Indigenous Australians and adults over the age of 65.¹⁶² In addition to poor access, there are additional factors which may confound the relationship between SES and PAHs. These include not only high levels of a range of chronic diseases among disadvantaged populations but other correlates of health such as lifestyle and environmental factors. High rates of smoking and alcohol consumption, low levels of exercise and poor nutrition have all been linked with SES, along with adequacy of accommodation, air quality, education and socialisation, and psychological wellbeing in terms of depression, hostility and stress.^{55,63,162,164,165,166,167}

For the last 20 years, evidence has shown that rates of PAHs are consistently high among low SES groups. In the seminal US research by Billings and colleagues⁵⁵, findings indicated that residents of low income areas were four times more likely to have PAHs compared to areas with higher income. Though these authors recorded some influence of age with a peak in hospitalisations among the 25-44 year old cohort, results indicated that the nature of medical conditions, disease prevalence, substance abuse and physician practices had much less impact on PAHs than income.

These findings have been substantiated in Australia. In a rural Victorian sample, PAHs occurred at a rate 40 per cent greater in the lowest socioeconomic areas than in higher SES areas.⁸ In Australia more generally, residents in the most disadvantaged areas had 61 per cent more PAHs than individuals from the least disadvantaged areas.^{53,160}



Initiatives to improve access to health care services

There is a distinct lack of research examining interventions that assist individuals from low SES backgrounds. Instead, research that considers the role of SES is typically descriptive and examines its role in creating variations in rates.

The most commonly cited method of preventing PAHs among low SES groups centres on improving access to health care services. Billings et al.⁵⁵ proposed that high hospitalisation rates among low SES groups may reflect a lack of timely and effective outpatient care and hence recommended that interventions should be directed at improving access to primary care. Given that people with a low SE background have particular difficulties with access, it can be reasonably assumed that interventions that promote access targeted at this group will reduce PAHs. Initiatives to improve access are described in Appendix F *Other approaches to reduce PAHs*. The following section describes a small number of intervention studies relevant to individuals with low SE backgrounds. While the research did not focus specifically on people from low SES as a target group, it was acknowledged as an important factor in reducing PAHs.

System level approaches

System level approaches can address different perspectives on PAHs. These may include policies to alleviate socioeconomic health inequalities such as implementing taxation to affect the distribution of wealth, income maintenance policies, and government investment in health care system infrastructure. Additional approaches relate to assessing the interaction between components of the health care system, and determining who is in greatest need of assistance in their associations with health services. Panattoni et al.¹⁶⁸ investigated risk identification and the importance of ‘case finding’ to identify groups or individuals who are vulnerable and more likely to experience a PAH. The authors recommended the use of predictive risk models in Australia and New Zealand to predict health service usage and forecast disease occurrence. These models, which are used in the UK, could be applied in health care settings to identify those individuals who would benefit from preventive interventions.

Multifactorial approaches

A number of comprehensive management interventions have been trialled to improve patients’ health care and reduce the likelihood of hospitalisation. There are benefits to combining multiple approaches, as mentioned earlier with the *Chronic Care Model*. A literature review^{42,43} identified six priority areas for PAHs that cluster in three main types: person, program and place priority areas, which are shown below in Table 11.

Table 11 Priority areas for interventions to reduce PAHs

Person priority areas	
Symptom management	This includes managing the presence and development of comorbidities and risk factors. In people with chronic disease, reducing the likelihood of acute or vaccine-preventable conditions is especially important.
Creating supportive environments	Research shows that developing social and disease management capacity in the individuals support network improved hospitalisation outcomes.
Program supports	
Self-management support	Improving self-management support, and developing individually tailored, disease management action plans improves hospitalisation outcomes.
Service delivery and coordination	This includes evidence based therapeutic interventions, care coordination, and improved access to care.



Place priorities	
Local liveability	This incorporated having a healthy build and natural environment, including reduced pollution, respiratory allergen management, and the challenges that geographical and topographical factors place on health care service accessibility.
Socioeconomic opportunity	This is a particularly important factor. Maximising socioeconomic opportunity includes having adequate income and employment opportunities.

[Source: Muenchenberger & Kendall, 2010]⁴³

Muenchberger and Kendall proposed that the best method for minimising PAHs was by promoting overall health. This would allow for a reduction in symptoms, better resources for self-management, access to health promotion tools and improved coordination of care. Comprehensive management involving multiples of the priorities listed above was advised as a more effective mechanism for preventing PAHs than single interventions.⁴³

The notion of combining methods has been embraced in programs offered both in Australia and internationally. One example is the *Restoring Health*^m chronic disease care model,³² which was implemented as part of the Victorian Government's *HARP* initiative. The authors emphasised the importance of the psychosocial and cultural aspects of health among a group of individuals at high risk of potentially preventable chronic disease deterioration. The low-cost, multidisciplinary model incorporated hospital-based contacts, community-based outreach staff, disease-specific rehabilitation and a rapid access outpatient clinic. Implementation led to decreases in presentations to emergency departments, hospital admissions and reduced length of stay in hospital.³² Similar management care programs have been implemented with successes in other subsets of Australia's Coordinated Care Trials¹⁶⁹, as well as in the USA.¹⁷⁰ It is important to note that these initiatives did not specifically target individuals from low SE backgrounds, however they did sample from populations in which people with low SES were likely to be highly represented.

Telehealth and Specialist Clinics

There is little available evidence pertaining to the effectiveness of telehealth and specialist clinics for individuals with low SES. For telehealth, which is primarily used for improving access, reliance on phone and internet connections that are fundamental to this method is often problematic. Moreover, such technology is typically less accessible to low SES groups for cost and other reasons.¹⁷¹

Indigenous Australians

The health status, incidence and severity of health conditions, and life expectancy of Indigenous Australians is significantly worse than the general Australian population.⁴⁵ Socioeconomic disadvantage plays a major role and results in higher rates of risk behaviours, including misuse of tobacco, alcohol and other drugs, poor diet and low levels of exercise.⁴⁵

Compared to the general Australian population, previous research has shown that Indigenous Australians have higher rates of PAHs, which are associated with poor access to appropriate primary care.^{16,172} In the two-year period from July 2006 to June 2008, admission rates for PAHs were five times as high for Aboriginal and Torres Strait Islander peoples compared with other Australians.¹⁷³ These data may reflect the problems faced by Indigenous Australians with regard to

^m For more detail, see section on *Comprehensive disease management programs* for diabetes.



the location, affordability and cultural appropriateness of primary health care services. After adjusting for age differences between the two populations, Indigenous Australians accessed health care at similar rates to non-Indigenous Australians in 2009-10. Given that Aboriginal and Torres Strait Islander peoples have significantly poorer health, we should expect to see access to health services 2-3 times higher than for other Australians. On the contrary, age-adjusted data showed that Indigenous Australians received fewer Medicare services per 1 000 population overall for every type of service (except non-referred GP items and pathology).¹⁷³

It is important to note that the difference in rates of PAHs between Indigenous and non-Indigenous Australians has widened in recent years; and that the rates for chronic ambulatory care sensitive conditions, which account for 79 per cent of admissions have been increasing significantly.¹⁷³ Adequate resources, community investment, appropriately trained staff and routine evaluation are required to address the disparity in rates of PAHs between Indigenous and non-Indigenous Australians.^{45,174}

Between July 2006 and Jun 2008, ambulatory care sensitive conditions accounted for 39 per cent of all hospital admissions (excluding those for dialysis) for Indigenous Australians.¹⁷³ Differences in rates between Indigenous and other Australians are particularly striking for older age groups. For Indigenous Australians, vaccine-preventable conditions account for approximately 2 per cent of all PAHs; acute conditions for 23 per cent; and chronic conditions for 79 per cent of all PAHsⁿ. While the majority of PAHs (69%) for adults are related to diabetes complications¹⁷², other significant conditions include COPD, convulsions/epilepsy and pyelonephritis. For children, the most common conditions related to PAHs are ear, nose and throat infections and dental conditions.¹⁷³

Compared with other Australians living in the same jurisdictions, PAHs for Aboriginal and Torres Strait Islander peoples were three times higher in New South Wales and Victoria; four times higher in Queensland, South Australia and Northern Territory; and 14 times higher in Western Australia.¹⁷³ Between 2001-02 and 2007-08, data also showed a steady decline in PAHs for vaccine-preventable conditions (0.2% per annum); no significant change for acute conditions for Indigenous Australians; and a significant increase in PAHs for non-Indigenous Australians.

These trends highlight some of the barriers that Indigenous Australians face in accessing appropriate and effective primary health care.¹⁷²

Initiatives to reduce PAHs

Evidence has shown some benefits from a range of approaches. These include:

- ⇒ comprehensive discharge planning involving all members of the multidisciplinary team and patient/family caregivers to develop a patient-centred plan⁴⁴
- ⇒ adequate patient education and instruction, performing an accurate reconciliation of medications, establishing timely follow-up and developing an appropriately detailed discharge summary that is communicated to GPs and specialists in a timely fashion⁴⁴
- ⇒ language and literacy-appropriate instructions and patient education materials to help in successful transition from hospital to home or community-based care. These documents must be brief and focused on critical information for the patient⁴⁴
- ⇒ “Homelands” programs targeting central Australian Indigenous population. This group was already at an advantage, due to their more active lifestyle, with less reliance on a western diet. The focus of the program was on early detection, utilisation of available resources

ⁿ The sum of these components is greater than 100 per cent as hospitalisations may be defined by multiple categories.



(dietary information, etc.) and implementation of ongoing planning involving patients and families to ensure quality care and minimisation of complications.⁴⁵

In many Indigenous communities, close relationships between health and education personnel permits the regular checking of children in schools for infectious conditions, hearing and respiratory problems, which results in early detection and minimises damage from chronic infections.⁴⁵

Other approaches

Screening for Indigenous patients at high risk of PAHs may help healthcare providers and organisations target resources for these patients and enable better planning for programs and interventions.⁴⁴ These high-risk groups include: individuals using high-risk medications (antibiotics, anticoagulants; antipsychotics, etc.); those taking five or more medications; specific clinical conditions (advanced COPD, diabetes, heart failure, stroke and depression); prior hospitalisation typically including unplanned hospitalisations within the last 6 to 12 months; low literacy and poverty; reduced social network indicators; and poor access to health services.⁴⁴

There is a need for strengthening services that intervene earlier in the disease process, particularly at the primary care level; and address barriers that Indigenous Australians face in accessing these services.¹⁷³ There is also a need for locally delivered health care that brings together primary health care, antenatal services, birthing support, and follow-up contact to families and communities, thus bridging the gap between mainstream services and local community groups.⁴⁵ While the Inala practice has made significant progress in bridging this gap¹⁷⁵, the effect on PAHs is unknown.

To implement programs and interventions, it is necessary to ensure adequately resourced community health service infrastructure capable of supporting health care services.¹⁶ Aspects of primary care that are optimally positioned to sustainably reduce PAHs depend on the causal mechanisms underlying care-seeking behaviour and clinical decision-making in particular contexts.¹⁷²

Unsuccessful approaches

Several interventions and approaches that have failed to reduce PAHs include:

- ⇒ Premature discharge or discharge to an environment that is not capable of meeting the patient's bio-psycho-social needs – this is likely to result in rehospitalisation.⁴⁴
- ⇒ Programs that are not culturally appropriate and contribute to miscommunication between Indigenous patients and their health care providers, which result in lack of patient control over language, timing, content and circumstances of interaction; differing modes of discourse; dominance of biomedical knowledge; cultural and linguistic distance and a lack of resources (such as trained interpreters).⁴⁴



Avoidable readmissions

Van Walraven et al.⁴⁶ emphasised that readmissions to hospital are common, costly and often avoidable. Moreover, high rates of readmission are often related to the provision of suboptimal inpatient care and may be viewed as an indicator of quality of hospital care or a missed opportunity to coordinate care more effectively.^{176,177,178,179} To a lesser extent, other causes of readmission, such as the deterioration of intractable, chronic conditions, or the development of a new condition,^{180,181,182} may also be potentially avoidable where an inpatient's worsening condition has not been recognised, discharge was ordered prematurely, or patients received inadequate post-treatment information.¹⁸³

The costs of hospital readmissions are substantial, with evidence from the US indicating that 18 per cent of Medicare patients are readmitted within 30 days of discharge from hospital, at a cost of \$US15 billion.¹⁸⁴ As the number of days post-discharge increases, the proportion of potentially avoidable readmissions increases (up to 14% at the 30-day period).¹⁸⁴ Reducing hospital readmissions is a key objective of the US Affordable Care Act, which was enacted in March 2010; and the Medicare Payment Advisory Commission (MedPAC) recommended to Congress that hospitals with an "excess readmissions rate ratio"^o receive lower per case reimbursements.¹⁸⁵

Hospitals must work much more closely with their physicians, interdisciplinary health teams, discharge and care managers, pharmacists, home health aides, and patients and their families to ensure optimal guided-care transitions to better coordinated care outside of the hospital to prevent readmissions and to improve outcomes (p9S).¹⁸⁵

Research suggests that the risk for avoidable readmissions is greater for some populations, particularly those from low socioeconomic backgrounds.¹⁵⁹ In addition, patients who recovered slowly after surgery, who suffered from multiple chronic comorbidities, or who were hospitalised within six months preceding a nonsurgical index hospitalisation, were more likely to be readmitted.¹⁸⁰ This study found that frequently readmitted patients were more likely to be older; have an urgent triage classification (categories 1 and 2); present with an unplanned return visit within 28 days of a previous visit; and have a diagnosis of mental illness, COPD, dyspnoea or chronic heart failure.¹⁸⁶

The role of primary health care and avoidable readmissions

A key question is whether effective management of discharge to primary health care has an impact on reducing avoidable readmissions. Research in this area is complicated by problems of definition and measurement. The rates of avoidable readmission are difficult to reliably assess due to the lack of a justified, specific time interval between a previous discharge and a readmission; and there is a lack of consensus on the methods used to judge the avoidability of a readmission.^{181,182}

There was little research about the extent to which primary health care interventions reduce avoidable readmissions; particularly readmissions related to conditions that fit the criteria for PAHs (see Table 3). However, some research indicates that absence of follow-up with a primary health care provider is associated with high rates of readmission. Analysis of Medicare claims data in the US showed that almost 20 per cent of Medicare beneficiaries were readmitted to hospital within 30 days of discharge; and more than half of these had not seen their doctor in the 30 days since

^o Excess readmissions rate ratio is a ratio of observed to expected number of readmissions, based on a standardisation of risks and incidence rates for each risk.¹⁷⁹



discharge.¹⁸⁷ While Jencks et al. estimated approximately 10 per cent of readmissions were planned (eg. cancer treatment), they suggest that 'unplanned'^p readmissions could be reduced with better discharge procedures and reliable follow-up care. This was supported in a recent US study,¹⁸⁸ which reported a lower risk of readmission within 30 days among heart failure patients that received early outpatient follow-up after discharge and better coordination of care with their primary care provider. Paradoxically, one intervention designed to improve veterans' access to primary care after hospital discharge resulted in *increased* readmissions, but greater satisfaction with care.¹¹

Initiatives to reduce avoidable hospital readmissions

The US MedPAC report¹⁸⁴ suggests that primary health care practitioners and post-acute care providers play a critical role in reducing readmissions; and efforts to reduce avoidable readmissions should target discharge planning and post-discharge follow-up.¹⁸⁴ They suggested that appropriate transition processes, including good communication, coordination, information exchange and engagement with patients' primary care providers, are essential to reducing avoidable readmissions.

One way to reduce readmission is to identify those most at risk. The PARR^q algorithm, which was developed in the UK⁴⁹ was applied to hospital admission data for all English patients admitted over a four-year period who had one of the identified reference conditions. The algorithm found that the key factors predicting subsequent readmission included age, gender, ethnicity, number of previous admissions, and the clinical condition. A similar validated tool, the LACE Index^r, was developed by Canadian researchers to quantify risk of unplanned readmissions within 30 days of hospital discharge.⁴⁶

Several programs aiming to reduce 30-day readmission rates have been developed; and three of these are listed in Table 12.⁴⁷ One program that used an algorithm similar to the UK PARR algorithm is the *Reengineered Hospital Discharge (RED)* program, which was based in an urban hospital that delivered assistance to a low income, ethnically diverse population.¹⁸⁹ *RED* included a discharge planning intervention to avoid similar readmissions from occurring. The intervention included employing a specially trained nurse as a discharge advocate who assisted the patient with education both during their stay and around discharge, and organised services and follow-up appointments. In a similar program, which included patient education, self-management plan, discharge plan, and follow-up monitoring and support, an asthma nurse specialist intervention significantly reduced avoidable hospital readmissions for high health care users in the US.¹⁹⁰ Compared to the usual care group, patients receiving the multi-faceted nurse-led intervention had 54 per cent fewer hospital readmissions for asthma.

Similarly, the *BOOST* and *STAAR* programs (see Table 12 for details) focus on the discharge process and follow-up post-discharge. While no rigorous evaluation of the *BOOST* program has been undertaken, evidence from case studies has shown improvements in reducing readmissions, length of hospital stay and mortality.⁴⁸ Overall, these strategies show promising results in reducing hospital readmission and utilisation.

^p Due to incomplete data, this study could not determine what proportion of unplanned readmissions was avoidable.

^q PARR = Patients At Risk of Readmission.

^r LACE Index measures the following variables: Length of stay, Acuity of the admission, Comorbidity of the patient, and Emergency department use.



Table 12 Initiatives to reduce 30-day hospital readmissions

Initiative	Details
Reengineered Hospital Discharge Program (RED) ^{47,191}	<p>The RED program comprises 11 elements:</p> <ol style="list-style-type: none"> 1 Patient education 2 Schedule follow-up appointments 3 Discussion about tests 4 Organise post-discharge services 5 Confirm medication plan 6 Reconcile discharge plan with national guidelines and critical pathways 7 Review appropriate steps regarding potential problems 8 Ensure timely transmission of discharge summary to patient's caregivers 9 Assess patient's understanding 10 Provide written discharge plan for patient 11 Post-discharge telephone reinforcement.
Better Outcomes for Older Adults Through Safe Transitions (BOOST) ⁴⁸	<p>BOOST intervention includes:</p> <ol style="list-style-type: none"> 1 Communication with patient's provider before discharge 2 Re-designed discharge process, with patient PASS⁵ form, assessment tools, checklists, tailored patient-friendly information and reminders 3 TeachBack technique to ensure patients are aware of steps in the recovery process and what to watch out for; understand medication instructions and other information 4 Follow-up phone call within 72 hours of discharge 5 Follow-up appointment with provider.
STate Action on Avoidable Rehospitalizations (STAAR) ⁴⁷	<p>STAAR program includes:</p> <ol style="list-style-type: none"> 1 Multi-state learning community to improve transitions of care 2 Targeted technical assistance to address systemic barriers to reducing avoidable readmissions (uniform measurement strategy, policy and payment frameworks, financial analysis, community and cross-boundary coordination of care) 3 Enhanced assessment of post-discharge needs 4 Enhanced teaching and learning 5 Enhanced communication at discharge 6 Timely post-acute follow-up.

⁵ Patient PASS (Preparation to Address Situations (after discharge) Successfully) is a transition record provided to patients at discharge (<http://www.cha.com/pdfs/Quality/passhospital.pdf>).



Conclusions

PAHs in Australia

Targeting a reduction in PAHs represents a number of possibilities for the Australian health care system. If primary health care interventions to prevent avoidable hospitalisations are successful, reducing PAHs may lead to: improved health system efficiency; improved cost-effectiveness; reduced pressure on hospitals; and most importantly, better care with less disruption to the lives of consumers.

Currently, PAHs comprise 8.6 per cent of all hospital admissions in Australia.¹⁹ The highest rate of all PAHs is for diabetes-related complications (24%).¹ Other conditions that are highly represented in the list of PAHs are COPD, dehydration and gastroenteritis, and dental conditions. Chronic disease and acute conditions are almost equally represented, with fewer vaccine-preventable conditions. In Australia, almost all State and national policies have focused on tackling chronic conditions, with few focusing specifically on acute or vaccine-preventable conditions.²⁰

Using PAHs as an indicator of the effectiveness of primary health care

While it is true that PAHs are related to access to primary health care services, many other factors that are less mutable to intervention may also contribute to a hospitalisation. Beyond access, the strongest influences on rates of hospitalisations are:

- ⇒ socioeconomic status^{12,75,76,77,78}
- ⇒ age^{9,14,66,67,68,69,70,71}
- ⇒ ethnicity^{16,79,80,81,82,83,84}
- ⇒ health status^{73,92}
- ⇒ comorbidity^{13,66,67,95}
- ⇒ continuity of care^{101,79,102,103,104}
- ⇒ rurality^{1,22,77,106,107}
- ⇒ mental health problems.^{124,125}

Due to the propensity for these factors to influence the rates of PAH, an extensive US review suggested that the rates of PAHs should be adjusted for demographic factors.⁹ The same review also suggested that PAHs should be interpreted as a collective set, rather than being broken down into disease-specific groups.

Despite caution against interpreting PAHs as a set, research suggests that disease-specific interventions may be more successful than more generalist interventions.²¹ Unfortunately, most of the research on PAHs is descriptive with little intervention research; and mostly focused on diabetes. The diversity in methodologies, populations, and disease focus means it is difficult to draw generalisations from the research. There are a number of large-scale programs or initiatives that have been developed and implemented in Australia with focus on PAHs. However, few of these have been evaluated, and of those that *have* been evaluated, changes in PAHs were not included as an outcome measure.

Future directions for interventions in Australia

Some promising large-scale programs were identified in Australia. These were the Hospital Admission Risk Program (HARP), Chronic Disease Management in Victoria²³, the NSW Community Acute/Post-Acute Service³⁵, and the Victorian Early Intervention in Chronic Disease in Community Health Program.¹¹⁰ These programs have a number of characteristics in common:



- ⇒ a focus on early intervention for those who are at risk
- ⇒ care coordination
- ⇒ a focus on equity and access
- ⇒ multidisciplinary care
- ⇒ developing systems that focus on disease management in the medium to long term.

These interventions also focused chronic disease, rather than acute or vaccine-preventable conditions.

A number of studies reviewed show that while the clinical indicators of disease may improve, PAHs for that disease may not necessarily decrease. Conversely, a program may not improve clinical indicators, but it does reduce PAHs. This suggests that there are other aspects of primary care disease management that reduce PAHs, such as assisting individuals to manage their symptoms better or providing advice about when hospital visits are appropriate.

Similarly, the most successful disease-specific interventions focused on care coordination and comprehensive disease management.^{25,27,31,32,77,126,142} A number of themes were identified from successful comprehensive disease management programs:

- 1 Individually tailored approach. Mostly this is for the patients, though also for the practitioners in terms of professional development to deliver high quality care.
- 2 Nurse coordinator. Many cost-effective programs had nurses coordinating the ongoing management of the patient and their health care services
- 3 Multidisciplinary workforce. Many programs included input from podiatrists and patient educators
- 4 Long-term programs. Many of these programs extended for longer than six months.²⁸ This is not typical of other intervention studies.
- 5 Reduced hospitalisations, though increased primary health care services. Increased GP presentations and pharmaceuticals.^{24,28}
- 6 Nurses in key role. Many of these programs also used nurses, rather than GPs or specialists. This may point to more contact time between the patient and the nurse, or skill development in a particular area of illness leading to improved patient outcomes.
- 7 Diabetes. Some success was seen with specialist diabetes outpatient clinics.^{29,30,131}
- 8 COPD. Hospitalisations were significantly reduced with the use of physiotherapy and rehabilitation clinics.^{36,37,147}

With dental conditions, and people from low SE backgrounds, hospitalisations were due largely to difficulty in accessing care. Given the relationship between access and avoidable hospitalisations, it is possible that any program that improves access will result in reduced hospitalisations. One review identified six factors, including improved socioeconomic opportunity as a factor in reducing PAHs.⁴² Other factors include:

- ⇒ symptom management
- ⇒ creating supportive environments
- ⇒ self-management support
- ⇒ service delivery and coordination
- ⇒ local liveability.⁴²

Muenchberger and Kendall also identified factors very similar to those proposed in Wagners' Chronic Care Model.³⁴ Importantly, research on the Chronic Model suggests that no single factor alone is likely to be effective and reduce PAHs;¹⁴² rather, at least three or four factors should be part of effective interventions.



Regarding readmissions, limited research suggests that readmissions may contribute substantially to the rates of PAHs. However, it is difficult to estimate given the lack of clear definition of what constitutes a readmission.^{181,182} Nonetheless, a number of studies have identified reliable algorithms to identify those most at risk of readmission.^{49,189} These patients have successfully avoided readmission through redesigning of the discharge planning processes, including linking people more effectively to the primary health care environment.¹⁸⁹

Finally, it is important that while hospital visits decrease, the burden on primary health care often increases. Given that primary health care is a more cost-effective alternative, it follows that primary health care practitioners need support and resources to develop the capacity to deliver these extra services.



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Appendices

Appendix A Expanded methods

Definition

A range of definitions have been used for PAHs depending on the context and country. The more common terms used are “ambulatory care sensitive conditions”, “potentially preventable hospitalisations” or “potentially avoidable hospitalisations”.⁵² Avoidable hospitalisations are distinct from preventable hospitalisations, the latter of which represents a broader range of conditions or illnesses that are preventable with population based health promotion efforts⁵³. Some research also includes adverse events that result from medical mismanagement rather than the condition itself⁴⁰ though these are excluded in this report as they were rarely included in the research reviewed.

The approach used in Australia (including the Health Performance Framework and AIHW)¹⁷ is based on the “potentially avoidable hospitalisations” framework. While there may be some minor differences in definitions, most research uses the terms interchangeably. Therefore, for consistency throughout this report, we have used PAHs, which are defined as:

*... conditions for which hospitalisation is considered potentially avoidable through preventive care and early disease management, usually delivered in a primary care setting, for example by a general medical practitioner, or at a community health centre.*⁵³

This definition of PAHs was chosen as it adheres most closely to that used by the Australian Institute of Health and Welfare, on which the Australian Health Performance Framework is based. Many important agreements (including COAG) in Australia are based on this definition.

Procedure

This report followed a ‘rapid review’ format. Rapid reviews are a short review that focuses on research evidence, with a view to facilitating evidence-based policy development. Due to the short timeframe for this review (8 weeks), searches and critical appraisal of the literature were not systematic or comprehensive. Search terms included a combination of text words and MeSH terms for PubMed; however, in order to obtain the most relevant material quickly, the combination of terms varied across the grey literature, such as Google Scholar, and for different databases. Consequently, replication of this review is likely to result in a different literature base.

The issue under investigation centred on interventions to decrease the rates of PAHs. Specifically, this focused on

What does the local and International research literature tell us about hospital admissions that are potentially avoidable related to improved primary health care service delivery?

A number of parameters were placed on the content in order to enable a practical and comprehensive review:

- ⇒ Interventions were investigated at multiple levels - eg. patient through to systems levels
- ⇒ Evaluation of the clinical merit of interventions was beyond the scope of this review
- ⇒ Emergency department presentations were excluded
- ⇒ The search strategy for this review did not explicitly include avoidable hospital *readmissions*. However, a brief section on potentially avoidable readmissions is included as there was some overlap in the literature
- ⇒ Hospitalisation due to adverse events, including medication errors, was excluded.



The literature was limited by time periods, as much of the research on PAHs was conducted in the early 1990s and the authors of this report did not want to lose this information. Likewise, no limits were imposed on location or setting, though different environments such as research that took place in the US, or within Health Maintenance Organisations have been flagged as such.

Both grey and peer reviewed literature were included in this report.

Caveats and Limitations

There are a number of caveats and limitations that should be considered when reading this report. These include:

- ⇒ *Non-systematic or exhaustive search:* Whilst significant effort was made to obtain all relevant literature on the topics addressed in this report, given the time limitations and the large scope of the topic, the approach was not systematic.
- ⇒ *Predominantly Australian focus:* The research was drawn primarily from studies conducted within Australia. In some respects, this was a deliberate strategy, as the nature of the report necessitated the use of Australian statistics and approaches. However, International wisdom pertaining to initiatives and interventions may have been lost as restricted timeframes precluded conducting a comprehensive search for relevant International interventions.

Appendix B Avoidable hospitalisations included in the Australian Health Performance Framework

Table 13 ICD codes for PAHs¹⁷

Category	ICD-10-AM codes
Vaccine-preventable	
Influenza and pneumonia	J10, J11, J13, J14, J15.3, J15.4, J15.7, J15.9, J16.8, J18.1, J18.8 in any diagnosis field, excludes cases with additional diagnosis of D57 (sickle-cell disorders) and people under 2 months
Other vaccine-preventable conditions	A35, A36, A37, A80, B05, B06, B16.1, B16.9, B18.0, B18.1, B26, G00.0, M01.4 in any diagnosis field
Chronic	
Asthma	J45, J46 as principal diagnosis only
Congestive cardiac failure	I50, I11.0, J81 as principal diagnosis only, exclude cases with the following procedure codes: 33172-00, 35304-00, 35305-00, 35310-02, 35310-00, 38281-11, 38281-07, 38278-01, 38278-00, 38281-02, 38281-01, 38281-00, 38256-00, 38278-03, 38284-00, 38284-02, 38521-09, 38270-01, 38456-19, 38456-15, 38456-12, 38456-11, 38456-10, 38456-07, 38456-01, 38470-00, 38475-00, 38480-02, 38480-01, 38480-00, 38488-06, 38488-04, 38489-04, 38488-02, 38489-03, 38487-00, 38489-02, 38488-00, 38489-00, 38490-00, 38493-00, 38497-04, 38497-03, 38497-02, 38497-01, 38497-00, 38500-00, 38503-00, 38505-00, 38521-04, 38606-00, 38612-00, 38615-00, 38653-00, 38700-02, 38700-00, 38739-00, 38742-02, 38742-00, 38745-00, 38751-02, 38751-00, 38757-02, 38757-01, 38757-00, 90204-00, 90205-00, 90219-00, 90224-00, 90214-00, 90214-02.
Diabetes complications	E10–E14.9 as principal diagnoses and E10–E14.9 as additional diagnoses where the principal diagnosis was: hypersmolarity (E87.0) acidosis (E87.2) transient ischaemic attack (G45) nerve disorders and neuropathies (G50–G64) cataracts and lens disorders (H25–H28) retinal disorders (H30–H36) glaucoma (H40–H42) myocardial infarction (I21–I22) other coronary heart diseases (I20, I23–I25) heart failure (I50) stroke and sequelae (I60–I64, I69.0–I69.4) peripheral vascular disease (I70–I74) gingivitis and periodontal disease (K05) kidney diseases (N00–N29) [including end-stage renal disease (N17–N19)] renal dialysis (Z49)
COPD	J20, J41, J42, J43, J44, J47 as principal diagnosis only, J20 only with additional diagnoses of J41, J42, J43, J44, J47
Angina	I20, I24.0, I24.8, I24.9 as principal diagnosis only, exclude cases with procedure codes not in blocks [1820] to [2016]
Iron deficiency anaemia	D50.1, D50.8, D50.9 as principal diagnosis only.
Hypertension	I10, I11.9 as principal diagnosis only, exclude cases with procedure codes according to the list of procedures excluded from the Congestive cardiac failure category above.



Nutritional deficiencies	E40, E41, E42, E43, E55.0, E64.3 as principal diagnosis only.
Rheumatic heart disease	I00 to I09 as principal diagnosis only. (Note: includes acute rheumatic fever)
Acute	
Dehydration and gastroenteritis	A09.9, E86, K52.2, K52.8, K52.9 as principal diagnosis only.
Pyelonephritis	N10, N11, N12, N13.6, N39.0 as principal diagnosis only.
Perforated/bleeding ulcer	K25.0, K25.1, K25.2, K25.4, K25.5, K25.6, K26.0, K26.1, K26.2, K26.4, K26.5, K26.6, K27.0, K27.1, K27.2, K27.4, K27.5, K27.6, K28.0, K28.1, K28.2, K28.4, K28.5, K28.6 as principal diagnosis only.
Cellulitis	L03, L04, L08, L88, L98.0, L98.3 as principal diagnosis only, exclude cases with any procedure except those in blocks 1820 to 2016 or if procedure is 30216-02, 30676-00, 30223-02, 30064-00, 34527-01, 34527-00, 90661-00 and this is the only listed procedure
Pelvic inflammatory disease	N70, N73, N74 as principal diagnosis only.
Ear, nose and throat infections	H66, H67, J02, J03, J06, J31.2 as principal diagnosis only.
Dental conditions	K02, K03, K04, K05, K06, K08, K09.8, K09.9, K12, K13 as principal diagnosis only.
Appendicitis with generalised peritonitis	K35.0 in any diagnosis field
Convulsions and epilepsy	G40, G41, O15, R56 as principal diagnosis only
Gangrene	R02 in any diagnosis field

Rates are age-standardised; analysis by State and Territory, remoteness and SEIFA Index of Relative Socioeconomic Disadvantage (IRSD) is based on usual residence of person.

Data are presented as a number per 100 000 population.



Appendix C Policies that focus on reducing PAHs

Table 14 Policies or strategies that aim to reduce PAHs²⁰

Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
NATIONAL		
Australian Better Health Initiative (ABHI)	General population Chronic conditions	To reduce the prevalence of risk factors for chronic disease, limit the incidence and the impact of these diseases and reduce morbidity and mortality rates. ABHI is a four year joint Australian, State and Territory government program, priority areas of which include: promoting healthy lifestyles supporting early detection of risk factors and chronic disease, supporting lifestyle and risk modification, encouraging active patient self-management of chronic conditions, and improving the communication and coordination between care services.
Audit and Best Practice for Chronic Diseases (ABCD) Project	Indigenous population Chronic conditions	To improve chronic disease prevention and management in Aboriginal primary care services. The ABCD project is a continuous quality improvement and participatory action research project that aims to implement evidence based approaches to assessing and improving health centre systems, service delivery and health outcomes in Indigenous population.
Australian Primary Care Collaboratives (APCC) Program [†]	People with diabetes or coronary heart disease	To improve clinical health outcomes, reduce lifestyle risk factors, maintain health for chronic and complex conditions and improve access to Australian general practice.
Bettering the Evaluation and Care of Health (BEACH) Program	General population	To collect reliable and valid data about general practice and establish an ongoing database of GP/patient encounter information; to assess patient based risk factors and the relationship that these factors have with health service activity; and to provide accurate and timely data to a wide variety of users including government bodies, GP organisations, consumers, researchers, and the pharmaceutical industry.
Divisions of General Practice (DGP) Program [†]	General population Non-specific, but has a focus on chronic conditions and population health	To provide services and support to general practices at the local level to achieve health outcomes for the community and better service delivery, that would not otherwise be achieved on an individual GP basis. The Divisions network comprises of the Australian General Practice Network (AGPN), state based organisations and regional DGPs, which provide core programs to address: access; prevention and early intervention; supporting integration and multidisciplinary care; and an increased focus on population health and the better management of chronic disease.



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
NATIONAL cont		
Enhanced Primary Care (EPC) Plan • Allied health Partnership	Older population Chronic conditions	To provide preventive care for older Australians and improve coordination of care for people with chronic conditions and complex care needs. NB. EPC items were removed from the MBS in 2005 and replaced by the Chronic Disease Management (CDM) items (721-731).
General Practitioner Immunisation Incentives Scheme † (GPII)	Children under the age of 7 years Vaccine-preventable conditions	The GPII provides financial incentives to GPs that monitor, promote and provide immunisation services to children under the age of seven years. The overall aim of the GPII scheme is to encourage at least 90% of practices to achieve 90% proportions of full immunisation.
General Practice Super Clinics (GPSP)	General population	To establish a greater range of affordable, high quality, comprehensive and integrated primary care services which are convenient and accessible and tailored to the needs and priorities of the local community, particularly in rural and regional areas and where Medicare has not been utilised to its fullest because of workforce shortages.
Immunise Australia Program	General population Vaccine-preventable conditions	To increase national immunisation rates for vaccine-preventable diseases. The program implements the National Immunisation Program (NIP) Schedule which currently includes vaccines against a total of 16 diseases.
Mental Health Nurse Incentives Program	General population Mental health conditions	To provide non-Medical Benefit Schedule (MBS) incentive payments to community based general practices, private psychiatrist services and other appropriate organisations (such as DGP) who engage mental health nurses to assist in the provision of coordinated clinical care for people with severe mental disorders. This program is a part of the Commonwealth component of the Council for Australian Governments (COAG) National Action Plan on Mental Health 2006-2011.
National Primary Health Care Strategy	General population	To better tackle the current health challenges and to deliver better frontline care to families across Australia. The main priorities of this proposed strategy include: better rewarding prevention, promoting evidence-based management of chronic disease, supporting patients with chronic disease to manage their condition, supporting the role GPs play in the health care team, addressing the growing need for access to other health professionals, including practice nurses and allied health professionals like physiotherapists and dieticians and encouraging a greater focus on multidisciplinary team-based care.



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
NATIONAL cont		
National Chronic Disease Strategy	General population Chronic conditions	To encourage coordinated action in response to the growing impact of chronic disease on the health of Australians and the health care system. This strategy provides an overarching framework of national direction for improving chronic disease prevention and care across Australia and includes three major elements: (i) a national chronic disease strategy; (ii) a set of five national service improvement frameworks for asthma, cancer, diabetes, heart, stroke and vascular diseases; and osteoarthritis, rheumatoid arthritis and osteoporosis; and (iii) a blueprint for nationwide surveillance of chronic diseases and associated determinants. One of the key objectives of this strategy is to reduce PPH related to chronic conditions.
National Model of Chronic Disease Prevention and Control: A Public Health Framework	General population Chronic conditions	To provide the basis for a comprehensive, evidence based, public health response to the National Health Priority Area initiative by providing a strategic framework for the prevention and control of chronic non-communicable diseases in Australia. The framework recommends building the organisation of the national prevention effort in Australia around three key areas of activity: (i) <i>ensuring an effective information base to guide action</i> (systematic surveillance of risk factors and their determinants, systematic development of an evidence base to inform policy and program design, and evaluation and performance measurement); (ii) <i>strengthening prevention and health promotion</i> (reduction of risk factors and their determinants, enhancing protective factors, promotion of health across the life course, building partnerships for inter-sectoral action and supportive public policies, and giving priority to populations most at risk); and (iii) <i>improving systems of care for those with chronic conditions</i> (strengthening the role of prevention in the health system, improving early detection and intervention, integrating primary care systems, and developing care partnerships and consumer participation).
Pneumococcal Vaccination for Older Australians Program	Older population Pneumococcal disease	To provides free pneumococcal polysaccharide vaccine to adults aged 65 years or older. This program is listed on the National Immunisation Program (NIP) Schedule and funded under the Immunise Australia Program.
Practice Incentives Program (PIP)	General population	To deliver financial incentives with the aim of recognising general practices that provide comprehensive, quality care, who are either accredited or working towards accreditation for the Royal Australian College of General Practitioners' (RACGP) Standards for General Practices.



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
AUSTRALIAN CAPITAL TERRITORY		
ACT Health Chronic Disease Strategy 2008-2011	General population Chronic conditions	To improve the health of the ACT community through improved prevention, detection and management of chronic disease across the population. The Strategy includes the 5 areas of action: prevention and risk reduction across the continuum; early detection and early treatment; integration and continuity of prevention and care; self-management; and research and surveillance.
ACT Immunisation Strategy 2007-2010	General population Vaccine-preventable conditions	To maintain and enhance the immunisation coverage rates of children and amongst adolescents, adults and vulnerable people within the community, with special emphasis on Indigenous people; to provide support for effective delivery of immunisation programs, in accordance with 'best practice'; to enhance the quality of information about immunisation in the ACT available to consumers and service providers to ensure that it is timely, consistent and comprehensive; and to increase the provision of early childhood immunisations through general practice.
ACT Diabetes Services Strategic Plan 2008-2012	People with diabetes mellitus	To prevent and delay the onset of diabetes; prevent and slow progression of diabetes complications; and enhance the quality of life of people with diabetes.
ACT Primary Health Care Strategy 2006-2009	General population	To provide population based and person centred health care through health promotion and early intervention, and CDM; to provide continuity of health care through integration of services, improving co-ordination between ACT Health and other ACT government funded services, to improve coordination with Australian government supported services; and to achieve high quality health care through improved information management, and evaluation and research.
Chronic Care Program	People with CHF and COPD who are frequent users of the acute health care system	To facilitate enhanced communication amongst all relevant healthcare and community service providers, encourage client self-management and provide education and support to clients and their support networks.
Mental Health Services Plan 2008 – 2013 (Draft)	General population Mental health	To articulate the vision and the strategic directions for the development of the mental health sector in ACT to the year 2020, and to establish a coordinated approach to achieving and sustaining mental health.



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
AUSTRALIAN CAPITAL TERRITORY cont		
Rapid Assessment of the Deteriorating Aged at Risk (RADAR)	Older population, younger patients may be seen if already known to the aged care team or in residential care facility, or over 50 years for Indigenous Australians	To provide an older person with a rapid medical intervention to prevent a subsequent hospital admission. The RADAR team (comprising medical staff, aged care nurse practitioner, other nursing staff) remains closely in contact with the GP and liaises with available services (pathology, imaging, hospital in the home, domiciliary allied health, community rehabilitation, etc.) to ensure that timely investigation and multidisciplinary management is available for the older person in the appropriate environment.
<p><i>Other:</i></p> <ul style="list-style-type: none"> • Building a Strong Foundation: a Framework for Promoting • Home Tele-monitoring • Mental Health and Wellbeing in the ACT 2009-2014 • Self-Management of Chronic Conditions Programs • Care Coordination Project • Staff Influenza Immunisation Policy • Chronic Disease Management Register • Staff Screening and Immunisation Policy • Community Acute and Post-Acute Program • Telephone and web-based coaching programs 		



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
NEW SOUTH WALES		
Acute Post-Acute Care/ General Practitioner (APAC/GP) Shared Care	General population Acute conditions that have not responded to oral antibiotics or other interventions or therapies	To manage the patient in the community, by collaborative work of the GP and the APAC team to ensure that where possible the patient does not need to go to hospital for initiation of clinical care. The GPs role is to establish the clinical diagnosis, prescribe and administer the first dose of treatment. The APAC team under the ongoing clinical management of the GP continue the care.
Avoidable Admission Strategy, NSW State Plan • Sustainable Access Plan	General population 12 medical conditions: cellulitis, community acquired pneumonia, COPD, bronchitis and asthma, red blood cell disorders and transfusions, DVT, UTI, acute non-surgical pain (musculo-tendinous disorders), chest pain, seizure, headache and gastroenteritis	To identify specific low complexity medical conditions that can be treated in alternative settings to inpatient hospital care. The strategy identifies the CAPAC Model of Care (see below for details) as the NSW Health Preferred vehicle to deliver target of a range of selected conditions that are amenable to being managed in the acute community environment.
NSW Chronic Care Program [†]	General population Chronic conditions	The program is aimed at reducing avoidable hospital admissions and improving quality of life for people with chronic illness and their carers. To strengthen the capacity of the NSW health system to improve service delivery for people with chronic diseases, with its strategies aimed at: supporting consumers at the centre of the health system with services designed around their unique health needs; developing the capacity of consumers to participate fully in their own health care and more effectively navigate their way through the health system; ensuring easier and more timely access; facilitating continuity of relationships between health providers at various levels of the health system and between health providers and consumers; and developing organisational and governance systems and structures to support long term orientation and reorientation of care within the health system.



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
NEW SOUTH WALES cont		
Community Acute Post-Acute Care (CAPAC) Service [†]	General population Selected acute and chronic conditions	To provide the most appropriate care setting, avoid hospital admissions or reduce patient length of stay through the immediate provision of multidisciplinary care for clients at their home as an alternative to inpatient (hospital) care. It encompasses services variously described as “Hospital-in-the-Home” and “Post-Acute Care”.
HealthOne NSW	General population, including chronic conditions	To prevent illness and reduce the risk and impact of disease and disability; to improve chronic disease management in the community; to reduce avoidable admissions (and unnecessary demand for hospital care); improve service access and health outcomes for disadvantaged and vulnerable groups and to build a sustainable model of health care delivery.
Healthy at Home [†]	Frail older people in the community who are over 65 years (over 45 years for Indigenous people)	To provide more integrated and tailored care for frail elderly at home, before a crisis occurs, and avoid hospitalisation. The key elements of the program include: Referral Information Centre, Healthy at Home teams (rapid response teams), Community Options (case management service) and ComPacks (case- managed package of care for up to six weeks).
NSW Chronic Care Collaborative	People with COPD and heart failure	To enhance implementation of the clinical service frameworks for chronic respiratory disease and heart failure developed in Phase 1 of the Chronic Care Program which focused on the improving the diagnosis and management of COPD and heart failure across the NSW. The NSW Chronic Care Collaborative is a clinical improvement program organised and led by the Clinical Excellence Commission and NSW Department of Health, to enhance implementation of NSW Clinical Service Frameworks developed as part of the NSW Chronic Care Program.
NSW Immunisation Strategy 2008-2011	General population Vaccine-preventable conditions	To minimise the incidence and prevalence of vaccine-preventable diseases through maximising immunisation coverage.



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
NORTHERN TERRITORY		
Centre for Disease Control (CDC) Immunisation Program	General population Vaccine-preventable conditions	The Immunisation Program is one of a range of services provided through the CDC, primarily to prevent, monitor and control communicable and non-communicable diseases in the Northern Territory.
Chronic Disease Network	General population Chronic conditions	To link stakeholders and promote: communication, collaboration, coordination, and collective memory in the area of common chronic diseases affecting the NT population, across the continuum of care.
Preventable Chronic Disease Strategy & Framework	General population 5 preventable chronic conditions: type 2 diabetes, renal disease, hypertension, ischaemic heart disease, and COPD.	To bring about change in the prevention, early detection, and management of chronic diseases in the Northern Territory, and at all levels of the health care system, with collaboration by a broad range of players from governments, non-government organisations and the private sector.
<i>Others:</i> <ul style="list-style-type: none">• Healthy Living NT• Urgent Care After Hours• General Practice Network NT• Expanded Health Service Delivery Initiative		



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
QUEENSLAND		
Queensland Health's Directions For Aged Care 2004 – 2011	Older people who are 65 years and over (45 years and over for Indigenous people)	To provide direction to health service providers on meeting older people's health and aged care needs while respecting their (and their carers') choices about that care.
Queensland Strategy For Chronic Diseases 2005-2011	General Population Chronic conditions	To reduce avoidable hospital admissions in the short-term, to improve the quality of life for people with chronic disease in the short-to-medium-term and to reduce the incidence and prevalence of chronic disease in the medium-to-longer-term.
Country Home link	People living in regional/rural area	To provide support and assistance to people living in the country who are at the risk of hospitalisation and/or who require support in order to be discharged early from metropolitan hospital.
Metro Home Link	General Population	To provide support and assistance to people in their homes to avoid deterioration of their health and eventual admission to a metropolitan hospital.



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
SOUTH AUSTRALIA		
SA Health Strategic Health Plan 2008-2010	General Population	Outlines the key strategic directions of SA Health, which include: strengthen primary health care; enhance hospital care; and reform mental health care. The strategic directions for strengthening primary health care aims to focus on health protection and promotion, provide effective avenues for prevention and early intervention, facilitate effective coordination and continuity of care, minimise the burden of disease on the health system and provide appropriate services closer to where people live.
GP Plus Health Care Strategy: GP Plus Health Improvement Plan: A New Model For GP Plus Health Networks	General Population	To provide fully integrated and accessible health care to the South Australian community; to increase prevention and early intervention services to promote good health.
Chronic Disease Action Plan for SA	General Population Chronic conditions	To use evidence based strategies to prevent chronic disease, by reducing risk associated with biomedical and lifestyle factors; detect disease and risk of disease early and intervene effectively; and manage existing disease effectively and proactively.
<i>Others:</i> <ul style="list-style-type: none">• Practice Nurse Initiative• Health Service Framework for Older People• Cardiology Service Plan• Rehabilitation Service Plan• Stroke Service Plan• Primary Service Plan• Palliative Care Service Plan• Renal Service Plan		



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
TASMANIA		
Consistent Community Health (CCH) Project	General Population	The main aims of the CCH Project are: to align clinical practice and business processes with evidence and national standards based on an agreed service model; to develop a Community Care Tool Kit that delivers a consistent approach to the fundamental elements of the client flow which are referral, admission, assessment, care planning, service delivery, discharge, and post discharge follow up; to provide consistency across the core clinical and business processes of documentation, reporting and associated data definitions; and to identify the customer group and the range of services provided to enable best use of skill mix/resources.
Primary Health Services Plan (PHSP) 2007-2010	General Population	To develop an integrated primary health care system with a focus more on prevention and community-based care.
Primary Health Chronic Disease Demonstration Service	General population Type 2 diabetes	To employ a partnership approach to the delivery of chronic disease management in the community, incorporating the principles of: integration, coordination, multidisciplinary team care, communication, care planning and broad based funding.
Strengthening the Prevention and Management of Chronic Conditions Policy Framework 2005	General population Chronic conditions	To introduce service change in community based health services to prevent and manage chronic diseases.
<i>Other:</i>		
<ul style="list-style-type: none">• COPD Patients Self-management Program		



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
VICTORIA		
Care In Your Community	General Population All conditions, with a particular focus on chronic conditions	To deliver person-centred health care in community settings, reducing the need for inpatient care, and improving the health outcomes of Victorians. This initiative provides clear policy directions and an overarching planning framework for ambulatory care service delivery models and facilities in Victoria, building on established and successful elements of the current health system.
Community Health Services (CHS) - Creating a healthier Victoria	General population	To develop and integrate CHS within the broader national and state health system and provide a consistent set of roles, principles and directions that is to: provide leadership in improving health outcomes and reducing health inequalities of local communities throughout Victoria; be a major platform for integrated community-based health services; be a strong partner in the broader health and community service system; and provide services and programs that are high quality, affordable and delivered in a timely way.
Crisis Assessment and Treatment (CAT) service	General population Mental health	To provide community-based assessment and treatment for people experiencing psychiatric crisis, with the aim to prevent unnecessary hospitalisation by providing treatment in the person's own environment, such as in their home. The CAT service is responsible for screening all people who appear appropriate for psychiatric inpatient treatment in order to determine whether the psychiatric inpatient service is the most appropriate environment for them to receive treatment.
Early Intervention in Chronic Diseases in Community Health (EliCD) [†]	General population Chronic conditions	To implement community based early intervention services for people with chronic diseases who are at higher risk of hospitalisation in medium to long-term. This program developed a set of models, with leadership from community health services and DGPs, targeting people with chronic conditions.



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
VICTORIA cont		
Hospital Admission Risk Program Chronic Disease Management (HARP CDM) [†]	People with chronic heart disease, chronic respiratory disease, diabetes, complex psychosocial needs and older people with complex needs	To improve management of people with defined chronic diseases and complex needs who frequently use hospitals or who are at risk of hospitalisation. The objectives of HARP CDM are to: <ul style="list-style-type: none"> • Improve patient outcomes; • Provide integrated seamless care within and across hospital and community sectors; • Reduce avoidable hospital admissions and ED presentations; and • Ensure equitable access to healthcare. HARP was implemented through a series of competitively funded community and hospital based projects and comprises a range of prevention initiatives that have the potential to affect hospital emergency demand.
Primary Care Partnerships (PCP) <ul style="list-style-type: none"> • Integrated CDM 	General population Chronic conditions and other conditions	To improve the health and well-being outcomes of people using primary health care services and to reduce avoidable use of hospital, medical and residential services. PCPs focus on building relationships between agencies and service system reform, with highly developed networks engaging different sectors and stakeholders.
Victorian Immunisation Strategy 2009-2012	General population Vaccine-preventable conditions	To provide a clear overview and direction for immunisation service providers and consumers in the State, within the context of national policy. The development of the Strategy started in April 2007 and has been overseen by the Victorian Immunisation Advisory Committee (VIAC), a cross-sectoral body of independent immunisation experts that meets regularly to review and inform immunisation policy and services across Victoria.
<i>Others:</i> <ul style="list-style-type: none"> • Health Care Workers Influenza Vaccination Program • Pertussis Vaccine for New Parents • Refugee Health Nurse Program • Nurse-On-Call Service 		



Policy, Strategy, Initiative title	Target population & PAH conditions if specified	Objectives
WESTERN AUSTRALIA		
Ambulatory and Community-based Care: A framework for non-inpatient care	General population All conditions	To provide the strategic direction for ambulatory and community care from which specific models of care and service delivery will be developed and implemented as part of state-wide policy and Area Health Service clinical planning. One of the priority areas of the framework is developing strategies to reduce the demand for inpatient services ie. targeting PAH.
Chronic Disease Self-Management Strategy	General population Chronic conditions	To create opportunities for collaboration between all chronic diseases self-management service providers in WA and raise awareness of self-management amongst other stakeholders. This strategy is part of the Australian Better Health Initiative and is currently funding two self-management programs across the metropolitan area: <i>Living well</i> and <i>Living with Diabetes</i> . The self-management programs approach emphasises the person's central role in managing their health, links them to personal and community resources and includes strategies of assessment, goal setting, problem solving and follow-up.
Healthy at Home Chronic Disease Service	People with diabetes, COPD and/or heart failure	To maximise the health and well-being of patients with chronic health conditions, by helping patients to stay in control of their health and prevent avoidable hospitalisation. This program is offered to patients who are referred and supported by their GP.
Immunisation Program	General population Vaccine-preventable conditions	The Immunisation Program is a state-wide program, which conducts the distribution of scheduled vaccines to immunisation providers, school based vaccination programs and immunisation campaigns. The program also manages the Central Immunisation Clinic. In addition, the Immunisation Program also: <ul style="list-style-type: none">• Conducts the distribution of vaccines to other agencies as well as providing direct vaccination through the Central Immunisation Clinic in Perth.• Initiates campaigns to promote vaccinations and to alert general practitioners to missed vaccinations in children attending the surgery.



Appendix D Oral health initiatives

Several national primary dental health policies and initiatives are underway; however, these are at varying stages of completion and effectiveness outcomes are not yet available. Examples of these initiatives have been briefly detailed below.

Closing the Gap

Under the Northern Territory National Partnership Agreement, the Australian Government funds a range of specialist and allied health follow-up services, including oral assessment and dental treatment.¹⁹² The Closing the Gap initiative aims to assess all Indigenous children under 16 years of age who have been referred for dental follow-up. At December 2009, 1 594 of the 3 223 children referred for dental follow-up had been assessed at least once.

Medicare Allied Health and Dental Care Initiative

This initiative commenced in July 2004. It allows people with chronic conditions and complex care needs, who are being managed by a general practitioner under a Chronic Disease Management plan[†], to access Medicare rebates for allied health services including dental specialists.¹⁹³

Medicare Teen Dental Plan

This initiative commenced in July 2008 and improves the affordability of maintaining good teenage dental health in eligible families.¹⁹⁴ The service provides a preventative oral examination which may include x-rays, scale and clean, fluoride treatment, provision of oral hygiene instructions and/or dietary advice, or fissure sealing.

Chronic Disease Dental Scheme

This scheme allows eligible patients to access a range of Medicare dental items, via referral from a general practitioner. To be eligible, patients must have a chronic medical condition and complex care needs and their oral health must impact on, or be likely to impact on, their general health.¹⁹⁵

Better Oral Health in Residential Care training

This training program commenced in December 2009 and aims to provide carers with an increased awareness and understanding of oral hygiene issues.¹⁹⁶

Healthy Start for School Initiative

This initiative, which commenced in July 2011, relates to parents who receive an income support payment during the year their child turns four, and who are receiving Family Tax Benefit Part A.¹⁹⁷ The four-year-old child receives a mandated health evaluation (including an oral health assessment) to ensure that they are healthy, fit and ready for school.

Healthy Mouths, Healthy Lives – Australia's National Oral Health Plan 2004-2013

This plan aims to improve health and wellbeing across the Australian population by improving oral health status and reducing the burden of oral disease.¹⁹⁸ The plan aims to address a number of action areas: across the Australian population; children and adolescents; older people; low income and social disadvantage; people with special needs; Aboriginal and Torres Strait Islander peoples; and the dental and oral health workforce. The plan details a number of short-, medium- and long-term strategies for improving oral health across each of these action areas.

[†] Replaced the Enhanced Primary Care plan in 2007.



Dentcare Australia

A 2009 report by the Australian Government National Health and Hospitals Reform Committee recommends the national provision of a universal scheme for access to basic dental services.¹⁹⁹ Under this scheme ('Dentcare Australia'), all Australians could elect to have basic dental services (prevention, restoration, and the provision of dentures) paid for by Dentcare via either private health insurance or public dental services. This report also recommends that graduating dentists and oral health professionals undertake internships, to receive broader clinical experience and training.



Appendix E Clinical practice guidelines for dental conditions

Figure 5 Clinical practice guideline primary dental health care recommendations

Intervention	Guideline recommendations	Systematic review evidence
Dietary	<ul style="list-style-type: none"> Members of the dental team should support and promote breastfeeding according to current recommendations.^{200,201} Infants should not be put to bed with a feeding bottle (Armstrong et al 2008); drinks containing free sugars, including natural fruit juices, should never be put in a feeding bottle.²⁰⁰ Cheese is a good high energy food for toddlers as it is non-cariogenic and may be actively protective against caries.^{7,200} Free sugars intake should not exceed 10% of the total dietary energy intake (including alcohol) nor 11% of the total food energy (excluding alcohol).²⁰¹ Foods, beverages and confectionery containing free sugars should be minimised and, if possible, restricted to meal times.^{200,201} Confectionery and beverages containing sugar substitutes are preferable to those containing sugars.²⁰⁰ Health professionals should check if a medicine contains sucrose and offer sugar-free alternatives wherever possible²⁰¹ The frequency of acidic drinks such as fruit juices, squashes and carbonated drinks (including diet and sports drinks) should be reduced.²⁰¹ 	<p>Harris and colleagues²⁰² found that one-to-one dietary interventions in the dental setting may change patient behaviour, although the evidence was greater for interventions aiming to change fruit, vegetable and alcohol consumption than for those aiming to change dietary sugar consumption.</p> <p>Lingstrom and colleagues²⁰³ found that the evidence for the use of sorbitol or xylitol in chewing gum, or for the use of invert sugar, is inconclusive. They found that adding calcium phosphate or dicalcium phosphate dihydrate to chewing gums had no caries-preventive effect.</p>
Fluoride	<ul style="list-style-type: none"> Children should have their teeth brushed with fluoride toothpaste.²⁰⁰ Toothpaste containing fluoride concentrations of 1 000 ppm (parts per million) +/-10% should be used by pre-school children.²⁰⁰ Topical fluoride varnish should be applied to the dentition at least twice yearly for preschool children assessed as being at increased risk of dental caries.²⁰⁰ Adults should brush twice daily with fluoridated toothpaste.²⁰⁴ Adults should use fluoridated toothpaste with at least 1 350 ppm 	<p>Walsh and colleagues²⁰⁶ found that the caries preventive effect of fluoride toothpaste increases significantly with higher fluoride concentrations. This was only significant for fluoride concentrations of 1 000 ppm and above.</p> <p>Marinho and colleagues²⁰⁷ found that fluoride mouthrinse, gels or varnishes used in combination with toothpaste, compared to toothpaste alone, had a significant effect on caries reduction ($p=0.01$). Additionally, the combined use of fluoride gel and mouthrinse in comparison to gel alone had a significant effect ($p=0.02$). However, another systematic review found that the use of fluoride toothpastes had a similar degree of effectiveness to</p>



	<p>fluoride.²⁰⁴</p> <ul style="list-style-type: none">• Dietary fluoride supplements are recommended for children at high risk of developing caries, and are not recommended for children who are at low risk of developing caries.²⁰⁵	<p>mouthrinses or gels for the prevention of dental caries in children (Marinho et al 2004a).</p> <p>Bonner and colleagues²⁰⁸ compared slow-release fluoride devices with an alternative fluoride treatment, placebo, or no intervention in children, and found that caries increment was significantly lower in the intervention group than in the placebo group.</p> <p>McDonagh and colleagues²⁰⁹ found that fluoridation of drinking water led to reductions in the incidence of caries, although these reductions were smaller than previously reported. The prevalence of fluorosis was found to be highly associated with the concentration of fluoride in drinking water.</p> <p>Yeung and colleagues²¹⁰ compared fluoridated milk with non-fluoridated milk at three year follow-up, and found that fluoridated milk was beneficial to the permanent dentition of school children.</p> <p>Marinho and colleagues²¹¹ found that the supervised regular use of fluoride mouthrinse at two main strengths and rinsing frequencies was associated with a clear reduction in caries increment in children ($p < 0.0001$).</p> <p>Tubert-Jeanin²¹² found that when compared with no fluoride supplement, the use of fluoride supplements may be associated with a reduction in caries increment in permanent teeth. The effect of fluoride supplements on deciduous teeth was unclear. When compared with the administration of topical fluorides, no differential effect was observed. Additionally, Ismail and Hassan²¹³ found weak and inconsistent evidence that the use of fluoride supplements prevents dental caries in primary teeth, and some evidence that such supplements prevent caries in permanent teeth. They noted that mild-to-moderate dental fluorosis is a significant side effect of oral fluoride supplementation.</p>
Sealants	<ul style="list-style-type: none">• Children and adolescents who are assessed as being at high caries risk should have resin-based fissure sealant applied and maintained in pits and fissures of permanent teeth. Adults who are assessed as being at high caries risk should have resin-based fissure sealant applied and maintained in pits and fissures of permanent teeth.²¹⁴	<p>Ahovuo-Saloranta and colleagues²¹⁵ compared the effectiveness of sealants with no sealant, or sealants from different classes of materials, for preventing occlusal caries in children and adolescents. After 4.5 years the sealed permanent molar teeth of children aged 5–10 had over 50% reduction in decay compared with teeth without sealants. One included study with longer follow-up showed that after nine years only 27% of</p>



		<p>sealed tooth surfaces were decayed compared with 77% of tooth surfaces without sealant.</p> <p>Azarpazhooh and Main²¹⁶ concurred that sealants should be placed on the primary molars of children who are susceptible to caries, and noted that they should be placed as part of an overall prevention strategy based on assessment of caries risk.</p> <p>Hiiri and colleagues²¹⁷ found that pit and fissure sealants were significantly more effective than an application of fluoride varnish every six months in preventing occlusal decays of first molars at 23 months, at four years and nine years.</p>
<p>Toothbrushing</p>	<ul style="list-style-type: none"> • Children should have their teeth brushed at least twice a day, using no more than a smear or small pea-sized amount of toothpaste.^{200,204} • Toothbrushing should commence as soon as the primary teeth erupt.^{200,204} • Children’s teeth can be brushed with either manual or powered toothbrushes as an effective means of administering fluoride.²⁰⁰ • Brush last thing at night and on one other occasion.²⁰⁴ • Spit out after brushing and do not rinse.^{200,204} • Clean interdentally using interdental brushes or floss.²⁰⁴ 	<p>Robinson and colleagues²¹⁸ found that brushes with a rotation oscillation action removed plaque and reduced gingivitis more effectively than manual brushes in the short-term and reduced gingivitis scores in studies over three months.</p> <p>Deacon and colleagues²¹⁹ found some evidence that rotation oscillation brushes are more effective at reducing plaque and gingivitis more than side-to-side brushes in the short term; however, this difference was small and its clinical importance was unclear. Sambunjak and colleagues²²⁰ found that flossing plus toothbrushing showed a statistically significant benefit compared to toothbrushing alone in reducing gingivitis at one, three and six months. They also found that flossing plus toothbrushing may be associated with a small reduction in plaque at one and three months.</p>
<p>Dental recall checks; scaling and polishing</p>	<ul style="list-style-type: none"> • First examination at the eruption of the first tooth and no later than 12 months. Repeat every six months or as indicated by child's risk status/susceptibility to disease.²²¹ 	<p>Beirne and colleagues²²² found that there was insufficient evidence on the potential benefits and harms of altering the recall interval between dental check-ups, or to support or refute the practice of encouraging patients to attend for dental check-ups at six-monthly intervals.</p> <p>The same study found that there is insufficient evidence on the beneficial and adverse effects of routine scaling and polishing for periodontal health, and on the effects of providing this intervention at different time intervals.²²²</p>



Appendix F Other approaches to reduce PAHs

Initiatives to improve access, as a secondary means of avoiding hospitalisation

Despite Ho et al.¹⁶⁴ suggesting that similar in-hospital mortality rates between the highest and lowest SES groups denoted equity of access in the Western Australian public health care system, the majority of evidence in the literature suggests that low SES is strongly related to difficulties accessing health care; one of the overarching perceptions is that “equal need [does] not equate to equal utilisation”^{41 p.74}. This is associated with the inverse care law described earlier and the mismatch between availability of, and need for, health care. Ansari et al.⁸ proposed that “the removal of disparities in health care access between ... socioeconomic groups ... will have the potential to improve health outcomes in the population and reduce demand on hospital services” (p. 41). Access incorporates economic (eg. cost, transport, child care), structural (eg. informed about services, eligibility) and personal/cultural barriers (eg. health literacy, language, confidence)^{55,56,160,223} and each of these could be targeted when improving circumstances for low SES groups. Watson²²³ focused on methods of increasing uptake of services and retaining participants among families vulnerable due to abuse; and highlighted important components of access as the relationship between the service provider and the individual, communication style, practical support, ease of physical access to programs, continued contact/follow-up and approachability. In the US, Epstein²²⁴ actively tested the access hypothesis and found that the availability of free public ambulatory clinics in medically underserved areas was able to reduce preventable hospitalisations among low income groups.

However, there is evidence that interventions to improve access and efficacy of primary care among low SES individuals must be strategic. Chan et al.¹⁵⁰ conducted an RCT assessing the value of a multidisciplinary team approach to primary care among women in low SES areas and found no significant differences between intervention participants and controls on any measure of mental health, general health or quality of life. Instead of the improvements in health they expected, these authors found that in some cases wellbeing declined as the patients' attention was directed at the difficulties they faced in their lives and the length of the program did not allow for adequate processing of such emotions or the bolstering of support to tackle challenges. Nevertheless, Bindman et al.³ indicated that when addressing factors affecting health and preventable hospitalisation, improving access is more likely to be effective than changing individuals' propensity to seek care or altering physicians' behaviours. Perhaps there simply needs to be greater consultation on what low SES groups require. Additional factors affecting access relate to health insurance, concession cards, bulk-billing and subsidised medications⁵⁴. Korda et al.¹⁶³ found that in Australia concession cards were able to reduce socioeconomic inequality in general practice use among middle-aged women but had no effect on specialist care, while some of the inequality in allied health service use was attributed to private health insurance. Once again it follows that improving access to different health services will likely prevent PAHs.

Health Prevention

Despite some question as to the effectiveness of health promotion among disadvantaged groups¹⁶², one method for targeting PAHs among low SES groups has been to consider health prevention and reducing risk factors for PAH thereby indirectly addressing PAHs. As indicated by Cable²²⁵ “removing financial barriers is critical but may be insufficient for reducing preventable hospitalisations if other barriers are not also addressed” (p. 66). Evaluations of these strategies do not typically measure avoidable hospitalisation as outcomes and most do not specifically describe how they impacted upon low income groups, yet consistently these approaches mention that the program may be of benefit to low SES groups due to increased prevalence of health risk behaviours among this population.



There have been a number of interventions delivered to reduce rates of substance use, including smoking, alcohol consumption and both legal and illicit drugs¹⁶⁶. The programs have been of mixed quality and produced mixed results but unanimously emphasised the need to consider vulnerable populations who are prone to high rates of substance abuse. Interventions addressed all age groups and included family home visits, parent education, school-based education, peer interventions, sport and recreation programs, mentoring, mass media campaigns and law enforcement. The idea of many of these strategies is to reduce incidence of substance use and prevent further health risks. Substance use has been associated with cardiovascular health, cancer and injury; hence it seems logical that there may be an association with these kinds of lifestyle factors and PAHs. Loxley et al.¹⁶⁶ suggested that structural and legislative strategies are the most effective methods of addressing health inequalities. These authors also suggested targeting vulnerable and disadvantaged groups, offering support to families, encouraging healthy development and providing health education across a range of age groups.

In considering smoking specifically, acknowledging an association between SES and cardiovascular disease (CVD), Beauchamp et al.²²⁶ sought to investigate the efficacy of CVD interventions among disadvantaged groups both in Australia and internationally. Overall their review identified limited benefit of CVD interventions among low SES groups. The authors assessed smoking reduction strategies, absolute risk assessment, secondary prevention medications and rehabilitation, and heart failure self-management programs. There was some merit in the notion of increasing tobacco taxation as a method for reducing smoking prevalence but the availability of cheap tobacco from alternative sources (ie. black-market) proved a barrier to this strategy. Nicotine replacement therapy had short-term benefits but underlying addiction and continuing psychosocial influences prevented its long-term efficacy. Cardiac rehabilitation and heart failure self-management were also considered beneficial on the whole though access and health literacy were barriers requiring attention. In contrast, absolute risk assessment models were perceived as potentially underestimating the breadth of the problem. The authors recommended intervention across all stages of the CVD continuum with an emphasis on combining community or population-based interventions with high-risk group-directed strategies.