

Improving care Hospital Admission Risk Program

Public report



A Victorian
Government
initiative



Improving care

Hospital Admission Risk Program

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The improving care design symbolizes the person-centered focus of the work that health services and the Continuing Care and Clinical Service Development section of the department are striving to achieve together. Our mutual goal is to improve and maintain a person's optimal independence within the community.

The design element is a visual representation showing how people of all ages, from all walks of life and cultural backgrounds with differing levels of physical and intellectual ability, move through a journey of icons that represent the home, health centres, work and recreational pursuits.

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Foreword from the Minister

Actively improving the health of Victorians has been a key objective of our Government during the past five years. As Minister for Health, I am delighted with what our government and the health sector have achieved together. The Hospital Admission Risk Program (HARP) is an excellent illustration of these achievements.

In response to unprecedented and sustained increases in demand for health care services that were placing significant pressures on hospitals, the Victorian Government committed \$582 million as an initial investment over four years from 2001–02 to 2004–05 to implement the Hospital Demand Management Strategy.

Of the overall Hospital Demand Management Strategy, \$150 million was invested to develop new approaches in providing care for patients known to have a high risk of deterioration in their health and thus preventing avoidable hospital use in the future. These new approaches to patient care were developed, implemented and evaluated through HARP.

It has been rewarding to see a range of positive health outcomes for patients with various chronic and complex conditions managed through HARP. The overall impact on the level of hospital utilisation in Victoria has also been significant.

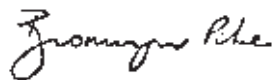
HARP involved a collaborative effort by each stage of a patient's care including hospital services, community services and general practitioners.

The approach to care and outcomes achieved through HARP contributes to the growing body of evidence about effective strategies to meet the needs of people at risk of hospitalisation.

Chronic disease is now commonplace and will continue to affect an increasing proportion of the population. Approximately 70 per cent of the total burden of disease in Australia is attributable to six disease groups, all of which have the potential to be either prevented or managed in settings and modes other than bed-based inpatient care.

Living with a chronic disease has a significant impact on a person's quality of life and on their family. The outcomes achieved through HARP will continue to assist in developing services to support people living in the community with chronic and complex conditions. I am confident this work will actively contribute towards continued improvements in policy development and clinical service delivery.

The Victorian Government is committed to ensuring the achievements through HARP will continue to be implemented more broadly across the state. I commend this report to you and look forward to sustaining this collaborative effort to improve the health outcomes of Victorians.



Hon Bronwyn Pike MP
Minister for Health

Acknowledgements

The Metropolitan Health and Aged Care Services Division of the Department of Human Services produced the Hospital Admission Risk Program public report. Many people and organisations gave their time and support to guiding the development and implementation of the Hospital Admission Risk Program (HARP). In particular, we wish to acknowledge and thank members of the governing groups that supported this important initiative, which include the:

- HARP Steering Committee
- HARP Reference Group
- HARP Planning Group.

The Department of Human Services also thanks all the partners who supported the development and implementation of HARP and particularly appreciates their contribution to the evaluation process. We recognise the significant amount of time and effort that was required as part of this process.

We wish to acknowledge the people who undertook the evaluation of this initiative, which include:

- the HARP Evaluation Subcommittee
- BearingPoint Australia
- the Clinical Epidemiology and Health Service Evaluation Unit, Melbourne Health
- Associate Professor Ian Gordon from the University of Melbourne Statistical Consulting Centre.

We also acknowledge the health services that provided us with regular reports for the HARP evaluation as well as quotes, case studies and examples of good practice demonstrated through HARP. These are a small sample of the many innovative and quality practices that have been developed to reduce avoidable hospital admissions for people with chronic disease and complex care needs in Victoria.

In light of the successful outcomes of HARP, the Department of Human Services has commenced the process of mainstreaming chronic disease management initiatives developed through HARP across the Victorian health service system.

We look forward to continuing our work with partner agencies in the further development of HARP Chronic Disease Management services across Victoria.



Lance Wallace
Executive Director
Metropolitan Health and Aged Care Services
Department of Human Services

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1 Background

Hospitals faced pressure from the growing number of people presenting to emergency departments for treatment. The rising demand for public health care was driven by a number of key factors, including:

- Given the longstanding impact of these factors, ongoing demand for acute public health care was anticipated to grow.

- emergency demand
- elective surgical waiting lists
- strategies to prevent avoidable hospital use by providing more appropriate care.

Of the overall Hospital Demand Management Strategy, \$150 million was invested to develop new approaches to patient management, providing more appropriate care for individuals known to have a high risk of potential health deterioration and thus preventing avoidable hospital use in the future. These new approaches to patient care were funded, monitored and evaluated under the Hospital Admission Risk Program (HARP).

HARP projects were designed to identify those at risk of repeated hospitalisation at the time of emergency presentation² or hospital admission or at discharge from hospital, in order to target alternative interventions at appropriate points in their journey through the health system. Interventions for this group of individuals were then focused on one or more of the following strategies:

- preventing health deterioration in the community
- identifying alternative management for those who deteriorate
- providing different approaches for 'at risk' patients who present to hospital
- providing more targeted support for 'at-risk' patients discharged home.

At the point of final evaluation, HARP funding had been provided to 87 projects³, treating approximately 100,000 patients across Victoria. While the majority of these patients received early care coordination within the emergency department, around 20,000 Victorians participated in comprehensive interventions provided by a range of different HARP projects.

- improving communication and cohesion between services (78 per cent)
- improving the management of 'at risk' patients (67 per cent)
- improving the proactive management of patients (59 per cent).

3 A list of the HARP projects for 2004–05 is presented at Appendix 3.

Many projects also targeted HARP objectives relating to:

- providing better continuity of care (55 per cent)
- improving responsiveness to patients' needs (51 per cent)
- increasing capacity within the health system to manage people's health needs (49 per cent).

Many HARP projects focused on strategies to avoid hospital use by preventing health deterioration or providing extra support following hospitalisation to help 'at risk' individuals remain in the community.

Characteristics of system interventions

System-level interventions were focused on improving the coordination between different services, implementing changes in the overall approach to clinical practice, or providing additional workforce support through professional development and training opportunities.

- Interventions involving interagency partnerships and coordination promoted effective service responses across the continuum of care so that patients experienced a seamless transition between care settings.
- Changes in clinical practice promoted new visions for achieving better health and addressing the non-clinical characteristics of patients at risk of hospitalisation.
- Training and development opportunities were designed to promote a more appropriate response from the acute and community sectors to the needs of people who have historically relied heavily on the emergency services of acute public hospitals.

4 Key HARP outcomes

Three primary indicators were examined to identify the success of HARP projects:

- the number of presentations to the hospital emergency department
- the number of unscheduled admissions to hospital
- the number of days staying in hospital for individuals who received unscheduled admissions for an episode of care.

Overall outcomes

In general, HARP patients experienced⁴:

- 35 per cent fewer emergency department attendances
- 52 per cent fewer emergency admissions
- 41 per cent fewer days in hospital.

Thus, HARP had a positive overall impact on the level of hospital utilisation in Victoria. The reduced need for hospital services was equivalent to approximately one emergency department attendance, two emergency admissions, and six days spent in hospital each year for every HARP patient⁵.

4 See Appendix 4. All results were statistically significant ($p < .05$) and based on average differences between a sample of HARP patients and a sample of non-HARP patients.

5 Estimates based on differences in average rate of hospital use between a sample of HARP patients and a sample of non-HARP patients.

5 Major lessons learned from the program

Key lessons reported by individual HARP initiatives were broadly classified according to their impact on project development and implementation. HARP project staff reported a number of key factors that facilitated establishment of individual HARP projects, including:

- key government policy initiatives or specifications
- local funding flexibility
- administrative arrangements that promoted innovative practice and facilitated communication between different service providers
- active involvement of multiple service providers
- flexibility in clinical service delivery
- linkages and networks with other HARP consortia
- staff flexibility to changing service demands.

6 HARP Chronic Disease Management services

Based on the overall positive impact that HARP has had for patients and the benefits for the health service system, the Victorian Government decided to mainstream HARP projects into an ongoing program now known as HARP Chronic Disease Management (HARP-CDM) Services. This sees a change in focus from innovation and experimentation to embedding successful models of care within the service system.

Building on the \$150 million investment in HARP during the initial four-year innovation period, the government expanded the funding in 2005–06 by an additional \$11 million to enable the successful models of care to be implemented more broadly across the state. The total investment in HARP in 2005–06 was \$53 million. HARP-CDM Services are now available at 21 health services across Victoria, with six new services established during 2005–06 (five in rural Victoria and one in metropolitan Melbourne).

7 Areas for further development

To understand key dynamics underlying the successful operation of HARP, several areas have been explored in further detail. These areas are considered to be important for the ongoing development of HARP-CDM Services:

- effective governance across acute and community sectors
- improved access in rural and regional areas
- future dimensions of program monitoring.





1 Background

In the late 1990s Victoria experienced unprecedented growth in demand for public health services. Hospitals faced particular pressure from the growing number of people presenting to emergency departments for treatment. The rising demand for public health care was driven by a number of key factors, including:

- a rise in chronic and complex illness associated with an ageing population
- a reduction in the access to general practitioners within the community
- workforce shortages, particularly for nurses
- a shortfall in the number of residential aged care beds
- an increase in the range of new treatment options through advances in medical technology
- a reduction in the availability of informal carers within the community.

Given the longstanding impact of these factors, ongoing demand for acute public health care was anticipated to grow.

As a response, the Victorian Government committed \$582 million as an initial investment over four years from 2001–02 to 2004–05 to implement the Hospital Demand Management Strategy⁶ to address:

- emergency demand
- elective surgical waiting lists
- strategies to prevent avoidable hospital use by providing more appropriate care.

Of the overall Hospital Demand Management Strategy, \$150 million was invested to develop new approaches to patient management, providing more appropriate care for individuals known to have a high risk of potential health deterioration and thus preventing avoidable hospital use in the future. These new approaches to patient care were funded, monitored and evaluated under the **Hospital Admission Risk Program (HARP)**.

Collaboration and governance

HARP aimed to maximise collaboration across multiple levels of the health system, including hospitals, community providers, clinical health professionals, general practices, ambulance services, consumers, carers and research bodies, in order to achieve effective and sustainable change in health service delivery.

A HARP reference group and steering committee were convened and consisted of academics, managers and clinicians from across the health service system. These groups provided the direction and drive throughout the implementation of HARP.

The HARP Reference Group was established in December 2001 as a guiding coalition of experts to advise how the avoidable use of hospitals can be best prevented. The HARP Steering Committee was established at the inception of HARP to consider system-wide issues for the provision of care to people targeted by HARP.

The terms of reference and membership of the HARP governance groups are presented in Appendix 1.

⁶ Additional information about the Hospital Demand Management Strategy can be found at www.health.vic.gov.au/hdms



Program objectives

HARP objectives	Rationale
Improve the management of ‘at risk’ patients	To provide secondary and tertiary prevention for people who demonstrate a high likelihood of health deterioration or frequent hospital use
Improve support and/or self-management	To promote an individual’s ability to manage aspects of their own health care or the ability of staff to manage the care of an individual living in supported community living situations
Improve responsiveness to patients’ needs	To address individuals’ needs in a comprehensive manner through timely and appropriate service provision
Improve the proactive management of patients	To anticipate and manage the short term and longer term needs of individuals so that interventions support health maintenance
Increase capacity within the health system to manage people’s health needs	To increase the service system’s ability to provide sustainable and appropriate services to people who benefit from care
Provide better continuity of care	To promote more complete, consistent care across services to enable a smooth patient transition (for example, between hospital and the community)
Improve communication and cohesion between service providers	To promote timely care and create cohesion between acute hospitals, sub-acute care and the primary care sector
Improve resource efficiency	To ensure maximum value for money and promote the equitable distribution of services

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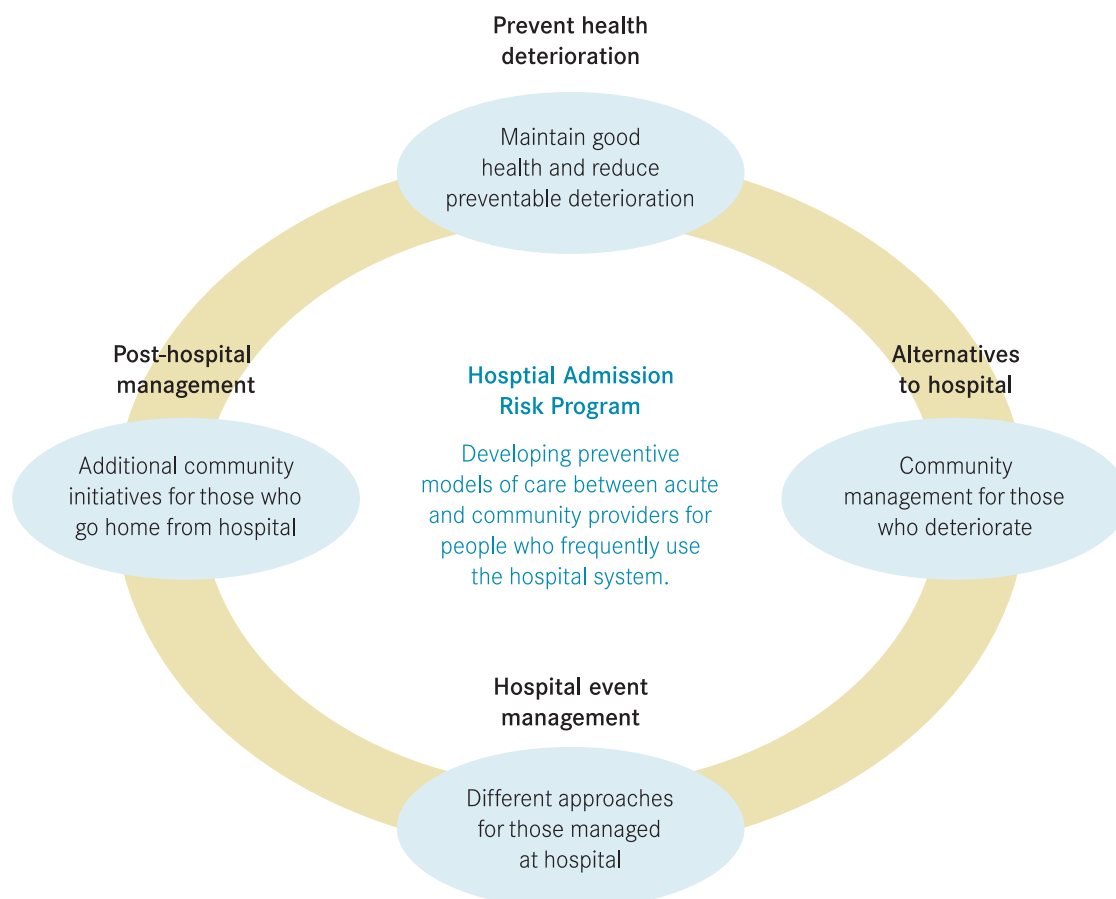
Major areas of focus

HARP projects were designed to identify those at risk of repeated hospitalisation at the time of emergency presentation or hospital admission or at discharge from hospital⁷, in order to target alternative interventions at appropriate points in their journey through the health system. Interventions for this group of individuals were then focused on one or more of the following strategies:

- preventing health deterioration in the community
- identifying alternative management for those who deteriorate
- providing different approaches for ‘at risk’ patients who present to hospital
- providing more targeted support for ‘at risk’ patients discharged home.

The funding emphasis for HARP projects shifted from hospitals to the community sector over the course of the program. Collaboration and alliances between the hospital and community sectors were stressed to promote a smoother patient transition across the continuum of care. Illness prevention, service linkages and integration, and system-wide impacts were also encouraged through the formation of working parties to focus on designated streams of care.

Figure 1: Key HARP strategies



7 A glossary of terms is presented at the end of the report.

Outcome monitoring

A project-based approach was implemented to allow for new initiatives to be piloted, assessed for effectiveness and revised where appropriate. An independent evaluation was commissioned to monitor HARP outcomes. The Evaluation Subcommittee was convened to guide this evaluation (see Appendix 2).

The evaluation methodology built an evidence base to identify effective models of care through:

- descriptive analysis of outcomes for individual projects, groups of projects, and the overall hospital system
- comparative analysis of individuals before and after enrolment in selected HARP projects
- comparative analysis between a selection of HARP and non-HARP patient cohorts.⁸

The Department of Human Services undertook subsequent analysis to further explore a range of key HARP outcomes.



⁸ Details about the HARP objectives, strategy areas and the evaluation methodology are provided in the Hospital Admission Risk Program evaluation guide available at www.health.vic.gov.au/harp-cdm/harp_eval_guide.pdf.



At the point of final evaluation, HARP funding had been provided to 87 projects⁹, treating approximately 100,000 patients across Victoria. While the majority of these patients received early care coordination within the emergency department, around 20,000 Victorians participated in comprehensive interventions provided by a range of different HARP projects.

- improving communication and cohesion between services (78 per cent)
- improving the management of 'at risk' patients (67 per cent)
- improving the proactive management of patients (59 per cent).

- providing better continuity of care (55 per cent)
- improving responsiveness to patients' needs (51 per cent)
- increasing capacity within the health system to manage people's health needs (49 per cent).

Many HARP projects focused on strategies to avoid hospital use by preventing health deterioration or providing extra support following hospitalisation to help 'at risk' individuals remain in the community. Comparatively fewer projects focused on the management of those at risk of hospitalisation in emergency departments and hospitals. This was attributed to the shift in emphasis over the course of the program from hospital treatment to the management of those at risk of hospitalisation in the community.

Areas of focus	Proportion of projects
Preventing health deterioration	44 per cent
Post-hospital management	24 per cent
Different approaches to emergency event management	17 per cent
Providing alternatives to hospital treatment	15 per cent

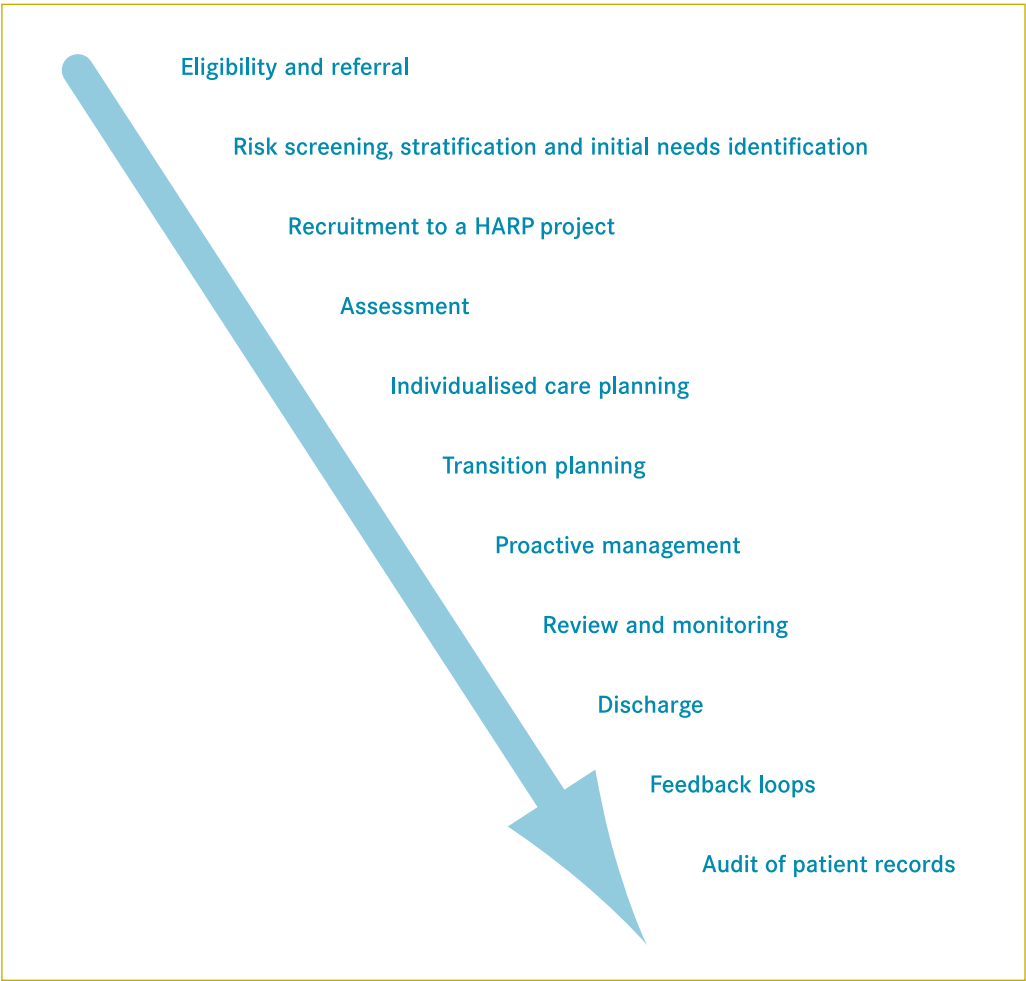
Common characteristics

Many HARP projects reported a number of similar characteristics, providing a common framework for patient management. This framework identified key phases of a coordinated approach to service provision, while maintaining a focus on a patient’s individual journey across the health service system. Key phases of service provision under HARP focused on:

- an assessment of overall eligibility to enter a HARP project
- risk screening and stratification

- comprehensive assessment of individual needs
 - individualised care planning
 - transition planning and proactive management of health conditions
 - ongoing monitoring and review of an individual’s health status in the community.
- Specific elements of care reported by different HARP projects are presented in Figure 2 and described in detail later.

Figure 2: Common components of care reported across HARP projects



Eligibility and referral



HARP projects typically included individuals who were frequent users of hospital emergency services and individuals with chronic health conditions. The majority of people receiving HARP services were aged 65 years and older. Other eligibility criteria varied according to an individual project's model of care, target group, local contextual influences or historical issues.

Referral processes varied across HARP projects, with some health services working towards a single point of referral for all their HARP projects and others allowing individualised referral processes that optimised relationships between different service providers.

Risk screening, stratification and initial needs identification



Risk screening involved recognising the clinical and non-clinical characteristics of patients to identify their overall risk of repeated hospitalisation. Screening focused on medical risks, past health service use, functional ability and the social needs of the individual patient. Patients may have then been stratified according to their overall eligibility to enter a HARP project, the appropriateness of the referral to the specific service provider, and the urgency with which they required clinical intervention or other services.

Risk screening occurred at the acute and community levels. The majority of HARP projects' risk screening processes incorporated tools that were developed locally and were based on available evidence and professional experience with the targeted patient group.

Recruitment to a HARP project



People who were screened as suitable were recruited into a HARP project.

Comprehensive assessment



Comprehensive assessment involved active consideration of patient needs, and a willingness to look beyond the presenting problem to identify other significant issues that may impact on health and wellbeing.

The depth and range of areas for assessment were determined according to the complexity of individual patients and the scope of the project's model of care. Patients with complex circumstances required a comprehensive assessment addressing the full range of medical, psychosocial, functional, cognitive and environmental needs.

Individualised care planning



Common elements of individualised care planning across many HARP projects include:

- engagement with and involvement of the patient
- documentation that reflected the immediate and longer term clinical, social and functional needs, and preferences of patients
- identification of service linkages to effectively address patient needs
- use of evidence-based guidelines and care pathways
- incorporation of ongoing patient and carer education
- advance care planning.

Transition planning



The transfer of information between the acute and primary care sectors was emphasised throughout HARP. For patients entering the health care system, successful transition from one level of care to another was considered vital for effective continuity of care and its subsequent impact on patient outcomes and acute service use.

Projects focused on building the system capacity for service linkages within and between the acute and primary care sectors in order to provide a more integrated approach to service delivery.

Proactive management



Proactive patient management focused on timely implementation of key stages of individual care and transition plans. Services may have been provided directly by HARP projects, referred to other service providers or purchased through brokerage funds.

Review and monitoring



HARP project staff consulted with patients, their carers and service providers to determine the appropriateness and timing of patient discharge from HARP projects. Specific discharge criteria and practices varied across HARP projects.

Discharge



HARP project staff monitored the patients' ongoing management to establish the success of transitions across the service system, the ongoing appropriateness of services provided, and the responsiveness of services to changes in patient or carer needs.

Feedback loops



Some projects established feedback loops to flag patients who re-presented to hospital following discharge from a HARP project, in order to re-establish contact and coordinate ongoing patient care.

Audit of patient records



Some HARP projects decided to undertake a retrospective investigation of patient records to review the quality of service delivery and inform future service development.

Specific characteristics

A range of specific interventions designed to achieve improvements in patient health status and health management, in addition to improvements in health system capacity and performance, characterised HARP projects.

Characteristics of patient interventions

Interventions designed to achieve improvements in patient health status and health management were tailored according to the complexity of the individual and the level of support available in their environment. The needs of low complexity patients were frequently addressed by facilitating effective ‘service linkages’,

including referral to a general practitioner or other community services, telephone triage, and patient education initiatives. High complexity patients were more likely to require initiatives focusing on ‘full service integration’, including complex high intensity care coordination, specialised rehabilitation programs, community maintenance programs, and access to specialist consultations.

Patient-level interventions commonly reported by HARP projects are outlined in Table 2 and illustrated through a series of project descriptions on the following pages.

Table 2: Patient-level interventions reported by HARP projects

Patient level interventions	Description
After-hours support	After-hours services were provided during evenings, over weekends or 24 hours a day by different HARP projects. Most afterhours services involved providing information, risk screening or advice via the telephone. Others included the capacity to have a nurse conduct a home visit to undertake patient assessment, management, monitoring or referral.
Care coordination (low/high intensity and maintenance)	A generic term for multiple coordinating roles performed by service providers in different HARP projects. This included case management, care management, general service coordination and nominated contact person roles.
Carer involvement	A focus on the needs and preferences of carers who provide unpaid care and support to family members or friends who have a chronic or acute condition, mental illness or disability or who are frail aged.
Evidence-based care	Projects identified and implemented guidelines, decision making pathways and models of care which were based on the strongest research ‘evidence’ or clinical ‘best practice’.
Diversion	Prompt identification by community service providers of individuals in the community who experienced a significant deterioration in their medical or social condition. For those individuals not requiring immediate hospital care, the assessment, care planning and appropriate care were provided to improve the person’s quality of life and prevent the need for future hospital care.
Interdisciplinary approach	An approach to patient management characterised by the simultaneous participation and involvement of two or more health disciplines. The different disciplines pool their expertise to make team-based treatment decisions based on identified patient needs.

Table 2 continued

Patient level interventions	Description
Medication management	A variety of different strategies are employed to reduce the incidence of adverse events resulting from medication mismanagement in the home environment. Strategies may involve a home visit by an outreach pharmacist, a home medication review by a general practitioner or a community pharmacist, or education and monitoring by nursing staff.
Multidisciplinary care	An approach to patient management characterised by a team of different health professionals who provide independent clinical input into patient management.
Outreach care and services	A variety of service responses that were provided to patients in their own domestic environment (for example, own homes, rooming houses, supported residential services). A range of outreach services were provided through HARP which included patient monitoring and review, general practitioner support, intensive rehabilitation, individual asthma education, and pain management.
Rapid response	Prompt identification by hospital service providers of individuals who experienced a significant deterioration in their medical or social condition. For those individuals not requiring immediate hospital care, the assessment, care planning and appropriate care were provided to improve the person's quality of life and prevent the need for future hospital care.
Rehabilitation care	The provision of services to improve or maintain the functional capability of patients to engage in daily activities.
Self-management	Self-management programs encourage people with chronic conditions to engage in activities that protect and promote health, monitor signs and manage symptoms of illness, manage the impacts of illness on functioning, emotions and interpersonal relationships, and promote adherence to treatment regimes.
Shared care	The mutual involvement of different services in the provision of integrated patient-centred care (for example, general practitioners and hospital specialists actively co-managing a patient with a chronic illness).
Specialist clinics and staff	Clinics were developed to assess, review and educate patients about their medical and social needs. A variety of health professionals were involved in specialist clinics, including medical consultants, specialist nurses, psychologists, speech pathologists, dietitians, occupational therapists and physiotherapists.
Support services	Some projects developed dedicated support services to suit particular individual, cultural or linguistic needs, including a volunteer companionship program, culturally specific self-management programs with peer leadership, and employment of dedicated health workers for Aboriginal and Torres Strait Islander peoples.
Transition services	Transition services aim to facilitate a person's smooth movement within and between the acute and primary care sectors. These services are usually time-limited, provide support and prevent deterioration until ongoing services (if required) have commenced.

Patient-level interventions

Outreach services, Bendigo Health

Partnerships in chronic disease management

Key stakeholders involved in chronic disease management were brought together from the acute, sub-acute and primary care sectors. The project established a mobile service to visit rural areas. The mobile service included a clinic with a consulting physician and chronic disease care coordinator.

The clinics were held in general practices and focused on assessment and review of patients with chronic conditions, in addition to the education of practice nurses in disease management.

Chronic disease management, Latrobe Regional Hospital

This project at Latrobe Regional Hospital developed a model of care based on guidelines for the management of chronic diseases. This project facilitated improved management of patients with chronic conditions who frequently use hospital services.

The focus of care interventions shifted from reactive management in the acute sector to proactive management in the primary sector. Care coordination was a critical success factor of the model of care because it enabled ongoing assessment and review to meet the needs of individual patients.

Clinical pathways, Barwon Health

Assertive case management for chronic and complex diseases

This project addressed the complex social, medical, emotional and behavioural problems that underlie frequent use of the emergency department and repeat admissions to hospital.

An assertive case management approach was implemented, involving regular follow-up and monitoring of HARP patients to ensure compliance with agreed health management plans. Key components of the assertive case management model were secondary and tertiary prevention strategies that were developed from evidence-based clinical pathways, and disease-specific and generic chronic disease self-management strategies.

Rehabilitation, Austin Health, Integrated chronic disease management

Chronic obstructive pulmonary disease and chronic heart failure were common reasons for emergency department presentations and emergency admissions at Austin Health. Integrated chronic disease management targeted people with chronic obstructive pulmonary disease and chronic heart failure living in the catchment area of Austin Health.

The project established a dysphagia clinic. It provided comprehensive dysphagia and nutrition assessment and management for chronic obstructive pulmonary disease patients presenting with dysphagia symptoms. It aimed to minimise potential aspiration risks, and to promote self-management of dysphagia in the community.

Evidence-based models of care, Melbourne Division of General Practice

Diabetes Clinical Co-management

This project implemented a model of care to enhance clinical management, care coordination, and support for people with diabetes by providing registered nurses as credentialled diabetes educators within general practices. The nurse educators collaborated with general practitioners in providing chronic disease management, integrated care across the health system, patient education and self-management support and afterhours telephone advice. Improved collaboration led to more appropriate clinical management, disease monitoring, care coordination and patient education, and reduced hospital presentations.

Patient-level interventions

Self-management, Bayside Health

The aim of the Disease Management Unit at Bayside Health was to provide ongoing specialist management and follow-up for patients with chronic and complex conditions. Key aspects of the self-management approach adopted by this unit include:

- group education sessions on relevant topics, such as anxiety and depression management, energy conservation and nutrition
- providing written information to patients about their condition and symptom management that can be incorporated into their lifestyle (for example, aids to better quality sleep and recipe books)
- psychological intervention to assist patients in managing depression
- implementing patient diaries to monitor health behaviours.

Community outreach, City of Port Phillip

The ConnectED project at the City of Port Phillip had a specific focus on the management of people with mental health and complex psychosocial needs, including homelessness and drug and alcohol related issues.

Services arranged through intensive community outreach included care coordination, short term stopover beds, emergency accommodation and housing. This service improved patient health and wellbeing and contributed to improvements in avoidable emergency department presentations and hospital admissions.

Rapid response, Eastern Health

Expert rapid response was provided to frail older persons living in the community or residential care who had experienced a significant increase in dependency as a result of a change in their medical condition or social situation.

Key interventions provided as a part of the rapid response team include:

- a central point for referral
- expert multidisciplinary assessment and care planning
- immediate and appropriate service provision
- follow-up at regular intervals.

Carer involvement, Royal Children's Hospital

The Accelerated Care through Emergency (ACE) project targets children with chronic and complex conditions who are expected to frequently attend the Royal Children's Hospital.

The program aims to reduce the number of children presenting to the emergency department and create clearer clinical pathways to enhance their continuity of care and to support and enhance the family's capacity to manage their child's condition in the most appropriate setting. ACE staff provide 24-hour, seven day a week telephone support to these families and the most senior medical staff review these children if they present to the emergency department.

Community client oriented medication services, Northern Health

This project identified the need to promote safe medication practices for older people. Important strategies developed at Northern Health to minimise medication misadventure include:

- risk assessment established as an integral component of the assessment process to identify patients at risk of medication misadventure
- education to patients, families and service providers to increase knowledge, awareness and safe practices of medication management
- establishing links and support across services in the acute and community sectors to promote sustainable practices across the care continuum
- referrals to services as patients move across the care continuum.

Characteristics of system interventions

System-level interventions were focused on improving the coordination between different services, implementing changes in the overall approach to clinical practice, or providing additional workforce support through professional development and training opportunities.

- Interventions involving interagency partnerships and coordination promoted effective service responses across the continuum of care so that patients experienced a seamless transition between care settings.

- Changes in clinical practice promoted new visions for achieving better health and addressing the non-clinical characteristics of patients at risk of hospitalisation.
- Training and development opportunities were designed to promote a more appropriate response from the acute and community sectors to the needs of people who have historically relied heavily on the emergency services of acute public hospitals.

System-level interventions commonly reported by HARP projects are outlined in Table 3 and illustrated through a series of project descriptions on the following pages.

Table 3: HARP system-level interventions

System-level interventions	Description
Service system mapping	Local health service systems were investigated to identify gaps in service provision for those who frequently use emergency hospital services.
Interagency collaborations	Interagency collaborations were enhanced, providing connected leadership, support and guidance for an integrated approach to care across the local health sector.
Service linkages and partnerships	Service linkages and partnerships were strengthened to connect services and facilitate coordinated service provision across and within acute and primary care services.
New models of care	New models of care were developed to address the clinical and non-clinical needs of both patient and carer across the care continuum.
Standardising components of care, protocols and processes	A range of care and other pathways were developed to promote a more systematic approach across different service providers.
Professional education and up-skilling	Professional education and up-skilling were prioritised to enhance the specific skills and expertise of HARP and relevant staff to implement preventive-focused interventions.
Staff support	Staff support was important to manage the complex change management requirements of implementing HARP as traditional role delineation and organisational arrangements shifted to accommodate new models of patient care.
Information sharing	Information sharing was enhanced through regular forums, newsletters and clinical meetings to establish system-wide, local and cluster-specific HARP networks.

System-level interventions

Staff support and information sharing

To promote evidence-based information sharing and to support the development of new models of care, HARP produced the *HARP background paper (2002)* and the seven HARP working party reports (2003) which supplemented reports such as the *Ambulatory Care Sensitive Conditions Study 2001–02 (2004)*.

These reports contributed to shaping the design and implementation of HARP within Victoria by building an evidence base through high level data analysis, literature reviews and analysis in priority areas that provided opportunities to have a significant impact on preventing the avoidable use of hospitals.

The background paper and working party reports are listed in Appendix 3 and available at: www.health.vic.gov.au/harp-cdm/harppubs

Standardising care processes, Southern Health

The Health for Kids in the South East project built on evidence-based guidelines and standardised approaches to enhance the quality of care for children with asthma, bronchiolitis, croup and gastroenteritis. Clinicians and consumers from all relevant clinical groups developed guidelines.

New models of care, Metropolitan Ambulance Service

Metropolitan Ambulance Service developed alternative solutions to potentially avoidable ambulance transports to emergency departments. The new model of care focused on identifying those who would benefit from more appropriate referral to medical deputising services, developed pathways to facilitate referral to these services, and monitored the progress of the new system on patient outcomes and the subsequent demand for ambulance transport.

Service linkages, St Vincent's Health

St Vincent's Health developed the capacity to flag HARP patients on their patient administration system.

When a HARP patient presented to the emergency department they could then be identified and their agreed emergency care plan implemented. By flagging patients and providing contact points for referral, HARP patients were proactively identified and managed.

Professional education and upskilling, Plenty Valley Community Health Service

The 'Suicide and Self Harm Prevention' project aimed to improve the service system response to people with suicidal or self-harming behaviours, complex psychosocial problems and substance abuse who were likely to present to the emergency department. Strategies to improve the capacity of the local service system to manage the patient group include:

- maintaining strong links with mental health services
- conducting workshops with local community service providers, including general practitioners, to increase knowledge of appropriate resources and referrals
- providing secondary consultation and undertaking joint patient work
- Project outcomes indicated more appropriate referrals from staff who participated in education, reduced staff anxiety, reduced emergency department presentations and improved continuity of care for patients.

System-level interventions

Service partnerships, Melbourne and Western HARP Consortium

The Western and Melbourne HARP Consortium and three Primary Care Partnerships collaborated on a project to develop electronic referral and care planning. These systems used the Primary Care Partnership service coordination tools to reduce the duplication of information and to provide a smoother patient transition between services.

Interagency collaborations–Effective HARP governance, Western Health

The overarching responsibility for HARP chronic disease management delivery at Western Health sits with the Governance Committee, which is made up of key leaders from each partner organisation and chairs of the program steering committees. The governance structure is underpinned by clearly articulated terms of reference and a signed ‘statement of intent’ as a tangible symbol of cooperation and collaboration for HARP and associated initiatives. Cohort-specific steering groups support the governance structure, overseeing the operational aspects of the program and ensuring program development and innovation is evidence-based, has a population health approach and is clinician-led.

System mapping and care coordination, Ballarat Health Services

The ‘Integrated Model of Care to Manage Patients with Complex Needs’ project identified inefficiencies and access limitations experienced by people with complex psychosocial issues who frequently present to the local emergency department. The project examined key interfaces across the care continuum. Strategies were implemented to target key issues in the health system operation in order to improve care coordination and service integration. Psychosocial intervention strategies across the local health care system include appropriate screening and assessment, joint care planning, and customised service pathways to address patient needs.

Peninsula Health Residential Outreach Response Team – an alternative model of care

The Residential Outreach Response Team located in the emergency department at Frankston Hospital provides a multidisciplinary outreach service for residents living in residential aged care facilities. This means residents who are suitable for the service can receive the care they need while remaining in their familiar environment and not be transferred to hospital.

On one occasion residential aged care facility staff contacted the team and indicated plans to transport some residents with gastroenteritis to the emergency department. The team mobilised staff to assess the residents at their home environment. Advice was provided about appropriate infection control procedures and nursing care. Medical follow-up and ongoing support for the residential aged care facility were also organised. From this referral, the Residential Outreach Response Team was able to assess 35 other residents and provide advice for their management.

Strengthening acute and community partnerships, Goulburn Valley Health

The ‘Strengthening Acute and Community Partnerships’ project at Goulburn Valley Health focused on improving the integration and coordination of care for older people, individuals with mental health issues and people with diabetes.

An important component of this systems approach was to develop strategic partnerships and leadership for care delivery across the acute, primary and community care sectors. Other key elements to improve the care of patients and reduce their hospital use include:

- health maintenance assessment, care coordination and follow-up for people presenting to the emergency department
- an allied health team to provide care beyond the traditional acute/community boundaries
- disease-specific interventions, such as diabetes outreach care and support.

To facilitate analysis of HARP outcomes, the range of different interventions reported by individual projects were grouped into higher level clusters¹⁰ describing:

- health conditions that were targeted for intervention, including:
 - chronic obstructive pulmonary disease
 - chronic heart failure
 - diabetes
 - mental health or complex psychosocial needs
 - asthma.
- models of care that were delivered by a particular project, such as:
 - integrated care for complex needs
 - emergency department care coordination
 - rapid outreach
 - acute primary care liaison.
- other aspects of intervention, for example:
 - advance care planning
 - medication management.

Certain groups of patients were known to exert a particular influence on the demand for hospital services¹¹ and became a major focus of subsequent attention. They include¹²:

- people with chronic obstructive pulmonary disease
- people with chronic heart failure
- people with diabetes
- people requiring integrated care for complex needs
- people with complex psychosocial needs.

10 Definitions of the clusters are in the glossary at the end of the report, except for 'rapid outreach' and 'medication management' which are defined in the patient-level interventions section.

11 Emergency Demand Coordination Group, Department of Human Services, 2002, Hospital Admission Risk Program (HARP) Background Paper, Victorian Government Department of Human Services, Melbourne.

12 Department of Human Services 2003, HARP working party reports, refer to Appendix 2 for details.



Three primary indicators were examined to identify the success of HARP projects:

- The number of presentations to the hospital emergency department was examined to see whether HARP strategies were effective in providing sufficient community support, health maintenance or alternative treatment options. The number of unscheduled admissions to hospital and number of days staying in hospital were examined to see whether HARP strategies were effective in providing different approaches to emergency event management and to identify the impact of HARP on the level of care required by people needing hospitalisation.

Overall outcomes

- 35 per cent fewer emergency department attendances
- 52 per cent fewer emergency admissions
- 41 per cent fewer days in hospital.

Outcomes for key patient groups

Key outcomes for individual sub-groups of HARP patients were also examined to assess the impact of particular groups of interventions on the need for hospital services.

14 See Appendix 4. All results were statistically significant ($p < .05$) and based on average differences between a sample of HARP patients and a sample of non-HARP patients.

Case study

Background

A 48-year female with a 13-year history of type 2 diabetes mellitus with associated complications. She has longstanding chronic ulcers from previous surgery that resulted in severely deformed feet and chronic osteomyelitis. She was walking with the assistance of one crutch. The patient lives with her husband and two children. She was referred to the Diabetic Foot Unit, part of Melbourne Health's HARP Collaborative.

Assessment

- control infection
- provide pressure relief during acute healing phase; provide custom insoles and shoes to reduce further long term complications
- refer to community care
- tighten glycemic control

Clinical outcomes

- ulcers healed or infection under control
- deformed and macerated foot healed within four months
- patient received rehabilitation and custom footwear and insole provision
- progress monitored through regular attendance at community health clinic
- patient remains on the Melbourne Health Diabetic Foot Clinic program and has regular footwear and insole adjustments to conform to rapidly changing foot structure
- improved functional independence
- improved quality of life

Service system outcomes

A multidisciplinary approach with care coordination across the acute/community interface has demonstrated:



- a reduction in emergency department presentations
- reduced number of hospital admissions
- reduced averages in length of hospital stay
- significant reduction on all lower limb amputations
- 15 per cent direct clinical care/service provision cost saving based on pre-HARP recruitment compared to post HARP recruitment.

Testimonials

Patient

I feel that I have had the best podiatrist who has helped me immensely, who is easily accessible, easy to talk to and who explained things well to me.

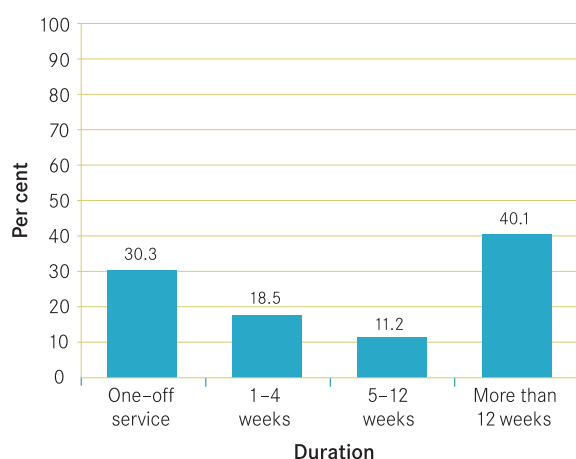
Clinician

In my experience, this is the first hospital admission reduction program that is driven by the needs and requirements of the client. The outcome is a program that is delivering a model for the continuity of client care that bridges service gaps and eliminates boundaries. The benefits to the community and health sectors are also exciting.

Patients with chronic obstructive pulmonary disease

Around one in five HARP projects (18 per cent) targeted people with chronic obstructive pulmonary disease. Approximately one in three patients received a one-off service, a further one in three received services between one and 12 weeks duration, and the remainder received services for more than 12 weeks duration (Figure 3).

Figure 3: Duration of HARP interventions for patients with chronic obstructive pulmonary disease



When major outcomes were examined, HARP patients with chronic obstructive pulmonary disease experienced¹⁵:

- 63 per cent fewer emergency department attendances
- 65 per cent fewer emergency admissions
- 50 per cent fewer days in hospital.

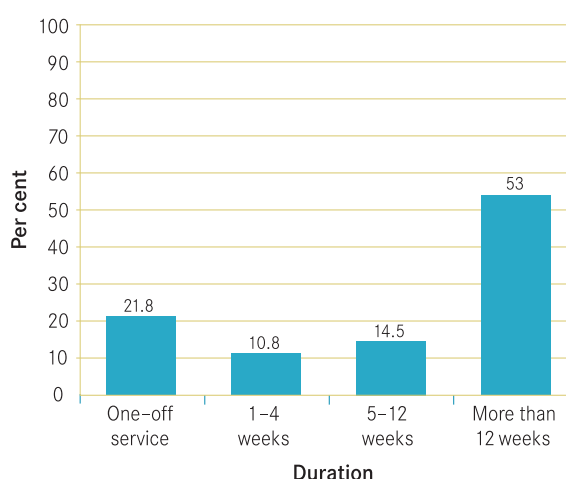
¹⁵ Estimates based on differences in average rate of hospital use between a sample of HARP patients and a sample of non-HARP patients.

The reduced need for hospital services was equivalent to approximately two emergency department attendances, three emergency admissions, and eight days spent in hospital each year for every HARP patient with chronic obstructive pulmonary disease¹⁶.

Patients with chronic heart failure

Around one in five HARP projects (18 per cent) targeted people with chronic heart failure. Most HARP patients with chronic heart failure received services for 12 or more weeks (Figure 4).

Figure 4: Duration of HARP interventions for patients with chronic heart failure



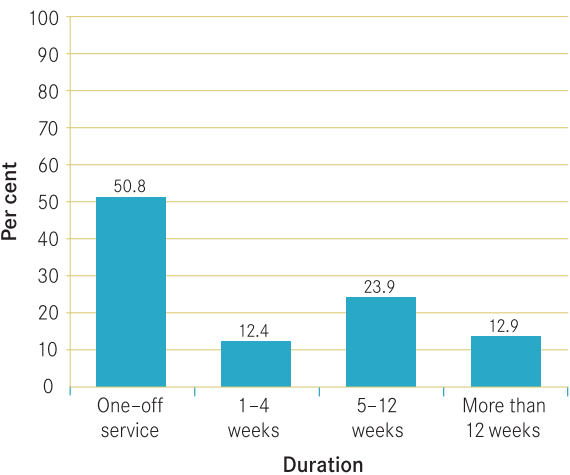
Analysis of major outcomes revealed similar patterns of ongoing hospital use (presentations, admissions and number of nights spent in hospital) for both HARP and non-HARP patients with chronic heart failure.

¹⁶ All results were statistically significant ($p < .05$) and based on average differences between a sample of HARP patients and a sample of non-HARP patients.

Patients with diabetes

Around one in five HARP projects (18 per cent) targeted people with diabetes. One half of all HARP patients with diabetes received a one-off service (Figure 5).

Figure 5: Duration of HARP interventions for patients with diabetes



When major outcomes were examined, HARP patients with diabetes experienced¹⁷:

- 38 per cent fewer emergency department attendances
- 73 per cent fewer emergency admissions
- 40 per cent fewer days in hospital.

The reduced need for hospital services was equivalent to approximately one emergency department attendance, five emergency admissions, and five days spent in hospital each year for every HARP patient with diabetes¹⁸.

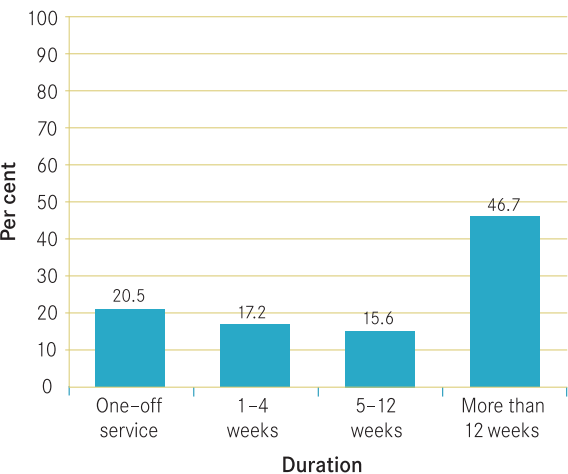
17 Estimates based on differences in average rate of hospital use between a sample of HARP patients and a sample of non-HARP patients.

18 All results were statistically significant ($p < .05$) and based on average differences between a sample of HARP patients and a sample of non-HARP patients.

Patients with complex needs

Around one in ten HARP projects (9 per cent) targeted people with complex needs. Patients classified as having ‘complex needs’ were frequently individuals with one or more diagnoses, including chronic obstructive pulmonary disease, chronic heart failure or diabetes. Complex psychological or social care requirements were also a key feature of this group of individuals. Unsurprisingly, many HARP patients with complex needs received services for more than 12 weeks (Figure 6).

Figure 6: Duration of HARP interventions for patients with complex needs



When major outcomes were examined, HARP patients with complex needs experienced¹⁹:

- 49 per cent fewer emergency department attendances
- 61 per cent fewer emergency admissions
- 57 per cent fewer days in hospital.

The reduced need for hospital services was equivalent to approximately one emergency department attendance, three emergency admissions, and 14 days spent in hospital each year for every HARP patient with complex needs²⁰.

19 Estimates based on differences in average rate of hospital use between a sample of HARP patients and a sample of non-HARP patients.

20 All results were statistically significant ($p < .05$) and based on average differences between a sample of HARP patients and a sample of non-HARP patients.

Outcomes for specific HARP projects

Outcomes reported by individual HARP projects focusing on a variety of different interventions also demonstrated reduced hospital use, in addition to a range of other positive outcomes, including:

- improved physiological status
- improved functional status
- improved quality of life.

Other projects reported outcomes that indicated a need for further exploration and development of strategies to improve²¹:

- effective medication management
- clinician uptake of clinical guidelines
- engagement of general practitioners
- the provision of afterhours support for people with chronic and complex needs
- hospital management of people with a chronic disease or complex needs
- strategies to promote service integration.

A selection of HARP projects that reported positive patient outcomes are presented in Table 4.

Table 4: Selected projects reporting positive patient outcomes

Intervention	Outcome
Rehabilitation	
Acute and community pulmonary rehabilitation involving: • standard maintenance rehabilitation • Stanford model, better health self-management program • community-based maintenance rehabilitation.	A randomised controlled trial at Northern Health reported: • a significant reduction in hospital use • improved function, physiological measures, and quality of life.
Community-based pulmonary rehabilitation involving: • a formal group program • home-based rehabilitation • self-management education • home-based support • case management and monitoring.	Outcomes pre- and post-HARP intervention at Melbourne Health indicated: • significant reduction in emergency department presentations and hospital admissions • improvement in physical function and quality of life.
Inpatient and community pulmonary and cardiac rehabilitation involving: • education • exercise programs.	Outcomes pre- and post-referral at Austin Health indicated: • a reduction in emergency department presentations and hospital admissions for intensive and maintenance pulmonary, and intensive cardiac rehabilitation • improved function and quality of life for intensive and maintenance pulmonary and cardiac rehabilitation.

²¹ Details of specific interventions and outcomes are available in individual project reports.

Table 4 continued

Rehabilitation	
Inpatient and community rehabilitation for chronic obstructive pulmonary disease, chronic heart failure and diabetes (types 1 and 2) involving: • individual patient assessments • group multidisciplinary education • group exercise • carer support groups • post-program follow-up.	Outcomes pre- and post-HARP intervention at St Vincent's Health indicated: • improved function and quality of life • an overall reduction in emergency department presentations, emergency admissions and number of bed days.
Disease management	
Chronic disease management for paediatric asthma and adult patients with chronic obstructive pulmonary disease and chronic heart failure involving: • partnership building • clinical streams • access/intake/assessment • care coordination/facilitation • referral to a suite of services.	Comparison between HARP non-HARP patients at Western Health indicated: • a reduction in emergency department presentations for paediatric asthma and adults with chronic obstructive pulmonary disease and chronic heart failure • a reduction in hospital admissions and hospital bed days for paediatric asthma and adults with chronic obstructive pulmonary disease, and chronic heart failure. Surveys conducted before and after HARP interventions indicated: • improvements in general health, functional ability and quality of life.
Integrated care	
Integrated and coordinated care for patients with chronic diseases and complex needs involving: • coordinated discharge planning and transition services • integration of existing services • community service liaison • health providers' education about complex medical discharge planning • referrals to rehabilitation or self-management courses.	Outcomes pre and post-HARP intervention at Melbourne Health indicated: • a reduction in hospital admissions and emergency department presentations • improved quality of life • improved physical function.
Cardiac clinics	
Establishment of a complex cardiovascular disease clinic involving: • specialist consultation to develop the clinic • development of clinical practice guidelines • provision of complex cardiovascular disease advice and management to patients from a consultant physician and clinical nurse.	Outcomes following clinical attendance at Northern Health indicated: • a reduction in the average number of visits per patient to the clinic.

Case study

Background

A 64-year-old male was admitted with chest pain, increased shortness of breath and leg ulcers. He was diagnosed with ischemic heart disease, heart failure and unstable diabetes. Coronary artery bypass surgery followed. His blood glucose was 8.7 per cent and he was admitted to the Restoring Health Program.

Assessment

The patient was provided with information and education on cardiac and diabetes self-management strategies and was linked to cardiac rehabilitation, home care assistance and a Restoring Health Community Nurse for ongoing support. However, despite these interventions, his blood glucose continued to worsen. He also experienced depression. The patient was referred to the endocrinology unit and was readmitted for diabetes stabilisation. The Restoring Health Clinical Nurse contact commenced one-on-one diabetes education and he was referred to the Restoring Health Dietitian on discharge with home-based education to stabilise blood glucose levels. Concurrently, the community nurse assisted with support for self-management strategies for salt intake, fluid balance and weight monitoring for his heart failure, blood glucose and foot care. The patient's insulin regime was monitored so as not to interfere with his heart failure. His infected ingrown toenail was removed and he commenced a rehabilitation program.

Clinical outcomes

- improved quality of life
- no presentations at emergency department for more than 12 months
- improved functional independence
- improved ability to self-manage health
- improved health status with blood glucose levels and cardiac ejection fraction having improved from severe to moderately severe—an excellent outcome for a patient with chronic health issues
- improved exercise capacity and confidence
- patient keen to resume work.



Service system outcomes

A multidisciplinary approach with care coordination across the acute/community interface has demonstrated:

- reduction in Emergency Department presentations
- reduced number of hospital admissions
- reduced averages in length of hospital stay
- 17 per cent direct clinical care/service provision cost saving based on pre-HARP recruitment compared to post HARP recruitment.

Testimonials

Patient

The Restoring Health Program involvement in my life has been so good for me that I have only been hospitalised once this year, to stabilise my diabetes. I do consider myself very lucky to be involved and helped by this wonderful program.

Clinician

This team effort succeeded through persistence and working closely with the patient to encourage compliance with self-management and achieving personal goals. I believe that this saved him from further deterioration.

Case study

Background

A 41-year-old female with asthma and chronic emphysema. Complex care issues include prior respiratory arrest requiring intubation and tracheotomy, anxiety around care of her children and husband's ill health, and no home services. She lives with her five young children (one with special needs) and husband (who has special medical needs).

Assessment

Initially, the patient was refused HARP-CDM Services due to home access issues. She had poor respiratory function, poor reserve and exercise-induced hypoxia. The patient was a frequent emergency department presenter. Her home environment had numerous triggers of exacerbation of asthma/COPD and she was an infrequent visitor to her general practitioner. The patient has severe osteoporosis of the lumbar spine.

Clinical outcomes

- outreach services including nurse care coordinator, physiotherapy, occupational therapy, council services and rapid response service
- referral to outpatient Pulmonary Rehabilitation Program
- activation of general practitioner action plan and regular home surveillance
- activation of education, self-management and symptom diary
- in-house respite for child care
- facilitation of home oxygen and non-invasive pressure ventilation at home
- arrangement of support services for husband's medical needs
- facilitation of referral to Lung Transplant Unit (patient now on transplant list)
- no presentation to emergency department by patient since August 2005
- improved functional independence
- improved quality of life.



Service system outcomes

A multidisciplinary approach with care coordination across the acute/community interface has demonstrated:

- a reduction in emergency department presentations
- reduced number of hospital admissions
- reduced averages in length of hospital stay
- 30 per cent direct clinical care/service provision cost saving based on pre-HARP recruitment compared to post HARP recruitment.

Testimonials

Patient

I am more confident that I can care for my children and my husband now that I have oxygen and I can breathe more easily. I feel that I have support from caring people and that I can get on with life.

Clinician

This case was challenging because of the patient's specific health care needs and complicated family and social issues. However, having a structured approach that facilitated care across different service systems has enabled a stable outcome.

Table 4 continued

Cardiac clinics	
A 'heart function/discharge clinic' focusing on: • identification of left ventricular dysfunction in patients with suspected heart failure • referral to specialists, outreach services and rehabilitation programs.	Outcomes pre- and post-HARP intervention at Austin Health indicated: • a reduction in emergency department presentations and hospital admissions.
Self-management	
Asthma self-management for children, focusing on: • medical and psychosocial issues related to disease management • carer involvement • best practice, culturally sensitive asthma education, skills training and support • linkages and support between general practitioners, and hospital and community services • support for parental smoking cessation and family-based physical activities.	Outcomes pre- and post-HARP intervention at Dianella Community Health Services indicated: • improvement in health outcomes • a reduction in the rate of growth in asthma-specific presentations to the emergency department • a reduction in the rate of growth of admissions • a decrease in length of stay • improved management of asthma • improved quality of life • strong partnerships.
Pulmonary self-management involving: • formal education programs (better self-management) • individual training • self-help groups • generic self-management advice.	Outcomes pre- and post-HARP intervention at Melbourne Health indicated: • improvements in dyspnoea and emotional function, and reduced fatigue • improved self-management.
Outreach care and services	
Respiratory and chronic heart failure services involving: • acute-based outreach nursing • support to general practitioners to better manage the patients in the community.	Outcomes pre- and post-HARP intervention at Austin Health indicated: • a reduction in emergency department presentations and hospital admissions.
Rapid response and diversion	
A rapid response for community-dwelling older persons involving: • a central point for referral • immediate service provision • multidisciplinary assessment and planning • follow-up and review.	Outcomes pre- and post-HARP intervention at Eastern Health indicated: • a reduced number of emergency department presentations over a six-month period for people living in residential care.
Case management for people with complex psychosocial/mental health needs	
Assertive case management addressing: • the complex, social, medical, emotional and behavioural issues underlying the frequent use of acute hospital services.	Outcomes pre- and post-HARP intervention at Barwon Health indicated: • reduced emergency department presentations and hospital admissions • improved mental health and quality of life.





5 Major lessons learned from the program

Key lessons reported by individual HARP initiatives were broadly classified according to their impact on project development and implementation.



Factors assisting project implementation

HARP project staff reported a number of key factors that facilitated establishment of individual HARP projects, including:

- key government policy initiatives or specifications
- local funding flexibility
- administrative arrangements that promoted innovative practice and facilitated communication between different service providers
- active involvement of multiple service providers
- flexibility in clinical service delivery
- linkages and networks with other HARP consortia
- staff flexibility to changing service demands.

Specific details of key factors assisting HARP project implementation are presented in Table 5.

Table 5: Key factors assisting the development of HARP projects

Facilitator	Outcome
Government policy initiatives such as the Primary Care Partnerships and Enhanced Primary Care items	• Provided opportunities to use the frameworks for planning and engaging stakeholders
Funding guidelines that articulated the requirement for collaboration across sectors	• Ensured partnerships were established across the acute and primary care sectors
Access to brokerage funds	• Addressed patient needs and service gaps and developed new aspects of the service
Pooled funding within or across agencies	• Enhanced the local service capacity • Facilitated joint appointments and shared strategies across projects (for example, a local evaluator)
Timely access to and sharing of information	• Enhanced the delivery of care across the continuum • Promoted an integrated approach
Marketing (for example, a formal launch, logos, posters, brochures, newsletters, advertisements and presentations)	• Increased provider and consumer awareness of projects • Promoted appropriate referrals
Allowance for creativity and exploration	• Facilitated innovation and flexibility to trial approaches to meet local needs
The presence of and links with other HARP projects in the local and broader service system	• Facilitated project development • Facilitated shared strategies across projects • Increased the pool of providers for referrals
Learning forums such as network meetings held by the Department of Human Services and staff networks	• Supported and developed project staff • Enabled project staff to learn from each other
General practitioner involvement with HARP through Divisions of General Practice and general practice liaison officers	• Facilitated general practitioner engagement • Increased the capacity for appropriate patient care across the care continuum
Multidisciplinary involvement in patient assessment and management	• Provided the range of skills and knowledge required for project implementation • Enhanced the team's skill base and learning
Recruitment and retention of experienced and skilled staff	• Facilitated project establishment, innovative development and continuing project operations
Committed and effective stakeholder collaborations	• Created drive and energy for innovative development and improvement through HARP
Effective mechanisms to identify HARP patients , such as a risk screen or patient flag	• Enabled project staff and other providers to identify, risk screen and refer HARP patients
A holistic assessment of the patient and family	• Identified the immediate and longer term needs for which services were required
Development of evidence-based protocols	• Supported the model of care implementation to promote consistency of practice
Patient and carer education and involvement in decisions about care options	• Enhanced knowledge and skills and capacity for self-management • Sustained patient compliance with the care plan
Strategies such as multilingual information kits for people from diverse backgrounds	• Enhanced the ability to meet the needs of people from culturally and linguistically diverse backgrounds
Assignment of a key health professional to the patient	• Facilitated patient and carer confidence in the consistency of contact with the project
The resilience of staff to embrace reform and face the challenges	• Managed the uncertainty and embraced new models of care and methods of evaluation



Barriers to project implementation

HARP project staff also reported a number of factors that constrained the establishment of individual HARP projects, including:

- challenges negotiating traditional service sector boundaries
- limited access to experienced and skilled staff
- constrained access to community and specialist services and general practitioners
- limited infrastructure for across-services communications
- variable and time-consuming reporting requirements
- the time requirements for appropriate management of some patient groups.

Specific details of key barriers to HARP project implementation are presented in Table 6.

Table 6: Key barriers to HARP project implementation

Barrier	Outcome
Addressing traditional sector boundaries . This included the different cultures of organisations, their views about professional autonomy, philosophies and approaches to patient management, and differing staff conditions of employment.	• Increased the period of time needed to establish and consolidate projects
Workforce shortages and short term contract-based employment	• Reduced availability of skilled staff • Difficulty recruiting, retaining and replacing skilled and qualified staff • Delayed project establishment • Increased work pressures for project staff
Limited access to interpreters	• Difficulties addressing the needs of people from culturally and linguistically diverse backgrounds
Long waiting lists for community services and limited access for specialist services	• A major barrier that hindered the ability to meet patient needs
Restricted access to general practitioners	• Limited the engagement of general practitioners in core project activities
Limited capability for information technology across the acute and community-based providers	• Restricted information sharing and data collection to support patient management
The complexity of establishing and maintaining communication pathways across the service sector	• Difficulty communicating in a timely manner • Communication breakdowns resulting in project delays
Establishing a reporting framework for the overall HARP evaluation	• Demanding on some staff in the initial stages • Difficulty modifying project data collection processes to accommodate new questions
Different reporting requirements across partner agencies	• Large time requirements to meet the multiple and varied reporting requirements
Patient complexity	• Management that was time-intensive and limited the project's capacity to recruit new patients • Difficulty in engaging and sustaining involvement of some patients, particularly those with complex psychosocial needs • Difficulty identifying valid risk screening tools
A wide geographical spread for some projects	• Made home visits time-intensive • Constrained the caseload and new enrolments



Based on the overall positive impact that HARP has had for patients and the benefits for the health service system, the Victorian Government decided to mainstream HARP projects into an ongoing program now known as HARP Chronic Disease Management (HARP-CDM) Services.

The Department of Human Services identified key areas for ongoing program funding relating to the care of:

- people with chronic diseases, such as chronic obstructive pulmonary disease, chronic heart failure and diabetes
- people with complex psychosocial needs
- older people with complex needs.

- the target group
- models of care
- key elements of interventions.

- local governance arrangements
- risk management
- the local vision and model of care for HARP as a program
- business and budget planning.

Building on the \$150 million investment in HARP during the initial four-year innovation period, the government expanded the funding in 2005–06 by an additional \$11 million to enable the successful models of care to be implemented more broadly across the state. The total investment in HARP in 2005–06 was \$53 million. HARP-CDM Services are now available at 21 health services across Victoria, with six new services established during 2005–06 (five in rural Victoria and one in metropolitan Melbourne).

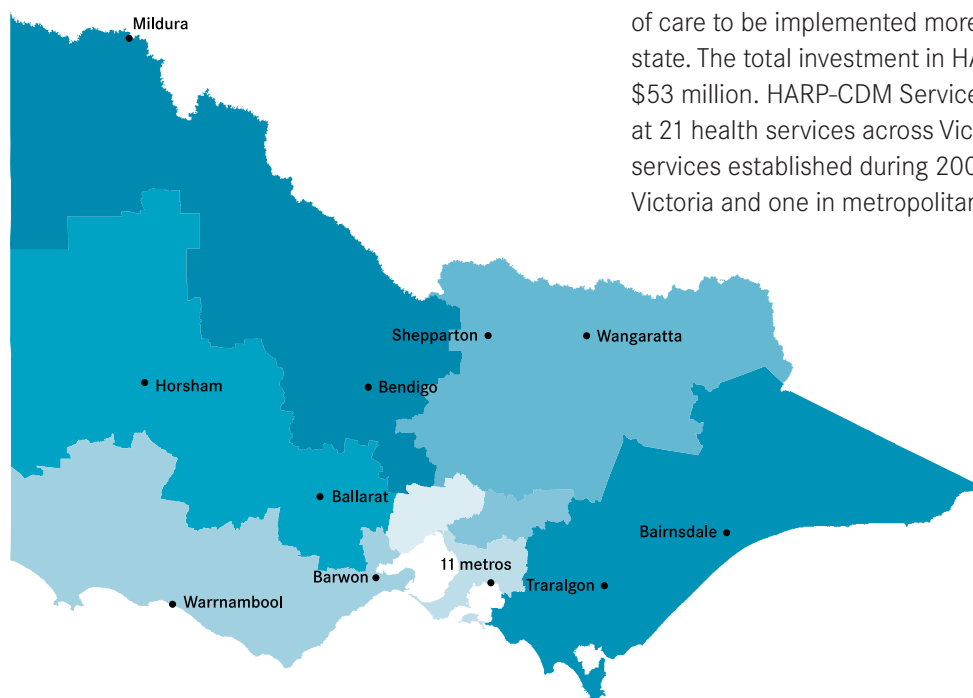


Figure 7: Victorian HARP-CDM Services 2005–06



To understand key dynamics underlying the successful operation of HARP, several areas have been explored in further detail. These areas are considered to be important for the ongoing development of HARP-CDM Services.

In the context of HARP, effective governance arrangements require close collaboration between acute and community providers in order to:

- provide organisational, managerial and clinical leadership
- establish and monitor strategic directions
- encourage and support important changes in operational focus.

A number of common challenges to establishing effective governance structures have been reported and include:

- **different perceptions about the importance of effective governance** arrangements across the acute/community care continuum
- the need for dedicated **executive leadership** and support for HARP
- the need for strong **clinical leadership** to promote best practice patient management
- overcoming **cultural differences** between organisations to develop mutual goals and directions for HARP
- outlining individual and shared **activities to be conducted by different service providers** to promote continuity of care and minimise operational duplication
- supporting the strategic and operational development of HARP through effective **delegation of day-to-day decision making** across a range of different organisations
- resolving **differences in reporting and accountability requirements** by participating service providers
- giving consideration to the **level of service system integration** and resulting governance options available to support HARP
- the need to encourage **active and regular participation** from all service providers
- clarifying **financial roles and responsibilities** between different service providers.

Strategies

Strategies identified to promote effective governance include:

- **identifying a range of governance arrangements for HARP** to support and lead the strategic development of local service providers
- **having senior executives regularly attend HARP governance meetings** to provide authority and to drive key decisions. Dedicated executive leadership increased the capacity to galvanise support within and between agencies across the care continuum. This was particularly important in the development of HARP when key decisions and organisational commitments were required
- **having senior clinical staff regularly demonstrating best clinical practice** (which engaged and challenged other clinicians to implement new evidence-based models of care)
- **identifying and resolving cultural differences in work practices** (which helped to align models of service delivery for HARP operating across the care continuum)
- **developing formal partnership agreements** between different acute and community service providers (which provided a framework to specify individual and shared activities conducted by different HARP initiatives. A range of different service agreements was established, including memoranda of understanding, statements of intent, service level agreements, and specific guidelines for consensus decision making)
- **establishing operational committees** (which supported the day-to-day decision making and operational momentum of HARP. These committees reported to a governance committee, which was responsible for higher level decision making and strategic direction)
- **developing a clear approach to address accountability needs** of different agencies (which facilitated effective monitoring and reporting. Some approaches adopted standardised reporting frameworks, whereas others allowed for individual differences between participating agencies)
- **recognising agencies involved in multiple HARP governance arrangements**, such as the local Divisions of General Practice, Primary Care Partnerships and district nursing services (this was considered important to encourage ongoing input and participation. Individuals who were nominated to represent multiple agencies maximised resource allocation and optimised involvement across different HARP initiatives)
- **specifying the roles and responsibilities related to fund holding** and fund sharing between participating service providers (which further clarified financial management and reporting requirements).

Many of these issues are also reflected in the HARP community–hospital interface working party report²², which outlines a series of recommendations for sustainable and effective governance arrangements of local alliances that are built on community–hospital partnerships.

²² Department of Human Services 2003, Hospital Admission Risk Program (HARP): Community-Hospital Interface Working Party report, Victorian Government Department of Human Services, Melbourne (See Appendix 2).

Improved access in rural and regional areas

Many factors are known to differentiate health service provision in regional and rural areas from that in metropolitan districts.

Issues

Common challenges experienced by services operating in regional and rural areas include:

- the **geographic isolation**, limiting the capacity for HARP to link with other services, particularly those outside the local area
- the need to consider the **travel time and transport requirements for staff** when planning care
- the **shortage of general practitioners** limiting the access of people with chronic diseases to early screening and intervention services
- the **limited availability and scope of local services** to meet the specific needs of HARP patients (for example, rehabilitation and restorative services)
- the capacity to manage **staff and skill shortages** that constrain HARP's capacity to deliver key services
- the **limited access to medical specialists** for HARP clinics
- the need for **after-hours HARP services** for HARP patients who are engaged in full time employment.

Strategies

Strategies identified to manage the challenges faced in rural and regional areas include:

- **identifying, negotiating access to and making referrals to services outside a local area.**
This increased the capacity of regional providers to offer services addressing the specific needs of HARP patients
- **having flexible approaches to local service provision.** HARP referred patients to more general local services when specialist services were unavailable
- **implementing strategies to promote patient access to services.** Teleconferencing was used to streamline referral and communication processes. A range of local transport services were used to facilitate patient access to HARP related services, including taxi vouchers, the Red Cross volunteers, and local government transport services
- providing afterhours services using **flexible staffing arrangements** with existing employees
- **providing specialist training and support** to staff to increase the local capacity to deliver services that met the needs of HARP patients
- **aligning new HARP streams of care with the existing workflow of current staff members** to improve integration and alignment and reduce fragmentation
- **extending the period of patient follow-up.** Many regional HARP initiatives introduced this to manage the potential for adverse outcomes resulting from limited local service availability.

Future dimensions of program monitoring

As successful HARP initiatives continue the transition from project to program-based funding and as new services are established, a comprehensive monitoring strategy is required to assess performance outcomes by:

- tracking progress against established program guidelines
- identifying and monitoring potential risks to program operations
- highlighting areas of improved performance
- monitoring levels of service demand
- developing a further understanding of the cost impacts of the program on the broader health system.

Issues

To undertake ongoing monitoring of HARP-CDM Services, the following major issues need to be resolved:

- **selection of key areas for performance measurement** that would provide a representative picture of the extent to which overall program goals were being achieved
- **design of the most appropriate type of indicator** to allow measurement of key elements of program operation, standard comparisons across the different health services, and the ongoing monitoring of program outcomes and performance
- **identification of methods for obtaining indicator data** using existing data platforms for program monitoring, financial and resource management, and patient information, or designing purpose-built data collections, such as satisfaction surveys, file reviews or targeted data modelling exercises
- **introduction of standard approaches to reporting** performance information that allow comparisons between different agencies

- **a range of service specific issues** based on the level of service development that has occurred (for example, level of local alliance formation, time required for infrastructure development, focus of resource deployment).

Strategies

Key strategies to promote effective performance measurement and monitoring of program related activities include:

- **focusing on five key areas of program operation:** key patient and service system outcomes, service access and demand, service quality and effectiveness, program management and implementation, and risk management
- **using indicators that focus on a range of key outcomes** covering hospital performance (for example, emergency presentations, unplanned readmissions), patient pathology (for example, investigation results), self-reported outcomes (for example, satisfaction, quality of life), service operation (treatment protocols, staff recruitment and retention), and service utilisation (waiting lists, costs per patient)
- **considering a range of different data collection sources**, including interrogation of existing clinical and management databases, patient file reviews, patient surveys, and predictive modelling exercises.

The ongoing transition from project to program operation which commenced in July 2005 is anticipated to continue over a three-year period. The monitoring strategy initially focused on transitional issues emphasising program implementation and risk management. As the transition proceeds towards consolidation of infrastructure, processes and model of care, the monitoring strategy will focus on outcomes, improving performance and the ongoing service needs of patients.

Future work will concentrate on establishing a framework for ongoing program monitoring, which will comprise:

- the Victorian Integrated Non Admitted Health Minimum Dataset development
- targeted evaluation of priority streams of care
- an appropriate model of funding.

These strategies will be used to inform the development of indicators and reporting tools that support the implementation of this statewide program.







8 Conclusion

Living with a chronic disease has a significant impact on a person's quality of life and on their family—not to mention the mounting financial costs to our community. Good chronic disease management offers real opportunities for improvements in patient care and service quality through better person-centred care.

HARP demonstrates that good chronic disease management prevents crises and deterioration by providing different care pathways, enabling people who live with chronic and complex conditions to attain the best possible quality of life.

The challenge remains to continue to work collaboratively with health services more broadly throughout the state and to further streamline implementation strategies.

Glossary

Acute Primary Care Liaison	an approach focusing on mechanisms to improve the functioning of the service system so that people would be cared for more effectively. Strategies aimed to improve the communication and cohesion between services and provide clearer coherent care pathways across the acute and primary care continuum.
Advance Care Planning	a process enabling a patient to make decisions about his or her future health care in consultation with their health care providers, family members and other important people in their lives to help ensure that their choices for future medical treatment are respected ²³ .
asthma	reversible narrowing of the airways (bronchospasm), causing breathing difficulties that can range from mild to life-threatening.
brokerage funds	funds specifically allocated for the purchase of services or packages of care for patients managed by HARP.
chronic obstructive pulmonary disease	the collective term for a number of lung diseases that prevent the lungs from breathing properly. Two of the most common types of chronic obstructive pulmonary disease are emphysema and chronic bronchitis.
complex psychosocial needs	includes psychosocial conditions that have a profound effect on a person's ability to function and their emotional wellbeing.
chronic heart failure	often previously referred to as congestive heart failure. While congestion with fluid retention is commonly present, in some patients congestion is absent so that the term 'congestive heart failure' has been replaced by the broader term 'chronic heart failure'.
diabetes	a chronic condition associated with abnormally high levels of sugar (glucose) in the blood due to insufficient production of or absence of production of insulin.
disease management	an approach to managing chronic illness that focuses on systematised evidence-based practice and better coordinated care.
emergency admission	an unscheduled admission to hospital, not a planned or maternity admission (the patient may or may not come through the emergency department). Emergency admissions include: • a general practitioner referred admission or self-referral for acute illness (such as unstable diabetes, chronic heart failure, pneumonia, asthma attack) • admission for injuries received in a home accident • an admission for threatened miscarriage before 20 weeks.
emergency department care coordination	provision of care to people who present to the emergency department and do not require an admission. The aim of the intervention is to ensure safe and effective discharge back into the community for people and to prevent hospital representations or admissions.

²³ Singer, PA, Robertson, GR & David, J 1996, 'Advance care planning. Bioethics for clinicians series 6', Canadian Medical Association Journal, vol. 155, no. 12.

Glossary continued

emergency presentation	an attendance at an emergency department that is reported on the Victorian Emergency Minimum Dataset.
integrated care	involves hospitals and the primary and community service sectors working together to establish and document systems that provide a smooth transition across sector boundaries, which results in improved patient care, support for carers, better health outcomes, and optimal resource use. ²⁴
occupied bed days	the number of days of stay for patients who are admitted to hospital.
Victorian Admitted Episode Dataset	the dataset that collects information about each patient admitted to every hospital in Victoria.
Victorian Emergency Minimum Dataset	the dataset that collects information about all patients attending emergency departments in Victorian public hospitals.

²⁴ Department of Human Services 2003, Hospital Admission Risk Program (HARP): Integrated Care for Patients with Complex Needs Working Party report, Victorian Government Department of Human Services, Melbourne.

Appendices



Appendix 1: HARP governance and evaluation arrangements

The HARP Steering Committee – terms of reference (2002–04)

Purpose

The HARP Steering Committee considered system-wide issues for the provision of care to people with chronic and complex conditions who require repeated hospitalisations. The Steering Committee comprised internal departmental representatives and oversaw the implementation of HARP in line with the agreed methodology and reported to the Department of Human Services executive.

Responsibilities

The responsibilities of the HARP Steering Committee were to:

- review the draft project framework and finalise the methodology
- authorise a detailed plan for each phase of the implementation
- determine target clinical conditions for each phase of the implementation
- evaluate health service submissions
- determine health service funding allocations
- oversee HARP implementation
- receive health service HARP reports.

Membership

Mr Shane Solomon	Executive Director Metropolitan Health and Aged Care Services (Chair)
Dr Michael Ackland	Manager Health Surveillance and Evaluation, Public Health Branch
Dr Chris Brook	Executive Director Rural and Regional Health and Aged Care Services
Ms Kathryn Cook	Director, Metropolitan Health Service Relations
Mr Ian Coverdale	Acting Manager Hospital Admission Risk Program
Ms Noreen Dowd	Director, Programs
Ms Lesley Dwyer	Manager Hospital Demand Management
Prof John Funder	Chair HARP Reference Group
Ms Jeannine Jacobson	Manager Coordinated and Home Care
Mr Geoff Lavender	Director Rural and Regional Health Services
Mr John Leatherland	Regional Director, Eastern Metropolitan Region
Ms Tracey Slatter	Acting Director, Primary and Community Health Branch
Ms Jan Snell	Regional Director Barwon South Western Region
Dr Ruth Vine	Director, Mental Health Branch

The HARP Reference Group – terms of reference (2001–04)

Purpose

The HARP Reference Group advised on how hospital admissions and emergency department presentations can be prevented. Particular emphasis was on people with chronic and complex conditions and those requiring repeated hospitalisations.

Specific issues considered by the group include:

- target population groups or conditions with most potential for preventing hospitalisations
- models of care that have demonstrated efficacy
- trends in morbidity and care options
- how to evaluate projects funded under HARP
- advice on allocating HARP funds.

Responsibilities

The responsibilities of the HARP Reference Group were to:

- review the draft program framework and provide input to finalise the methodology
- review and provide advice on a detailed plan for each phase of the implementation
- prioritise target clinical conditions for each phase of the implementation
- review and provide feedback on key aspects of the program, including:
 - submission guidelines
 - workshop materials
 - literature reviews
 - health service HARP plans
 - the HARP evaluation framework
- monitor timelines against the plan
- review and provide comments on health service HARP reports
- receive reports from networks established around specific clinical groups
- provide local support for HARP projects within own organisations
- assist with addressing unforeseen issues that may arise.

Membership

Name	Position title	Organisation
Professor John Funder	Chairperson Senior Fellow, Prince Henry's Institute Professorial Associate, Centre for Neuroscience Professor, Department of Medicine	University of Melbourne Monash University
Professor Jeremy Anderson	Professor of Epidemiology and Biostatistics	University of Melbourne
Ms Mary Barry	Chief Executive Officer	Victorian Association of Health and Extended Care
Ms Maria Bohan	Executive Director	Carers Victoria
Associate Professor George Braitberg	Director of Emergency Department	Austin Health
Professor Don Campbell	Director	Monash Institute of Health Services Research
Mr Alex Currell	General Manager Strategic Planning	Metropolitan Ambulance Service
Dr Jan Davies	Executive Officer	National Institute for Clinical Studies
Dr Tere Dawson	Senior Policy Officer	Health Issues Centre
Mr Geoffrey Devine	Victorian Branch Councillor	Australian Nurses Federation
Ms Marianne Egan	Manager of Social Work	Austin Health
Ms Clare Hargreaves	Senior Policy Adviser Social Policy	Municipal Association of Victoria
Ms Fiona Hearn	General Manager/Director of Nursing North and West Regions	Royal District Nursing Service
Dr Kim Hill	Executive Director Medical Services	Bayside Health
Ms Wendy Hubbard	Director Allied Health and Community Services	Ballarat Health Services
Dr Peter Hunter	Director (Medical) Aged and Continuing Care	St Vincent's Health
Mr Alan Lilly	Director of Rehabilitation and Aged Services	Southern Health
Dr John McEncroe	Chair	General Practice Divisions Victoria
Ms Christine Minogue	Divisional Director (Nursing) Royal Children's Hospital	Women's and Children's Health
Ms Libby Owen	Manager Hospital to Home	Bundoora Extended Care Centre
Mr Felix Pintado	Chief Executive Officer	Latrobe Regional Hospital
Associate Professor John Rasa	Chief General Manager Acute Health Services	Eastern Health
Mr Peter Ruzlya	Chief Executive Officer	Eastern Access Community Health
Dr Craig White	Executive Director Clinical Services	Austin Health

The HARP Planning Group – terms of reference (2005)

Purpose

The HARP Planning Group provides clinical and executive leadership to inform the strategic direction and key processes required to mainstream HARP projects.

Responsibilities

The responsibilities of the HARP Planning Group are to:

- provide advice on mainstreaming HARP projects
- develop program guidelines for:
 - chronic disease management – chronic heart failure/chronic obstructive pulmonary disease
 - integrated care for complex patients – aged/psychosocial
 - emergency department care coordination
 - general practice liaison officers
- advise on projects that will not be mainstreamed
- advise on service funding models and monitoring of mainstreamed services
- advise on governance issues for mainstreamed services.

Membership

Name	Position title	Organisation
Professor John Funder	Chairperson Senior Fellow, Prince Henry's Institute Professorial Associate, Centre for Neuroscience Professor, Department of Medicine	University of Melbourne Monash University
Ms Clare Amies	Chairperson	WestBay Alliance
Ms Maria Bohan	Executive Director	Carers Victoria
Dr Jan Davies	Executive Officer	National Institute for Clinical Studies
Dr Peter Hunter	Head of Geriatric Medicine and Clinical Director, Health Service Demand Management and Mental Health	St Vincent's Health
Professor Gary Jennings	Director	Baker Heart Research Institute
Mr Alan Lilly	Executive Director Rehabilitation and Aged Services	Southern Health
Professor Lou Irving	Director Department of Respiratory Medicine	Melbourne Health
Dr John McEncroe	Board Member	General Practice Divisions Victoria
Dr Craig White	Executive Director Clinical Services and Chief Medical Officer	Southern Health

The Evaluation Subcommittee – terms of reference

Purpose

The Evaluation Subcommittee advised on the development of the framework and methodology to evaluate HARP. Specific issues considered by the subcommittee include:

- the development of the evaluation framework
- the progress reports from HARP projects
- the independent evaluation of HARP
- the communication strategy for sharing HARP outcomes and the lessons learned
- the lessons learned from the evaluation to contribute to the evidence supporting prevention initiatives.

Responsibilities

The responsibilities of the Evaluation Subcommittee were to:

- oversee the development of the evaluation framework and tender
- participate in selection of the preferred external evaluator(s)
- participate in finalising the evaluation methodology and plan
- assist with the development of a minimum dataset for HARP and a reporting format for projects receiving HARP funding
- monitor evaluation timelines and progress
- review and provide comments on HARP draft evaluation reports
- report progress on the HARP evaluation to the HARP Reference Group
- assist in incorporating evaluation findings in the development of preventive strategies
- assist with addressing unforeseen issues that may arise.

Membership

The Evaluation Subcommittee was drawn from the membership of the HARP Reference Group.

Name	Position title	Organisation
Professor Jeremy Anderson	Chairperson Professor of Epidemiology and Biostatistics	University of Melbourne
Associate Professor George Braitberg	Director of Emergency Department	Austin Health
Professor Don Campbell	Director	Monash Institute of Health Services Research
Dr Jan Davies	Executive Officer	National Institute for Clinical Studies
Ms Fiona Hearn	General Manager/Director of Nursing North and West Regions	Royal District Nursing Service
Dr Peter Hunter	Director (Medical) Aged and Continuing Care	St Vincent's Health
Dr Craig White	Executive Director Clinical Services	Austin Health

Appendix 2: HARP background paper and working party reports

The background paper and working party reports are available at www.health.vic.gov.au/harp-cdm/harppubs.

Background paper

Emergency Demand Coordination Group, Department of Human Services, 2002, *Hospital Admission Risk Program (HARP) Background Paper*, DHS, Melbourne.

The working party reports

Department of Human Services 2003, *Hospital Admission Risk Program (HARP): Chronic Heart Failure Working Party report*, DHS, Melbourne.

Department of Human Services 2003, *Hospital Admission Risk Program (HARP): Chronic Obstructive Pulmonary Disease Working Party report*, DHS, Melbourne.

Department of Human Services 2003, *Hospital Admission Risk Program (HARP): GP-Hospital Interface Working Party report*, DHS, Melbourne.

Department of Human Services 2003, *Hospital Admission Risk Program (HARP): Technology Working Party report*, DHS, Melbourne.

Department of Human Services 2003, *Hospital Admission Risk Program (HARP): Community-Hospital Interface Working Party report*, DHS, Melbourne.

Department of Human Services 2003, *Hospital Admission Risk Program (HARP): Integrated Care for Patients with Complex Needs Working Party report*, DHS, Melbourne.

Department of Human Services 2003, *Hospital Admission Risk Program (HARP): Mental Health Working Party report*, DHS, Melbourne.

Appendix 3: HARP projects in 2004–05

Austin Health

Acute Primary Care Liaison
Assessment and Management of Older Patients in ED
Community Link Rapid Response
Out of Area Mental Health Bed Coordination
Integrated Chronic Disease Management
Improving Diabetes Care
Respecting Patient Choices

Ballarat Health Services

Targeting Care Management Across the Continuum
Integrated Care for Patients with Complex Needs

Barwon Health

Intermittent Home Care (COPD)
ED Care Coordination
Chronic and Complex Disease Assertive Case Management
Integrated Disease Management of CHF

Bayside Health

Medication Alert Project
Acute Aged Care Service
Better Care for Older People
Disease Management

Bendigo Health Care Group

Partnerships in Chronic Disease Management

City of Port Phillip

ConnectED

Dandenong District Division of General Practice

Diabetes Cardiovascular Risk Management Program

Darebin Community Health

Northern Hearts and Lungs

Dianella Community Health

Community Asthma Project

Djerriwarrh Health Services

Chronic Disease Management Approach to COPD

Eastern Health

Respecting Patient Choices
ED Mental Health Response
Disease Management
ED Care Coordination – Angliss Hospital
Primary Care Liaison
Rapid Outreach Response
Integrated Response to Complex Needs
ED Care Coordination – Maroondah Hospital
ED Care Coordination – Box Hill Hospital
Goulburn Valley Health
RACE for Chronic Disease Management
Strengthening Acute and Community Partnerships

ISIS Primary Care

Improving Care for People with Type 2 Diabetes

Latrobe Regional Hospital

Chronic Disease Management

Melbourne Health

Disease Management
Stroke Prevention
Acute Primary Care Liaison
Diabetes Related Foot Conditions
Step Down Accommodation for Mental Health Patients
Complex Psycho Social Needs
Care Coordination in the ED
Falls Prevention

Melbourne Division of General Practice

Diabetes Clinical Co-management

Metropolitan Ambulance Service

MAS/Deputising Service Link

Northern Health

Acute Primary Care Liaison
 Integrated Wound Management Services
 Aged Care Shared Care BHS
 Diabetes DM
 BECC GP Liaison Initiative
 Chronic Disease Management
 Care Coordination in the ED
 Respecting Patient Choices
 Aged Care Outreach BECC
 Community Client Oriented Medication Services

Northern Division of General Practice

Integrated Diabetes Management
 Asthma Best Practice Model

Peninsula Health

Complex Care Program
 Peninsula Health Residential Outreach Response Team
 Diabetes Disease Management
 Acute-Primary Care Liaison
 Self Managing CCF
 Care Coordination (including MAS/RAD)
 Coordination Between Psyche Services

Plenty Valley Community Health Service

Suicide and Self Harm Prevention

Royal Children's Hospital

Care Coordination for Chronic and Complex Conditions
 General Practice Liaison Officer

Royal District Nursing Service

Community Nursing Response to MAS

Southern Health

Health for Kids in the South East
 Acute Primary Care Liaison – Southern Health
 Care in Context
 Supporting the Improved Management of CHF in the Community
 Management of Chronic Respiratory Conditions
 Supporting Care in the Community

St Vincent's

ALERT
 Community Pharmacy Liaison Project
 Coach Program
 Restoring Health
 Treatment, Response and Assessment for Aged Care
 HITH-GP Liaison
 Respecting Patient Choices

Western

Acute General Practice Liaison
 Integrated System for Managing the Care of Older People with Complex Needs
 Care Coordination Western
 Western Hospital Health Advice Line
 ED Quick Response Team – Sunshine
 Chronic Disease Management

Whitehorse Division of General Practice

Healthy at Home

Note: COPD = chronic obstructive pulmonary disease; CHF = chronic heart failure; ED = emergency department; BECC = Bundoora Extended Care Centre

Appendix 4: Technical analysis of hospital utilisation

Background

In an effort to address the increasing demand on the public hospital system, the Victorian Department of Human Services developed the Hospital Admission Risk Program (HARP) in 2001. The program sought to reduce 'demand pressure by preventing the avoidable use of hospitals' through a competitively funded series of community- and hospital-based projects that included a focus on chronic disease management (1).

The major goals of HARP were to:

- reduce public emergency department visits
- reduce public emergency hospital admissions
- reduce public emergency hospital bed days.

To assess the impact of the HARP programs on these outcomes, a linked dataset (the HARP linked dataset) was created using data from a range of different HARP projects (n=29). The linked HARP dataset was the result of statistical linkage of enrolment data provided by the HARP projects to hospital utilisation data (the Victorian Admitted Episodes Dataset (VAED) and the Victorian Emergency Minimum Dataset (VEMD)) and death data (Victorian Death Index (VDI))²⁵. The linked VAED/VEMD/VDI was known as the Victorian Linked Dataset (2). Findings from early analysis of these data by external program evaluators indicated a range of positive outcomes for HARP patients (Table 7).

Table 7: Early indicators of improvement before and after HARP participation

	Emergency presentations	Emergency admissions	Overnight bed days
Chronic heart failure	↓ 58 per cent	↓ 44 per cent	↓ 59 per cent
Chronic obstructive pulmonary disease	↓ 29 per cent	↓ 29 per cent	↓ 15 per cent
Diabetes	↓ 14 per cent	↓ 25 per cent	↓ 31 per cent
Complex care	↓ 33 per cent	↓ 9 per cent	↓ 1 per cent

With the availability of new utilisation data from the state's hospital morbidity datasets for 2004–05, a more complete analysis of the impact of HARP on emergency hospital demand was undertaken. Two types of analysis were undertaken using the updated dataset, focusing on:

- a comparison of outcomes achieved by HARP patients before and after their enrolment in HARP projects (pre–post analysis)
- a comparison of outcomes achieved by similar types of patients who did or did not participate in HARP projects (comparison group analysis).

Pre–post analysis of HARP patients

The HARP linked dataset was used to compare the rate of utilisation in the pre-enrolment period (two years before enrolment) with the post-enrolment period (enrolment to 30 June 2005).

25 Statistical data linkage, data management and the analyses (unless otherwise indicated) were conducted in SAS 8.2(3).

Three hypotheses were framed for investigation:

1. that HARP cases would have a significantly lower rate of public emergency department attendances in the period after enrolment
2. that HARP cases would have a significantly lower rate of public emergency admissions in the period after enrolment
3. that HARP cases would have a significantly lower rate of public emergency bed days in the period after enrolment.

Key outcomes were examined for all HARP patients (combined) and for specific sub-groups of patients, including:

- those with no chronic diseases as primary reasons for hospital admission
- those with chronic obstructive pulmonary disease as a primary diagnosis, but no chronic heart failure or diabetes as primary diagnosis
- those with chronic heart failure as a primary diagnosis, but no chronic obstructive pulmonary disease or diabetes as primary diagnosis
- those with diabetes as a primary diagnosis, but no chronic obstructive pulmonary disease or chronic heart failure as primary diagnosis
- those with complex cases involving a combination of chronic heart failure and chronic obstructive pulmonary disease or chronic heart failure and diabetes or chronic obstructive pulmonary disease and diabetes or all three diagnoses.

Method of pre-post analysis

Patients were classified into groups based on whether they had experienced an emergency admission for any of the diseases within the two years before enrolment, which was identified through the appropriate ICD-10-AM diagnostic codes (Table 8).

Table 8: ICD-10-AM codes for the diagnostic groups

Disease	Primary admission and the following ICD-10-AM codes
Chronic obstructive pulmonary disease	J440, J441, J448, J449
Chronic heart failure	I50
Diabetes	E10, E11, E13, E14

A diagnosis was classified as ‘primary’ based on the following standard definition (4):

Primary diagnoses are those for which the patient received treatment or investigation during [a given] episode of care. There can be more than one code prefixed P.

The first diagnosis code must be prefixed P and meet the definition for Principal Diagnosis (ACS 0001 Principal Diagnosis, page 2).

Other diagnosis codes should be prefixed P if they do not meet the definition for A or C but:

- were other main conditions treated and/or investigated during the episode of care, or
- were the outcome of another P diagnosis code, or
- affected the treatment given and/or length of stay for the episode of care.

The pre-post analysis included the 7,681 HARP patients surviving at least one year after their enrolment date out of the 9,011 patients in the HARP linked dataset.

Key outcomes of interest in the pre-post analysis (counts of emergency department attendances, emergency admissions and bed days) were changed into rates in the following manner:

- pre emergency department rate = emergency department attendances in the two years before enrolment/730 days
- post emergency department rate = emergency department attendances after enrolment/length of survival.

Survival in the post-enrolment period was equal to the days from enrolment to death for those who died in the follow-up period or to the interval from enrolment to 30 June 2005 for those surviving.

Given the highly skewed distribution of these rates and in order to take into account the important contribution to the outcomes of patients in the extremes of the distribution, a bootstrap analysis (10,000 trials) was undertaken to identify the true confidence interval surrounding each of the key outcomes.²⁶ The mean and the bias-corrected 95 per cent confidence interval were examined as the major outcome measures. Overlapping pre and post 95 per cent confidence intervals were interpreted to indicate that there was no statistically significant difference between the pre- and post-utilisation rates.²⁷

26 Bootstrapping was specifically conducted to use all information in a genuine distribution of responses about levels of hospital utilisation (including extremely high and low values), rather than basing judgements on an ideal ‘normal’ distribution on which standard confidence intervals would otherwise apply. Bootstrapping allows the generation of a distribution using a process of random sampling with replacement. From each of these random samples, the measure of interest is calculated (5). The distribution of this measure is then used to calculate a confidence interval.

27 All bootstrap analyses were conducted using STATA Release 9 (6).

Results of pre-post analysis

The average age of patients who survived at least one year after enrolment and were included in the analysis was 63 years (standard deviation = 20 years). Half (52 per cent) of these patients were women. Results of the pre-post analysis of HARP patients are presented in Table 9.

When all patients were examined, emergency visits, emergency admissions, and overnight bed days showed a statistically significant difference after enrolment in HARP (all approximately 8 per cent lower).

Analysis of particular sub-groups revealed that:

- HARP patients without a specific pre-enrolment admission for diabetes, chronic obstructive pulmonary disease or chronic heart failure experienced a decrease in emergency visits (10 per cent lower) and emergency admissions (13 per cent lower) following enrolment in HARP
- Patients with a pre-enrolment admission for diabetes experienced a decrease in emergency visits and overnight bed days (both 12 per cent lower)
- Patients with a pre-enrolment admission for any combination of chronic heart failure, chronic obstructive pulmonary disease and diabetes also experienced a decrease in overnight bed days (12 per cent lower).

Other HARP patient groups showed similar patterns of hospital utilisation before and after enrolment in HARP projects.

It is important to note that patients selected for HARP projects were expected to deteriorate over time, resulting in an increase in overall hospital utilisation. Accordingly, outcomes from pre-post analysis could be viewed positively because no further increase in hospital utilisation was observed following participation in HARP projects.

Moreover, 8 per cent of HARP patients died in the follow-up period, with the lowest mortality of 5 per cent in the subgroup without a specific chronic disease diagnosis and the highest mortality of 18 per cent in the complex diagnostic group. Given the levels of mortality experienced by the HARP group of patients, combined with the knowledge that hospital utilisation can increase up to four times in the last year of life (compared with the year before this period)(17), it was considered that any pre-post analysis may bias against the capacity to identify any positive outcomes achieved by HARP projects. Accordingly, a more comprehensive analysis of HARP and non-HARP patients who were matched for similar disease-related characteristics was undertaken to identify the impact of HARP projects on hospital utilisation.

Table 9: Change in hospital utilisation* before and after enrolment in HARP projects

Outcome	Pre-HARP	Post-HARP	Trend	Difference			
				Raw	95 % CI	%	% range
All subjects (n=7,681), 8 per cent follow-up mortality							
ED visits	1.64	1.52	↓	-0.12	- 0.18, - 0.06	7.3	4 to 11
Emergency admits	1.23	1.13	↓	-0.11	- 0.15, - 0.06	8.9	1 to 12
Emergency bed days	6.30	5.84	↓	-0.46	- 0.75, - 0.16	7.3	3 to 12
No pre-enrolment admission for diabetes, chronic obstructive pulmonary disease or chronic heart failure (n=4,912), 5 per cent follow-up mortality							
ED visits	1.47	1.33	↓	-0.14	- 0.21, - 0.06	9.5	4 to 14
Emergency admits	1.00	0.87	↓	-0.13	- 0.18, - 0.08	13	8 to 18
Emergency bed days	4.42	4.12	No change	-0.30	- 0.60, +0.02	6.6	
Pre-enrolment admission for chronic heart failure (n=751), 17 per cent follow-up mortality							
ED visits	1.77	1.72	No change	-0.05	- 0.22, +0.14	2.8	
Emergency admits	1.53	1.47	No change	-0.06	- 0.21, +0.11	3.9	
Emergency bed days	9.26	8.54	No change	-0.72	- 1.91, +0.51	7.8	
Pre-enrolment admission for chronic obstructive pulmonary disease (n=676), 12 per cent follow-up mortality							
ED visits	1.95	1.85	No change	-0.10	- 0.29, +0.11	5.1	
Emergency admits	1.56	1.49	No change	-0.07	- 0.20, +0.09	3.9	
Emergency bed days	8.00	8.34	No change	0.34	- 0.68, +1.42	4.5	
Pre-enrolment admission for diabetes (n=780), 8 per cent follow-up mortality							
ED visits	1.95	1.72	↓	-0.23	- 0.41, - 0.07	11.8	4 to 21
Emergency admits	1.58	1.43	No change	-0.15	- 0.28, +0.00	9.5	
Emergency bed days	9.04	7.92	↓	-1.12	- 2.14, - 0.10	12.4	1 to 24
Pre-enrolment admission for combinations of chronic heart failure, chronic obstructive pulmonary disease, and diabetes (n=537), 18 per cent follow-up mortality							
ED visits	2.29	2.36	No change	0.08	- 0.18, +0.39	3.5	
Emergency admits	2.07	2.11	No change	0.04	- 0.17, +0.30	1.9	
Emergency bed days	13.27	11.64	↓	-1.63	- 3.22, - 0.09	12.3	1 to 24

*Pre and post HARP utilisation is expressed as a rate per person per year.

Comparison group analysis of HARP patients

Propensity scoring methods were used to compare the rate of utilisation between HARP and non-HARP patient groups. These methods are particularly useful in the assessment of treatment effects in non-randomised data (7), because they allow the analyst to adjust for a multitude of demographic, socioeconomic, disease related and patterns of care factors which may differ between intervention groups in observational data.

Three hypotheses were framed for investigation:

1. that HARP cases would have a significantly lower rate of public emergency department attendances compared with a matched group of non-HARP patients
2. that HARP cases would have a significantly lower rate of public emergency admissions compared with a matched group of non-HARP patients
3. that HARP cases would have a significantly lower rate of public emergency bed days compared with a matched group of non-HARP patients.

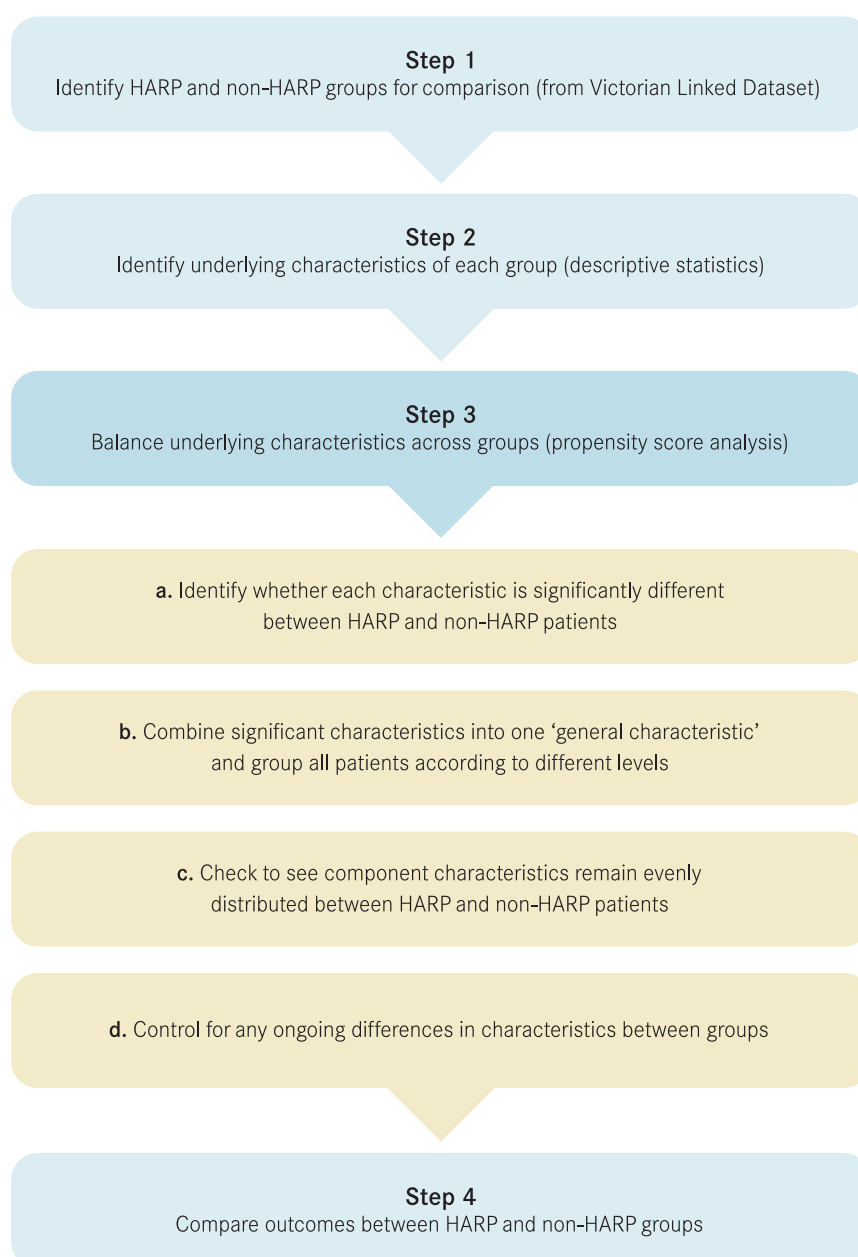
Key outcomes were also examined for major disease groups, including:

- those with chronic obstructive pulmonary disease as a primary diagnosis, but no chronic heart failure or diabetes as primary diagnosis
- those with chronic heart failure as a primary diagnosis, but no chronic obstructive pulmonary disease or diabetes as primary diagnosis
- those with diabetes as a primary diagnosis, but no chronic obstructive pulmonary disease or chronic heart failure as primary diagnosis
- those with complex cases involving a combination of chronic heart failure and chronic obstructive pulmonary disease or chronic heart failure and diabetes or chronic obstructive pulmonary disease and diabetes or all three diagnoses.

Method of comparison group analysis

The key stages in undertaking the comparison group analysis are outlined in Figure 8.

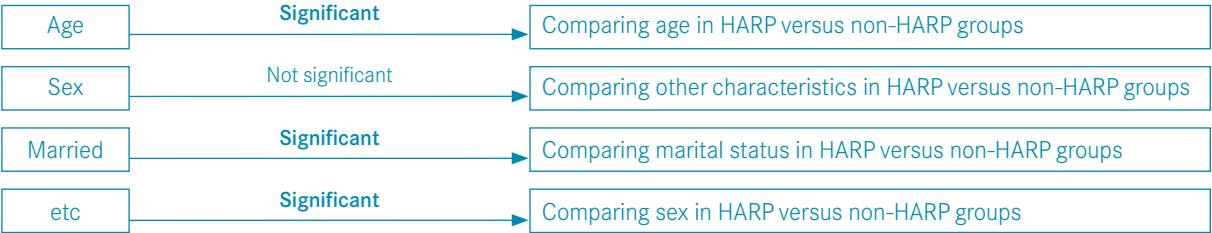
Figure 8: Overview of comparison group analysis



Specific steps involved in propensity score analysis are described in further detail here to demonstrate the method by which background characteristics are ‘balanced’ across the HARP and non-HARP patient groups. This is achieved in three general steps.

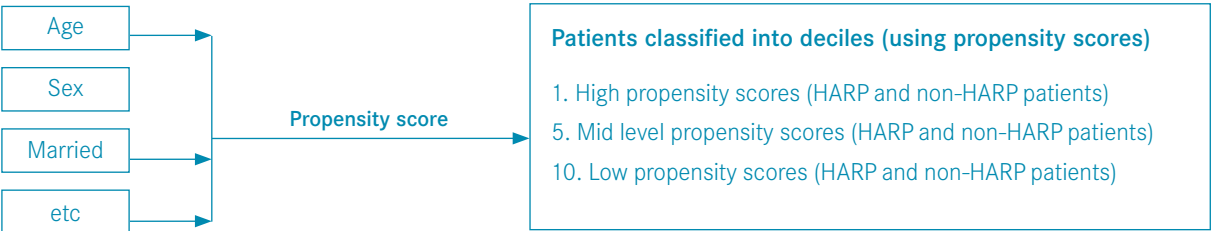
First, the influence of each separate characteristic is examined to see whether it is different between HARP and non-HARP patient groups. This stage (described as Step 3a in Figure 8) is hypothetically outlined in Figure 9.

Figure 9: Examining the influence of separate characteristics



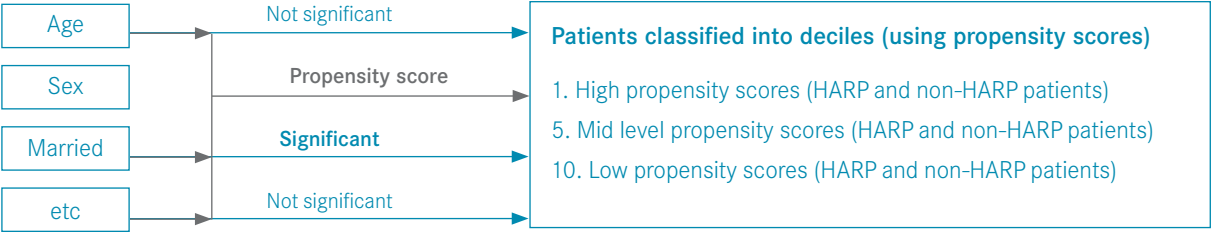
Second, all characteristics that are significantly different between HARP and non-HARP patient groups are combined into a single ‘influencing characteristic’ (known as a propensity score), which is used to group both HARP and non-HARP patients into different levels. The propensity score is used to estimate the chance of receiving a HARP-related treatment²⁸. This stage (described as Step 3b in Figure 8) is hypothetically outlined in Figure 10.

Figure 10: Combining characteristics and sorting patients into common groups



Third, each of the separate characteristics are re-examined at each of the ten levels of (propensity classified) HARP and non-HARP patients to establish whether there is any residual influence on HARP and non-HARP patient groups once the overall ‘influencing characteristic’ has been taken into account. This stage (described as Step 3c in Figure 8) is hypothetically portrayed in Figure 11.

Figure 11: Identifying residual influences of separate characteristics after propensity scores



28 More specifically, the propensity score represents an estimate of the probability of being in a HARP group. This estimate is based on individual patients’ levels of background factors (covariates) thought to influence the chances of being in the HARP group. The propensity score is used to group patients into different levels (deciles) of outcome.

If any single influencing factor continues to exert a significantly different impact on HARP and non-HARP patients, it is used together with the overall propensity score to control differences between the two groups in subsequent analysis of outcomes (described as Step 3d in Figure 8). It is important to note that although different numbers of HARP and non-HARP patients will be in each level, the characteristics are now 'balanced' within each of the ten separate levels, allowing comparisons to be made.

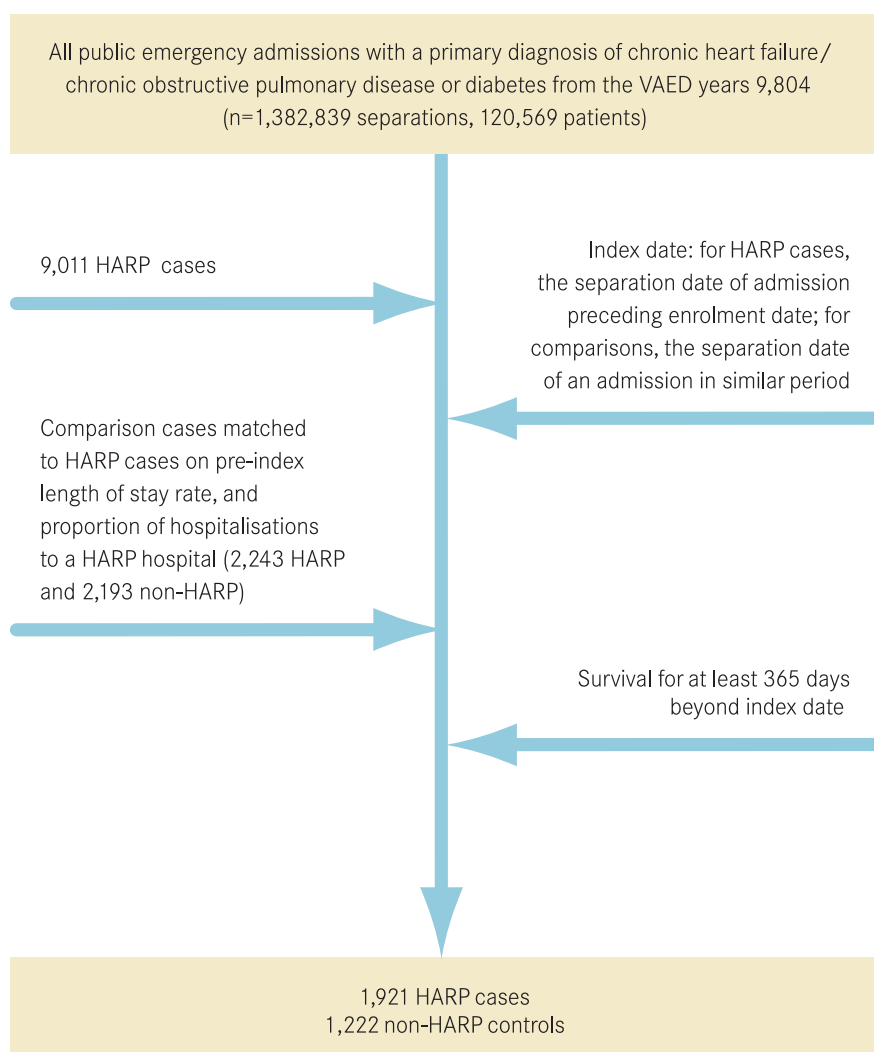
The key objectives, technical procedures and desired outcomes that accompanied each stage of the comparison group analysis are summarised in Table 10.

Table 10: Description of approach to comparison group analysis

Objective	Process	Technical implementation	Outcome
Identify patients for HARP and non-HARP groups	Select patient meeting appropriate sample entry criteria (See Figure 2)	Use HARP linked dataset (HARP-VAED component)	HARP and non-HARP groups defined
Identify characteristics differing between HARP and non-HARP patient groups	Determine all measurable characteristics (other than HARP interventions) that may influence patient outcome	List all available factors that may influence patient outcome and differ between HARP and non-HARP groups	List of influencing factors
Balance the influence of these characteristics between the two groups	Group all patients according to the level of different background characteristics	Using the covariates in Table 3, fit a logistic regression model (PROC Logistic in SAS 8.2) to predict HARP status for each patient (8). The area under the ROC curve was used to assess model fit. (Ideally this should be greater than 0.8.) Then divide all patients into ten groups (deciles) according to their overall level of background characteristics (the predicted probability from the logistic regression model, the 'propensity score').	The area under the ROC curve for the model was 0.94. Ten groups of patients, ranked according to their overall level of background characteristics. Each single group contains both HARP and non-HARP patients.
	Check to see background characteristics are evenly distributed between HARP and non-HARP patients in each group	Conduct a Chi-square to determine significant differences between HARP and non-HARP patients across the ten groups for each influencing factor	Identification of any ongoing differences between the two groups
	Control for any ongoing differences in characteristics between groups	Use influencing factors that remain significantly different between HARP and non-HARP as covariates in model	Correction for any ongoing differences between groups in key background characteristics
Compare major outcomes between HARP and non-HARP patients	Investigate major outcomes between the HARP and non-HARP patients and in subgroups	Fit a poisson regression model (PROC GENMOD in SAS 8.2) to examine key outcomes between HARP and non-HARP groups with the decile of propensity score as the only adjustment factor	Comparison of emergency presentations, admissions, and overnight lengths of stay

The process and outcomes for selection of HARP and non-HARP comparison groups is outlined in Figure 12.

Figure 12: HARP and non-HARP patient groups



Key characteristics that were identified as having the potential to influence HARP and non-HARP patients who were included in the analysis are described in Table 11.

Table 11: List of underlying characteristics used in HARP and non-HARP analysis

Variable class	Name	Comments
Demographic	Age	In years
	Gender	Percentage male
	Marital status	Percentage currently married
	Country of birth	Percentage from English speaking status based on country of birth
Socio-economic factors	Accessibility to goods and services	The Accessibility/Remoteness Index of Australia is a marker of how remote the patient's area of residence is from services (9). Presented as the 'per cent highly accessible'.
	• Index of Disadvantage • Index of Advantage–Disadvantage • Index of Economic Resources • Index of Education and Occupation	These indices reflect socioeconomic resources in the patient's statistical local area of residence (10). The Australian Bureau of Statistics calculates them from the 2001 Census. They are used as continuous measures.
Charlson Index Comorbidities	• Severe liver disease • Cancer • Congest heart failure • Connective tissue disease • Cerebrovascular accident • Dementia • Diabetes with complications • Diabetes • HIV • Liver disease • Metastatic cancer • Myocardial infarction • Paraplegia • Peptic ulcer disease • Pulmonary disease • Peripheral vascular disease	The Charlson Comorbidity Index is used to take account of comorbid illnesses which may affect the complexity of a hospitalisation (11–13). For our analyses it is measured at the index admission. The prevalence of each comorbidity is presented.

Variable class	Name	Comments
Burden of Disease: Life Expectancy (LE), Disability Adjusted Life Expectancy (DALE) and DALY (DALY)	• LE, Female • LE, Male • DALE, Female • DALE, Male • DALY, All Diseases, Female • DALY, All Diseases, Male • DALY, Asthma, Female • DALY, Asthma, Male • DALY, Cardiac, Female • DALY, Cardiac, Male • DALY, COPD, Female • DALY, COPD, Male • DALY, Diabetes, Female • DALY, Diabetes, Male	These measures provide an indication of the health of the local government area of residence of the patient (14, 15). Other than for the LE and the DALE, they are presented as DALYs per 1,000 population.
Ambulatory Care Sensitive Conditions Rate (ACSC)	Female rate Male rate	The ACSC rate represents the age standardised rate for 'preventable' hospitalisations within the patient's local government area (16). It serves as a proxy for access to ambulatory care.
Pre-enrolment primary admission rate	Chronic heart failure	This is the rate for up to two years before enrolment
	Chronic obstructive pulmonary disease	
	Diabetes	
Pre-enrolment associated admission rate	Chronic heart failure	This is the rate for up to two years before enrolment
	Chronic obstructive pulmonary disease	
	Diabetes	
ED visit rate	Chronic heart failure	This is the rate for up to two years before enrolment
	Chronic obstructive pulmonary disease	
	Diabetes	

Table 11 continued

Variable class	Name	Comments
Hospital utilisation factors in the two years before start	Admission to a HARP hospital	Percentage of pre-enrolment admissions to a HARP hospital
	ED visit to a HARP hospital	Percentage of pre-enrolment emergency department visits to a HARP hospital
	Mental health classified admission	Percentage of pre-enrolment admissions classified as going to an approved mental health/psycho geriatric program
	Private classified admission	Percentage of pre-enrolment admissions as a non-public non-Department of Veterans' Affairs patient – therefore private
	Department of Veterans' Affairs classified admission	Percentage of pre-enrolment admissions as a Department of Veterans' Affairs patient
	Teaching hospital admission	Percentage of pre-enrolment admissions to a teaching hospital (Class A1 or A2)
	Non-acute classified admission	Percentage of pre-enrolment admissions to a non-acute bed (interim, rehab, nursing home type)
	Length of stay rate	Total bed days per year pre-enrolment
	Elective admission rate	Elective admissions per year pre-enrolment
	Emergency admission rate	Emergency admissions per year pre-enrolment
	Number of hospitals	Number of pre-enrolment hospitals to which the patient was admitted
	Chemotherapy and radiotherapy rate	Chemotherapy and radiotherapy admissions per year
	Dialysis rate	Dialysis admission per year

Results of comparison group analysis

There were 1,921 HARP patients and 1,222 non-HARP patients in the comparison analysis. The average age of the HARP patients was 73 years and the average age of the non-HARP patients was 89 years (Table 12). After adjustment for propensity score decile, there were no statistically significant differences between the HARP and non-HARP groups, indicating that further analysis using the decile as the multivariate adjustment factor would provide unbiased results.

Table 12: Comparison of HARP and non-HARP groups in underlying characteristics

Class of variable	Variable	Before adjustment for propensity score			After adjustment for propensity score
		HARP (n=1,921)	Comparison (n=1,222)	P-value	P-value
Demographic	Age in years	73, (65–80)	89, (84–92)	0.0000	0.84
	Male, per cent	53.72	36.53	0.0000	0.93
	Currently married, per cent	47.61	29.14	0.0000	0.81
	English speaking, per cent	61.84	66.12	0.0635	0.72
Socioeconomic factors	Highly accessible	100	100		–
	Adv–Disadvantage	1,004.8, (947.2–1,095.6)	1,004.8, (947.2–1,066.56)	0.0001	0.93
	Disadvantage	1,013.36, (952.32–1,066.08)	1,014.24, (954.24–1,050.72)	0.0316	0.86
	Economic Resources	1,016.32, (947.92–1,086.64)	1,011.12, (957.88–1,053.76)	0.0010	0.76
	Edu and Occupation	1,007.2, (958.08–1,098.8)	994.24, (941.52–1,077.92)	0.0001	0.94
Burden of Disease of Geographic Area of Residence, based on local government area (LGA)	LE, Female	81.47, (80.86–81.73)	81.47, (80.97–81.85)	0.0000	0.95
	LE, Male	75.44, (74.66–76.32)	75.53, (74.9–76.58)	0.0000	0.87
	DALE, Female	74.78, (74.24–75.37)	74.78, (74.32–75.25)	0.0000	0.97
	DALE, Male	69.1, (68.22–70.01)	69.27, (68.57–70.2)	0.0000	0.90
	DALY, All Female	126, (119–134)	124, (118–129)	0.0000	0.89
	DALY, All, Male	143, (133–156)	140, (132–150)	0.0000	0.85
	DALY, Asthma, Female	4, (4–4)	4, (4–4)	0.0313	0.94
	DALY, Asthma, Male	3, (3–4)	3, (3–4)	0.8683	1.00
	DALY, Cardiac, Female	28, (26–31)	28, (26–30)	0.0000	0.83
	DALY, Cardiac, Male	33, (30–35)	32, (30–35)	0.0007	0.94
	DALY, COPD, Female	4, (4–5)	4, (4–5)	0.0000	0.79
	DALY, COPD, Male	7, (5–8)	7, (5–8)	0.0000	0.94
	DALY, Diabetes, Female	4, (3–5)	4, (3–5)	0.6735	0.98
	DALY, Diabetes, Male	5, (4–6)	5, (4–6)	0.3072	0.94
Ambulatory Care Sensitive Conditions Rate	Female	39.46, (33.48–42.91)	39.46, (33.4–44.32)	0.1031	0.84
	Male	39.39, (33.22–46.37)	39.39, (33.03–46.37)	0.1808	0.90
Charlson Index Comorbidities	Cancer	1.96	4.20	0.8693	0.96
	Metastatic cancer	0.53	1.19	0.2145	0.96
	Cerebrovascular disease	2.10	5.06	0.0000	0.91
	Chronic pulmonary disease	41.86	25.26	0.0000	0.32
	Chronic heart failure	45.97	66.62	0.0000	0.17
	Connective tissue disease	0.45	0.46	0.7599	0.99
	Dementia	0.36	2.14	0.0000	0.87
	Diabetes with complications	12.66	10.67	0.1218	0.77
	Diabetes	21.62	17.51	0.0145	0.53
	Liver disease	0.71	0.41	0.2623	0.91
	Severe liver disease	0.58	0.32	0.2367	0.92
	Myocardial Infarction	11.37	9.17	0.0130	0.88
	Paraplegia	1.07	3.10	0.0001	0.94
	Peptic ulcer	0.67	0.68	0.4169	0.90
	Peripheral Vascular Disease	0.94	1.69	0.0407	1.00
	Renal disease	13.95	18.83	0.0068	0.81

Class of variable	Variable	Before adjustment for propensity score			After adjustment for propensity score
		HARP (n=1,921)	Comparison (n=1,222)	P-value	P-value
Primary admission rate in the two years before start	Chronic heart failure	0.5, (0–1.5)	0.5, (0.5–1.5)	0.0000	0.86
	Chronic obstructive pulmonary disease	0, (0–1.5)	0, (0–0.5)	0.0000	0.97
	Diabetes	0, (0–1.06)	0, (0–0.5)	0.0001	0.92
Associated admission rate in the two years before start	Chronic heart failure	0, (0–0)	0, (0–0)	0.3166	0.98
	Chronic obstructive pulmonary disease	0, (0–0)	0, (0–0)	0.0000	0.90
	Diabetes	0, (0–1.5)	0, (0–1)	0.0001	0.91
Emergency visit rate in the two years before start	Chronic heart failure	0, (0–0.5)	0, (0–0.5)	0.0000	0.85
	Chronic obstructive pulmonary disease	0, (0–0.5)	0, (0–0)	0.0706	0.94
	Diabetes	0, (0–0)	0, (0–0)	0.1385	0.98
Hospital utilisation factors in the two years before start	Chemo and XRT rate	0, (0–0)	0, (0–0)	0.0045	0.99
	DVA admission	0, (0–0)	0, (0–0)	0.1739	0.90
	Dialysis rate	0, (0–0)	0, (0–0)	0.3482	0.97
	Elective rate	0, (0–0.01)	0, (0–0)	0.4021	0.93
	Emergency rate	0.01, (0–0.01)	0.01, (0–0.01)	0.0000	0.84
	ED visit rate	2.5, (1.5–4.5)	3.5, (2–7)	0.5758	0.84
	HARP hospital	90, (67–100)	91, (67–100)	0.0001	0.75
	HARP hospital emergency department	100, (100–100)	100, (100–100)	0.0558	1.00
	Length of stay rate	0.06, (0.03–0.12)	0.07, (0.03–0.12)	0.7300	0.94
	Mental health	0, (0–0)	0, (0–0)	0.0000	0.94
	Non-acute	0, (0–11)	0, (0–20)	0.2742	0.89
	Number of hospitals	2, (1–3)	2, (1–3)	0.2419	0.80
	Private	0, (0–0)	0, (0–0)	0.0000	0.95
	Teaching hospital	100, (72–100)	80, (33–100)	0.0000	0.89

The analyses indicated that, overall, patients who were selected to participate in HARP projects experienced lower levels of mortality than similar patients who were not selected to participate in HARP projects during the first year (odds ratio for death during the first year for the HARP group, 0.29 (95 per cent confidence interval 0.23, 0.35)). In order to provide an unbiased comparison (because it is known that patients in the last year of life use more resources), we limited the analysis to patients who survived at least one year after the index date in both the HARP and comparison groups²⁹.

In the final analysis of the matched patient groups, HARP patients showed statistically significant decreases in hospital utilisation in comparison with the non-HARP patients (Table 13). Emergency department attendances were 22–46 per cent lower, emergency admissions were 44–59 per cent lower and emergency bed days were 30–50 per cent lower. Other than for chronic heart failure, these overall findings were confirmed in the subgroup analyses.

29 Implicit in this approach is the view that the first year after the index date is a period that does not provide data on which HARP and non-HARP can be reasonably compared; we assume that no adverse effect of HARP occurs in this period.

Table 13: Hospital utilisation* in HARP patients in comparison with non-HARP patients

Outcome	Non-HARP	HARP	Trend	Difference	
				%	% range
All subjects					
ED visits	2.3	1.5	↓	35	22–46 %
Emergency admits	3.6	1.7	↓	52	44–59 %
Emergency bed days	15.3	9.1	↓	41	30–50 %
Pre-enrolment admission for chronic heart failure					
ED visits	0.9	1.2	No change	33	
Emergency admits	1.1	1.2	No change	9	
Emergency bed days	6.8	7.7	No change	13	
Pre-enrolment admission for chronic obstructive pulmonary disease					
ED visits	3.9	1.5	↓	63	41–77 %
Emergency admits	4.9	1.7	↓	65	50–76 %
Emergency bed days	16.8	8.4	↓	50	25–66 %
Pre-enrolment admission for diabetes					
ED visits	2.6	1.6	↓	38	1–61 %
Emergency admits	6.8	1.8	↓	73	61–82 %
Emergency bed days	13.7	8.2	↓	40	5–63 %
Pre-enrolment admission for combinations of chronic heart failure, chronic obstructive pulmonary disease, chronic heart failure, diabetes					
ED visits	2.7	1.4	↓	49	35–60 %
Emergency admits	4.5	1.8	↓	61	51–69 %
Emergency bed days	25.2	10.8	↓	57	46–66 %

*Hospital utilisation is expressed as a rate per person per year.

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