Queensland Government

Queensland Health

Enquiries to: David Noon
Manager
Cabinet and Parliamentary Services
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File Ref: CAPS1546

Mr Aaron Harper
Chair
Health, Communities, Disability Services and
Domestic and Family Violence Prevention Committee
Parliament House
George Street
BRISBANE QLD 4000

Dear Mr Harper

On 18 October 2019, representatives of Queensland Health and Queensland Ambulance Services appeared before the Health, Communities, Disability Services and Domestic and Family Violence Prevention Committee (Parliamentary Committee) as part of the Parliamentary Committee's inquiry into aged care, palliative care and end-of-life care and voluntary assisted dying.

Queensland Health took five questions on notice. The questions were:

- Can Queensland Health provide Information on the performance of the Queensland Aged Care Assessment Program and Aged Care Assessment Teams?
- Can Queensland Health provide a breakdown of the 2018-19 palliative care actual spending figures by each Hospital and Health Service?
- Can Queensland Health provide the Hospital and Health Service implementation plans for *State-wide strategy for end-of-life care 2015*?
- Can Queensland Health provide a list of Residential Aged Care Facility support services of care and any supporting information about how the programs are supported and performing?
- Can Queensland Health provide information on Hospital and Health Service scripted services, dedicated funding pools for palliative care and how each Hospital and Health Services engage community nursing services for in the home care?

The response to the above questions is now enclosed.

Should you require any further information, the Queensland Health contact is Mr David Noon, Manager, Cabinet and Parliamentary Services, Department of Health, on telephone [redacted]

Yours sincerely

Dr John Wakefield PSM
Director-General
25.10.19

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Health, Communities, Disability Services and Domestic Violence Prevention Committee

Inquiry into Aged Care, End-of-Life and Palliative care

Queensland Health response to Questions taken on Notice

Background

On 18 October 2019, officers from Queensland Health provided information and commentary to the Health, Communities, Disability Services and Domestic and Family Violence Prevention Committee. Five questions were taken on notice. Answers to these questions are provided below.

Question One

Can Queensland Health provide Information on the performance of the Queensland Aged Care Assessment Program and Aged Care Assessment Teams?

Answer to Question One

The Home Care Package program provides older people who want to stay at home with access to a range of ongoing personal services, support services and clinical care that help them with their day-to-day activities. The program is part of the Commonwealth's continuum of care for older people in Australia, providing services between the Commonwealth Home Support Program and residential aged care.

There are four levels of support under the Home Care Package program, including a level one package (basic care needs, with an annual amount of $8,721), level two package (low level care needs, with an annual amount of $15,045), level three (intermediate needs, with an annual amount of $33,076) and a level four package (high care needs, with an annual amount of $50,286).

The Aged Care Assessment Program is a cooperative working arrangement between the Commonwealth and state and territory governments to operate Aged Care Assessment Teams across Australia. The core objective of the Aged Care Assessment Program is to comprehensively assess the care needs of frail older people and to assist them to gain access to the most appropriate types of care, including approval for Commonwealth Government subsidised care services.

Aged Care Assessment Teams conduct face-to-face assessments with clients to determine their eligibility for aged care services to best meet their needs. Aged Care Assessment Teams involve clients, their carers and service providers in the assessment and care planning process. Queensland Health operates 14 Aged Care Assessment Teams.

During the assessment, the assessor and client will work together to establish a support plan that reflects the client's strengths and abilities, areas of difficulty and the support that will best meet their needs and goals. This will include the consideration of formal and informal services as well as reablement pathways where appropriate. A support plan review occurs when a client's care needs or circumstances has changed.

Queensland Health is the approved provider of the Aged Care Assessment Teams in Queensland. Under the *Aged Care Assessment Program Agreement 2018-20,* there are Key Performance Indicators and performance expectations. Queensland Health provides quarterly performance reports to the Commonwealth to demonstrate its achievement of agreed Key Performance Indicators and performance expectations as set out in the agreement. The Key Performance Indicators measure timeliness of assessment throughout the Aged Care Assessment pathway.

Queensland routinely meets most Key Performance Indicators as defined in the agreement with the Commonwealth, demonstrating timely assessment of clients in the hospital and community.

Table 1 outlines the volume of referrals actioned (i.e. received and accepted by the Aged Care Assessment Team) and the number of Support Plan Reviews completed by each Hospital and Health Service for April, May and June 2019.

For the most recent quarter, April – June 2019, Queensland Aged Care Assessment Team actioned a total of 12,151 referrals and completed 5,471 Support Plan Reviews. During the 2018-19 financial year, there were 49,768 actioned referrals to the service.

Table 1: Aged Care Assessment Teams referrals actioned and Support Plan Reviews (SPRs) by Hospital and Health Service for April, May and June 2019

	Apr-19		May-19		Jun-19	
	Referrals actioned in period	SPRs completed in period	Referrals actioned in period	SPRs completed in period	Referrals actioned in period	SPRs completed in period
Cairns	178	102	242	106	215	109
Central West	2	2	12	4	4	1
Fraser Coast	244	119	272	109	230	115
Gold Coast	532	269	620	251	582	245
Mackay	102	35	104	49	92	39
Metro North	763	377	882	393	789	336
Metro South	712	363	800	393	706	404
Mt Isa	13	1	11	4	8	3
Rockhampton	163	33	209	68	175	35
Roma	8	10	19	11	10	14
Sunshine Coast	533	229	554	267	458	252
Toowoomba	230	109	256	109	227	136
Townsville	199	80	233	69	190	68
West Moreton	177	56	196	46	199	50
Queensland	**3856**	**1785**	**4410**	**1879**	**3885**	**1807**

As at 30 June 2019, 119,524 Australians were waiting on the National Prioritisation Queue for their approved level of home care package. The estimated wait time for people entering by package level is as follows: Level 1, 3-6 months; Level 2, Level 3 and Level 4, more than 12 months.

As a result of the volume of people waiting on the national queue for home care packages, coupled with their care needs not being met in a timely manner due to their lack of appropriate package, the volume of Support Plan Reviews continues to increase. The increase in Support Plan Reviews results in further pressures on Aged Care Assessment Teams.

The volume of referrals is also steadily increasing. The increase in referrals is a result of increasing community awareness of Commonwealth supports and the proportion of eligible clients increasing in line with the growing population of Queensland residents over 65 years.

Question Two

Can Queensland Health provide a breakdown of the 2018-19 palliative care actual spending figures by each Hospital and Health Service?

Answer to Question Two

Each Hospital and Health Service is empowered to make decisions about their budget allocations, and changes during the financial year, to account for local priorities and needs, as per the *Hospital and Health Boards Act 2011.*

It is estimated that in 2018-19, Hospital and Health Services will have spent approximately $114 million for palliative care services.

On 28 February 2019, Question on Notice 246 was asked in the Queensland Parliament. This Question on Notice requested information about the palliative care budget for 2018-19 broken down by Hospital and Health Service.

The response to this question answers the question raised by the Parliamentary Committee. A copy of the response is attached (**Attachment 1**).

Palliative care services are delivered in a range of settings within each Hospital and Health Service. Some patients receive care in the hospital, but others provide services through either designated palliative care units or which may not be captured as a palliative care patient, for the purposes of reporting.

Question Three

Can Queensland Health provide the Hospital and Health Service implementation plans for *State-wide strategy for end-of-life care 2015*?

Answer to Question Three

In May 2015, the Minister for Health and Minster for Ambulance Services launched the *Statewide Strategy for End-of-Life Care 2015.* In October 2015, the Department of Health Leadership Team endorsed the associated *Care at the End of Life Implementation Plan 2015-2025.* To assist the Committee, please find attached, a proforma generic HHS 'Care at the end of life – Implementation Plan 2015-2025' (**Attachment 2**). Hospital and Health Service individual implementation plans are not currently available on the Department's website.

Hospital and Health Service implementation plans contain short, medium and long-term actions for each service to achieve by 2018, 2020 and 2025. The generic proforma for the implementation plan was developed in consultation with Hospital and Health Services, specialist care, clinical networks, each of the Department of Health Divisions and Commercial Business Units, as well as non-government, primary care and community stakeholders. Each Hospital and Health Service received an implementation plan, which was intended to guide local change at a regional level.

To support the implementation plans in practice, multidisciplinary groups and/or 'committees for care at the end of life' have been established in each Hospital and Health Service to coordinate local delivery of the implementation plans, to ensure delivery is responsive to the local context. Since 2016, this activity has also been supported by the Department of Health Care at End of Life project team.

The Hospital and Health Service implementation plans contain key deliverables. Actions specifically related to palliative care include:

- palliative care clinicians routinely engaging in medical emergencies and multidisciplinary team meetings;
- regular audit meetings to examine the quality of care provided at the end of life (not limited to terminal phase care or care provided by specialist palliative care teams);
- a process for developing and upscaling palliative care inpatient and consulting service strategies to enable rapid access to palliative care beds (or their equivalent);
- increased palliative care is either in place, or planned for, and considers the capability and capacity to provide daily coverage and accessibility throughout the Hospital and Health Service to the appropriate 'Clinical Services Capability Framework'. This action aims to meet service demand and optimise accessibility for the catchment population (see section 4.4 Service Direction 4: Provision in **Attachment 2**).

The 'Clinical Services Capability Framework' (the Framework) is for public and licensed private health facilities. The Framework helps Hospital and Health Services to set their strategic intent for future service provision. Implementation is predicated on a number of factors and may be impacted by limitations in funding, workforce and infrastructure.

The Framework outlines the clinical services that health facilities may provide, the complexity of the level of care and the clinical and support services necessary to accompany capability levels of facilities. Level 1 manages the least complex patients, moving upwards to the highest level, Level 6, managing the highest level of patient complexity.

Question Four

Can Queensland Health provide a list of Residential Aged Care Facility support services of care, and any supporting information about how the programs are supported and performing?

Answer to Question Four

In collaboration with consumers, clinicians and key stakeholders from across the care continuum, a Frail Older Persons program has been implemented to improve patient choice of care settings and quality and safety of care for older Queenslanders. A core component of this program is the Residential Aged Care Facility acute care support services (RaSS) model of care.

The RaSS model of care currently operates in in Cairns and Hinterland, Central Queensland, Gold Coast, Mackay, Sunshine Coast, Townsville and West Moreton Hospital and Health Services.

RaSS are Queensland Health funded services that aim to improve quality of care and choice of care setting for residents of Residential Aged Care Facilities with acute health care needs, that are beyond the scope of the general practitioner and Residential Aged Care Facility to manage independently of the hospital sector. The RaSS enable delivery of acute care in the Residential Aged Care Facility environment (where clinically appropriate and in keeping with resident wishes) through provision of emergency department substitutive care. RaSS provide:

- telephone triage – telephone assessment of acute care needs and matching the care need to the most appropriate care delivery service;
- emergency department substitutive care – acute assessment or care in the Residential Aged Care Facility environment as an alternative to emergency department transfer, the types of care able to be delivered are determined by the scope of practice of individual RaSS staffing models;
- gerontic nursing assessment for Residential Aged Care Facility residents presenting to emergency department or admitted to hospital;
- discharge planning, co-ordination and transitional communication for Residential Aged Care Facility residents presenting to emergency department or with an acute admission, including for residents who have presented to and been discharged from emergency department after-hours; and
- follow-up of all Residential Aged Care Facility residents via telephone consultation with Residential Aged Care Facility clinical nurses at 7 days (earlier if clinical need requires) to ensure fulfillment of referrals and resolution of care need.

To support this model of care, Clinical Excellence Queensland has collaborated with general practitioners, Residential Aged Care Facility clinicians, consumers and specialists to develop a suite of care pathways specific to Residential Aged Care Facility residents to support Residential Aged Care Facility registered nurses and general practitioners in the early detection of deterioration and early institution of evidence-based care. These pathways also provide guidance as to appropriate referral pathways and specialist services that may be indicated in these particular clinical contexts. Online education resources for Residential Aged Care Facility clinicians and general practitioners are currently in development to allow further capacity building in the Residential Aged Care Facility sector. The pathways are available at: https://clinicalexcellence.qld.gov.au/sites/default/files/docs/improvement/mgmt-acute-care-needs-racf-residents.pdf.

In the event of acute deterioration, where resident care needs exceed the scope of the general practitioner to manage independently of the hospital sector, Residential Aged Care Facility residents may be referred by Residential Aged Care Facility clinical nurses, general practitioners or Queensland Ambulance Service paramedics to a RaSS. RaSS clinicians collaborate with residents or their substitute health decision makers, Residential Aged Care Facility registered nurses and general practitioners, to assess the acute healthcare needs of the resident and develop a comprehensive management plan. RaSS clinicians facilitate linkage to hospital specialist and community services (in-person, or via telehealth) to fulfil the resident's care needs in a manner consistent with the resident's goals of care.

The RaSS builds on previously funded older persons model of care, including the initial pilot site (CARE-PACT at Metro South Health). A descriptive publication of the pilot service model, Metro South Health's CARE-PACT service, is available at: www.racgp.org.au/download/Documents/AFP/2015/April/April_Focus_Burkett.pdf. An external evaluation of the pilot model is provided to assist the Committee (**Attachment 3**).

Recurrent funding has been provided to establish the model of care in Cairns and Hinterland, Central Queensland, Gold Coast, Mackay, Sunshine Coast, Townsville and West Moreton Hospital and Health Services. Recurrent funding has been provided to bolster existing services, including the Metro North Residential Aged Care District Assessment and Referral service (RADAR) and Darling Downs Acute Geriatric Evaluation Service (AGES team). Torres and Cape, South West, Central West, North West, Metro South and Wide Bay Hospital and Health Services are not currently funded for the RaSS model of care. These Hospital and Health Services are currently participating in other models of care, including Comprehensive Aged Residential Emergency and Partners in Assessment, Care and Treatment (CARE-PACT), Geriatric Emergency Department Intervention (GEDI), or are part of a review to determine which model of care, or application of an existing model such as RaSS, best caters for the population size, resources and local needs of the Hospital and Health Service.

Individual Hospital and Health Services determine the geographical catchment they are able to safely service, and limitations can include distance from the base site to the Residential Aged Care Facility and time of day. Residential Aged Care Facilities located distances to the base site may be offered modified services such as telehealth consultations, rather than face-to-face consultations.

Improved care provided by the RaSS is supported by the *Healthy ageing: A strategy for older Queenslanders*, which focusses on helping Queenslanders to stay well in the community, to receive care closer to home and promoting seamless connection to health services.

Additionally, Queensland Health has funded public private partnerships for startup costs for mobile x-ray services to provide mobile plain radiography services with radiologist reporting for Residential Aged Care Facility residents in Metro South and Metro North Hospital and Health Services. A systematic review of scientific literature of mobile x-ray services for Residential Aged Care Facilities is attached to assist the Committee (**Attachment 4**). The review identified that mobile x-ray services are of comparable quality to hospital-based examinations and reduced transfers to and from hospital and facilitated timely diagnosis and access to treatments.

Metro South Hospital and Health Services also facilitates specialist geriatrician telehealth consultations to rural areas that are without Geriatrician access, such as South West Hospital and Health Service.

Question Five

Can Queensland Health provide information on Hospital and Health Service scripted services, dedicated funding pools for palliative care and how each Hospital and Health Services engage community nursing services for in the home care?

Answer to Question Five

To accurately answer this question advice is required to be sought from each Hospital and Health Service. The process for requesting this information has commenced and advice will be provided to the Parliamentary Committee as soon as possible.

Question on Notice

No. 246

Asked on 28 February 2019

MR M CRANDON asked the Minister for Health and Minister for Ambulance Services (HON DR S MILES)—

QUESTION

Will the Minister outline the palliative care budget (and bed numbers) for each Hospital and Health Service (HHS) in 2018-19 (reported separately by year and HHS)?

ANSWER

Hospital and Health Services (HHSs) are responsible for allocating their funding to meet local priorities and the needs of the patients in their care.

Hospital and Health Service	Estimated Beds Utilised (occupied beds/days July to November)	Forecast Expenditure 2018-19 $,000
Cairns and Hinterland	17	7,499
Central Queensland	7	3,006
Central West	1	356
Children's Health Queensland	4	4,858
Darling Downs	11	4,477
Gold Coast	17	9,860
Mackay	3	1,281
Metro North	28	13,158
Metro South	46	39,042
North West	2	1,667
South West	2	544
Sunshine Coast	17	11,015
Torres & Cape	0	390
Townsville	16	6,681
West Moreton	9	4,976
Wide Bay	13	6,012

Care at the end of life

Implementation Plan 2015-2025
Generic Version

June 2015

Queensland Government

Care at the end of life implementation plan 2015-2025

Published by the State of Queensland (Queensland Health), June 2015
IBNN or ISBN if needed

For more information contact:
Health Service Research Analysis and Modelling Unit, Service Needs, Access and Planning Branch, Health Commissioning Queensland, Department of Health, GPO Box 48, Brisbane QLD 4001, email Statewide_Planning@health.qld.gov.au

An electronic version of this document is available at www.insert.website.here.com

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Foreword

Taking the opportunity to improve care at the end of life

I was trained at a time when health care was focused almost entirely on the treatment of disease and few doctors were taught how to care for dying people or how to support their families.

Since the 1980's things have been steadily changing, frequently led by other health professionals such as nurses and social workers. There has been a growing awareness of the needs of dying people and of how to care for them and a steady cultural shift as we start to face up to the limits of our power to prolong a life of quality. However, too many people are still not provided the opportunity to access the benefits of best-practice care at the end of life.

It is important to remember that change does not happen spontaneously. We all have a part to play. As health workers we can change the ways we undertake the care of our individual patients. As employees of Queensland Health, or in the private sector, we can change the ways our health services are organised to deliver better care at the end of life. And as members of our community we can speak openly about the normality and inevitability of death, and promote Advance Care Planning and the delivery of quality care at the end of life.

Like many other communities in Queensland, this is what we have been doing in Townsville. Our journey started many years ago as a public collaboration between health workers of all disciplines, managers, community organisations, the media, politicians and prominent individual community members. We set about creating skilled clinical teams to deliver holistic multidisciplinary care, and educating the community in order that we might all deal better with the inevitability and normality of death.

Each community has its own challenges of geography, demographics, cultural mix, economics and history that must be addressed as it seeks to improve care at the end of life for its people. But, in the midst of this diversity there is a range of qualities that, as humans, we hold in common – compassion, family bonds, empathy and a desire to diminish suffering that drives the aim to provide appropriate care for both patients and their families as they die and grieve.

The Queensland *Statewide strategy for end-of-life care 2015* (the Strategy) provides the impetus for the creation of high quality care at the end of life for all communities across Queensland. While all Hospital and Health Services have agreed to support the Strategy, the roll-out will be best achieved as a collaborative process with Hospital and Health Services working together to share their successes, learn from the difficulties of others and, perhaps most importantly, avoid our mistakes of the past.

The Strategy and this Implementation Plan offer the opportunity to improve the way we care for people in our communities who are dying. It is up to us to make the most of that opportunity.

Dr Will Cairns OAM
Chair of the Palliative Care Sub Network of the Statewide General Medicine Network
Director of Palliative Care, Townsville, April 2015

1. Background

In 2012, the Health and Community Services Committee (the Committee) undertook a parliamentary inquiry into Queensland's chronic, frail and palliative care services at the request of the Legislative Assembly. In their report, *Palliative and community care in Queensland: towards person-centred care* [1],the Committee recognised that the health system's capacity to provide high quality palliative care needed to be improved and made 63 recommendations to achieve this end including the development of a statewide palliative care strategy. The *Statewide strategy for end-of-life care 2015* was subsequently developed by the Department of Health (DoH) in partnership with the Palliative Care Sub Network (PCSN) of the Statewide General Medicine Clinical Network (SGMCN) and endorsed by the Minister for Health in May 2015.

In parallel with the Strategy's development lead clinician groups, including the Queensland Clinical Senate (QCS) and the Australian Medical Association Queensland (AMAQ), simultaneously advocated for broad and systemic improvements to Queensland's public services for care at the end of life. In May 2013 the QCS recommended that the former Minister of Health endorse a range of actions to improve the uptake of Advance Care Planning (ACP) across Queensland and in July the following year they partnered with Health Consumers Queensland to discuss how the health system could better meet consumers' care needs at the end of life. To date the QCS in partnership with the SGMCN have produced *A Charter for the Care of Adult Patients at the End-of-Life* and undertaken a project to evaluate ACP tools and resources. Other changes advocated for by these lead clinician groups, including addressing widespread knowledge deficits and developing integrated models of care for system wide application, will be pursued as part of Strategy implementation.

This Implementation Plan aims to provide a practical tool to guide change over the next ten years in line with the Strategy's objectives.

1.1 Defining care at the end of life

The Strategy provides clear definitions of the terminology associated with care at the end of life. In summary:

- **Care at the end of life** (or end of life care) is defined as, '*healthcare services aimed at meeting the holistic needs of people (including infants and children) whose life expectancy is anticipated to be shortened as a result of known progressive life-limiting conditions, and where the primary intent of care may have shifted from life prolongation to a focus on quality of life'* [2].

- **Palliative care** is defined as the practice of preventing and/or relieving suffering for people at the end of life. It provides an essential element that is integrated into the continuum of end of life care and depending on level of need, may be delivered by specialist and non-specialist palliative care providers and supportive care providers such as volunteers, the patient's family and other carers.

2. Implementation Planning

This Implementation Plan has been developed in consultation with stakeholders to outline action areas and define timeframes to enable measurable improvements in the system-wide provision of care at the end of life. It also provides a framework to support future investment decisions where resources are clearly identified.

2.1 Overarching recommendations

Overarching recommendations for the Department of Health (DoH) include:

- Establish a project team with high level governance to implement DoH service actions, develop and/or collate standardised assessment and care management tools for care at the end of life, disseminate good practice and interface with each of the Hospital and Health Services (HHS).

Priority actions for the project team over the first 12 months are:

1. Collaborate with DoH Office of the Director-General and Integrated Communications Branch to deliver a public awareness strategy
2. Collate, or develop where necessary, a standardised set of health professional educational materials to be hosted on an intranet hub
3. Collate, or develop where necessary, a standardised set of evidence-based patient assessment and care management tools for implementation by HHS
4. Develop and promote a statewide model for ACP including standardised documentation and patient resources
5. Develop a standardised dataset and key performance indicators to evaluate and benchmark care provided at the end of life
6. Collaborate with DoH Health Services Information Agency to ensure documentation regarding care at the end of life can be included within Queensland Health's integrated electronic medical record, and
7. Evaluate current statewide education programs and refocus design as necessary.

Priority actions for each HHS will depend on the components of service planning and end of life care service delivery that are already in place. Nonetheless, proposed priority actions for HHS to be achieved over the next three years are:

1. Collaborate with DoH project group to access standardised documentation and processes.
2. Develop multidisciplinary group or committee for care at the end of life
3. Initiate implementation of short term service actions with consideration for the medium and long term service actions including
    - Develop a health professional education and training strategy
    - Implement standardised assessment and care management tools for care at the end of life, and
    - Enable widespread introduction of ACP in line with the statewide model once developed and endorsed.

2.2 Scope of the implementation plan

The Implementation Plan addresses the service actions outlined in the Strategy.

2.3 Implementation plan structure

This Implementation Plan is presented in two parts: Part A includes action areas requiring Department of Health implementation, Part B details actions for implementation by HHS. Actions are arranged according to the Strategy's four overarching service directions.

To support implementation both Part A and Part B detail:

- methods for achieving the objectives of each service action
- measures of successful implementation and
- estimated resource implications.

Additional information to support HHS implementation can be found within Appendix 1 including:

- *HHS Spotlight* – examples of what other HHS are doing now to implement the service actions
- *Opportunities for Collaboration* – highlights possible opportunities for collaboration with the DoH and across HHS

3. Part A -Department of Health Implementation Plan

3.1 Service Direction 1: Knowledge

What do we want to achieve?

Knowledge *of care at the end of life throughout Queensland (QLD) public health organisations* ***is expanded*** *and includes awareness of the benefits of Advance Care Planning (ACP), the delivery of care at the end of life and the availability of supporting services and resources. Targeted groups include the general public, health professionals and health system managers.*

Short term service actions to be achieved by 2018			
a. Deliver an overarching public awareness strategy			
DoH lead Care at the end of life project team and working party **Stakeholders** DoH Office of the Director-General, Integrated Communications Branch DoH Health Services Information Agency HHS Palliative Care Sub-Network (PCSN) and Statewide General Medicine Clinical Network (SGMCN) QCS Health Consumers Queensland	**Service action elements** • Identify key messages and content. • Determine communication media and produce or source materials, including culturally appropriate information. • Include the promotion of ACP using available resources wherever possible. • Develop an internet resource for the community. • Promote the *Charter for Care of Adult Patients at the End of life.* Develop a charter for the care of children at the end of life.	**Measurable outcomes** 1. Launch of a statewide public awareness campaign for care at the end of life.	**Identified resources required** • Care at the end of life project team and working party =1.0 FTE A08 and 2.0 FTE A07/NO7[1] ($423,103 per annum). • Dedicated funding for poster and brochure development, printing and distribution ($50,000 as per DoH Integrated Communications Branch / workforce within existing resources). • Internal promotion of the Strategy and development of internet and intranet sites can be achieved within existing DoH resources.

[1] Potential project officer/s costed at a Nurse Grade 7 as this provided the highest potential funding compared to an Administration Officer Grade 7 and Health Professional Grade 5. It will be at the discretion of the DoH which professional stream they chose to employ to.

b. Address knowledge deficits regarding the existing Queensland legislative framework for care at the end of life			
DoH lead Care at the end of life project team and working party **Stakeholders** DoH System Support Services, Legal and Governance Branch Queensland Ambulance Service (QAS) HHS PCSN and SGMCN Statewide education program providers	**Service action elements** • Produce a standardised and centralised set of health professional educational materials including an intranet resource. Topics to include: decision making at the end of life; and ACP and the law. • Include the development of specific resources for paramedic staff.	**Measurable outcomes** 1. A suite of resources for health professionals will be available that explains the application of Queensland's legislative framework for care at the end of life to clinical practice.	**Identified resources required** • As per 3.1.a: Care at the end of life project team and working party =1.0 FTE A08 and 2.0 FTE A07/NO7 ($423,103 per annum).
c. Evaluate the effectiveness of statewide education programs for care at the end of life and re-design as required			
DoH lead Care at the end of life project team and working party **Stakeholders** DoH System Support Services, Human Resources Branch HHS PCSN and SGMCN Statewide education program providers	**Service action elements** • Coordinate a review of the effectiveness and efficiency of statewide education programs. • Support service providers in the development and delivery of contemporary education packages. • Understand the variation between HHS in requirements for centrally organised education.	**Measurable outcomes** 1. The effectiveness of statewide educational programs has been evaluated and re-designed as necessary.	**Identified resources required** • As per 3.1.a: Care at the end of life project team and working party =1.0 FTE A08 and 2.0 FTE A07/NO7 ($423,103 per annum).

3.2 Service Direction 2: Access

What do we want to achieve?

*Patients who have or are anticipated to have a shortened life expectancy are **routinely identified as early as possible** and have access to timely Advanced Care Planning and appropriate care at the end of their life.*

Short term service actions to be achieved by 2018			
a. Establish evidence-based patient assessment and care management tools that support health professionals to identify patients nearing the end of life			
DoH lead Care at the end of life project team and working party **Stakeholders** DoH Health Service and Clinical Innovation Division DoH Health Service Information Agency HHS PCSN and SGMCN	**Service action elements** • Scope existing validated tools to assess individual patients and review their suitability for adaptation and implementation. • Investigate the technologies needed to build triggers for assessment into electronic systems. • Develop and/or collate a standardised toolkit of resources for use by HHS and embed into existing assessment and/or discharge documentation.	**Measurable outcomes** 1. A suite of evidence-based tools is available for HHS to implement.	**Identified resources required** • As per 3.1.a: Care at the end of life project team and working party =1.0 FTE A08 and 2.0 FTE A07/NO7 ($423,103 per annum).
b. Progress the uptake of advanced care planning activities across all service settings for all ages			
DoH lead Care at the end of life project team and working party **Stakeholders** DoH Office of the Director-General, Integrated Communications Branch	**Service action elements** • Develop a systems approach to promoting ACP activities such as developing and/or collating an ACP toolkit for use by HHS. • Promote ACP through the public	**Measurable outcomes** 1. Launch of a statewide care at the end of life public awareness campaign. 2. An education and training framework	**Identified resources required** • As per 3.1.a: Care at the end of life project team and working party =1.0 FTE A08 and 2.0 FTE A07/NO7 ($423,103 per annum).

HHS QCS Queensland Ambulance Service (QAS)	awareness campaign. • Develop an education and training framework on end of life communication (including electronic modules and workshop resource) to support health professionals to facilitate ACP. • Establish systems and processes to ensure QAS staffs are aware of ACP documentation.	for end of life communication is available for health professionals. 3. Evidence of interface with QAS regarding use of ACP	

3.3 Service Direction 3: Quality and safety

What do we want to achieve?

Care at the end of life delivered in Queensland public services consistently responds to the needs of patients throughout their illnesses and meets ***established clinical safety and quality standards.***

Short term service actions to be achieved by 2018			
a. Develop system level clinical policies and resources to support safe and high-quality service delivery			
DoH lead Care at the end of life project team and working party **Stakeholders** DoH Health Service and Clinical Innovation Division HHS PCSN and SGMCN	**Service action elements** • Identify a standardised data set and key performance indicators for measuring quality care at the end of life. • Develop policies and standards for implementing the *Essential Elements for Safe and High Quality End of Life Care in Acute Hospitals*[2] outlined by the Australian Commission on Safety and Quality in Health Care. • Standardise mortality and morbidity review and audit processes to ensure consideration of the quality of death.	**Measurable outcomes** 1. A standardised data set and key performance indicators for measuring quality care at the end of life have been endorsed by the DoH. 2. Clinical policies and standards for care at the end of life have been endorsed by the DoH.	**Identified resources required** • As per 3.1.a: Care at the end of life project team and working party =1.0 FTE A08 and 2.0 FTE A07/NO7 ($423,103 per annum).

[2]Commonwealth of Australia (2014) Australian Commission on Safety and Quality in Health Care. National Consensus Statement: Essential Elements for Safe and High Quality End of Life Care in Acute Hospitals.

3.4 Service Direction 4: Provision

What do we want to achieve?

*The strategic capability and configuration of services for care at the end of life in QLD is **strengthened to maximise their delivery and performance,** to ensure the QLD population has **access to appropriate services into the future** and to ensure available resources are used effectively.*

<table>
<tr><th colspan="4">Short term service actions to be achieved by 2018</th></tr>
<tr><th colspan="4">a. Establish governance arrangements to oversee and support system wide clinical improvements</th></tr>
<tr><td>DoH lead
DoH
Stakeholders
PCSN/SGMCN
QCS
HHS</td><td>Service action elements
• Establish a working group to lead and monitor the implementation of service actions and to undertake system wide project work.
• Evaluate progress of the Implementation Plan.</td><td>Measurable outcomes
1. Working group and project team established and operational.
2. Tool for monitoring progress is developed.
3. Evidence of an established communication process with each HHS</td><td>Identified resources required
• As per 3.1.a: Care at the end of life project team and working party =1.0 FTE A08 and 2.0 FTE A07/NO7 ($423,103 per annum).</td></tr>
<tr><th colspan="4">b. Implement incentives which reward good practice</th></tr>
<tr><td>DoH lead
DoH Health Commissioning Queensland Division
Stakeholders
Care at the end of life working party</td><td>Service action elements
• Investigate current and potential incentives.
• Identify key incentives and build into service agreements.</td><td>Measurable outcomes
1. Incentives to reward good practice are in place.
Achieved –Quality Incentive Payment (QIP) for ACP currently in place</td><td>Identified resources required
• N/A as already achieved.</td></tr>
<tr><th colspan="4">c. Ensure information regarding care at the end of life (including ACP) can be included within Queensland Health’s integrated electronic medical</th></tr>
</table>

record system			
DoH lead DoH Health Services Information Agency **Stakeholders** Care at the end of life working party	**Service action elements** • Investigate software compatibilities and clarify information technology requirements. • Identify care at the end of life information to be integrated electronically. • Once achieved, promote this capability to HHS.	**Measurable outcomes** 1. HHS can upload care at the end of life care information into electronic systems.	**Identified resources required** • Within existing DoH resources.
d. Leverage capabilities in the My Health Record so that clinicians can obtain access			
DoH lead DoH Health Services Information Agency **Stakeholders** Care at the end of life working party	**Service action elements** • Trial and evaluate preferred options for clinician access to My Health Record	**Measurable outcomes** 1. Achieved –My Health Record is now available to QLD Health clinicians via the Viewer	**Identified resources required** • N/A as already achieved.
Medium term actions to be achieved by 2020			
e. Review and evaluate the effectiveness of statewide services including those contracted to external providers			
DoH lead DoH Health Commissioning Queensland Division **Stakeholders** HHS PCSN/SGMCN	**Service action elements** • evaluate statewide services against CSCF and established KPI	**Measurable outcomes** 1. Statewide services have been reviewed.	**Identified resources required** • Within existing DoH resources.
f. Explore and implement viable funding mechanisms including for home based care at the end of life			

DoH lead	Service action elements	Measurable outcomes	Identified resources required
DoH Health Commissioning Queensland Division **Stakeholders** HHS PCSN/SGMCN	• Identify the need for community services for care at the end of life. • Work with the DoH Provider Engagement and Contract Delivery Branch to develop an appropriate funding model to meet need.	1. Development of funding model to meet community need.	• Within existing DoH resources.

4. Part B – *Relevant* HHS Implementation Plan

4.1 Service Direction 1: Knowledge

What do we want to achieve?

Knowledge *of care at the end of life throughout Queensland (QLD) public health organisations* ***is expanded*** *and includes awareness of the benefits of Advance Care Planning (ACP), the delivery of care at the end of life and the availability of supporting services and resources.*

Short term service actions to be achieved by 2018		
a. All health professionals have access to routine/regular educational opportunities and training resources about care at the end of life		
Service action elements • Undertake a needs analysis of education and training on care at the end of life. • Identify levels of education required for non-specialist palliative care and specialist palliative care staff. • Utilise centrally available resources where they exist. • Integrate education and training into staff orientation programs including standardised information on the QLD legislative framework for care at the end of life. • Provide education on culturally appropriate care at the end of life. • Support clinical experts to deliver ongoing educational programs. • Utilise telehealth models to deliver education to health professionals in remote HHS sites. • Clearly promote staff education (internal or external) to HHS staff e.g. via HHS intranet site.	**Measurable outcomes** 1. An education and training strategy for care at the end of life is endorsed and implemented at HHS level. 2. The training strategy is rolled out across all HHS services, the proportion of staff receiving training increases over time and is documented.	**Identified resources required** • To be individualised for each HHS

4.2 Service Direction 2: Access

What do we want to achieve?

*Patients who have or are anticipated to have a shortened life expectancy are **routinely identified as early as possible** and have access to timely Advanced Care Planning and appropriate care at the end of their life.*

Short term actions to be achieved by 2018		
a. Implement processes and interventions to identify and support patients care needs at the end of life		
Service action elements • Implement standardised assessment tools, policies and procedures for quality care at the end of life into routine clinical practice at key trigger points. • Implement innovative systems that enable health professionals to escalate patient access to palliative care (or equivalent) as required. • Ensure clinicians providing palliative care routinely attend other specialty multidisciplinary team meetings. • Ensure that communication, consultation and documentation about patient's end of life choices are available to all health professionals to prevent non-beneficial treatment being provided both routinely and during a medical emergency. • Implement clear care pathways for patients identified as having care needs at the end of life.	**Measurable outcomes** 1. The HHS can demonstrate that standardised assessment tools, policies and care pathways are in use and are appropriate for patients' end of life care needs. 2. Documentation that palliative care clinicians are routinely attending medical emergencies and multidisciplinary team meetings.	**Identified resources required** • As per 4.1.a.
b. Ensure documentation for care at the end of life is accessible to inter-professional teams		
Service action elements • Implement mechanisms to 'flag' the existence of documentation for care at the end of life e.g.	**Measurable outcomes** 1. Electronic alert systems activated.	**Identified resources required** • As per 4.1.a.

electronic alerts via Integrated Electronic Medical Record (iEMR) and/or Hospital Based Corporate Information System (HBCIS). • Provide all patients with information about My Health Record on admission to public health services and encourage its uptake (as per 4.4.e). • Note –ICT capability to upload documentation relating to care at the end of life into electronic systems is to be developed by the DoH Health Services Information Agency.	2. Documentation for care at the end of life is embedded into electronic systems. 3. If electronic alert systems are not available then a process for manually tracking and accessing documentation across service providers should be in place (as per 4.3.b and 4.4.e).	
Long term actions to be achieved by 2025		
c. Establish service pathways between organisations for the transition of children and adolescents into adult services (and/or between metropolitan and regional/remote settings)		
Service action elements • Identify a clinician from the multidisciplinary group or committee within each HHS to liaise with Children's Health Queensland HHS to identify transition pathways for children and adolescents.	**Measurable outcomes** 1. The HHS will have an established service pathway for transitioning children and adolescents to adult care and/or regional/remote settings.	**Identified resources required** • Within HHS resources.

4.3 Service Direction 3: Quality and safety

What do we want to achieve?

*Care at the end of life delivered in Queensland public services **consistently responds to the needs of patients** throughout their illnesses and meets established clinical safety and quality standards.*

Short term service actions to be achieved by 2018		
a. Implement systems to improve clinical care at the end of life		
Service action elements • Establish a multidisciplinary group or committee with links to statewide clinical networks to implement the Strategy. • Undertake regular audits of the quality of care provided to patients whose deaths were anticipated. • Integrate standardised measures for quality care at the end of life into audits and morbidity and mortality reviews.	**Measurable outcomes** 1. The HHS has a HHS wide multidisciplinary group or committee for care at the end of life with cross speciality membership. 2. The HHS multidisciplinary group or committee has established links and communications processes with the proposed DoH project team. 3. A regular audit meeting has been established to examine the quality of care provided at the end of life (not limited to terminal phase care or care provide by specialist palliative care teams).	**Identified resources required** • As per 4.1.a.
b. Implement service models that maximise opportunities for patient choice		
Service action elements • Ensure ACP services are available for, and promoted to, all patients. • Establish patient choices as early as possible via ACP or goals of care assessment. • Evaluate whether patients' choices are fulfilled. • Implement systems that trigger a review of the patients' goals of care, a multidisciplinary case conference and/or family meeting if they are	**Measurable outcomes** 1. To improve the proportion of patients offered ACP over time and where appropriate through both face to face and remote access. 2. Demonstrate that systems and pathways are in place to ensure patients' choices are met. 3. Demonstrate evidence of literature and information availability for CALD and Aboriginal and Torres Strait Islander populations.	**Identified resources required** • As per 4.1.a.

identified at increased risk of dying. • Utilise telehealth models of care to enable community based care. • Design and implement 'rapid discharge pathways' for patients who are imminently dying and wish to die at home. • Ensure appropriate information and support is available for Aboriginal and Torres Strait Islander people and those from Culturally and Linguistically Diverse (CALD) backgrounds. • Integrate with community and primary care services, including Aboriginal and Torres Strait Islander health care providers, to support service provision within the home.		
Medium term service actions to be achieved by 2020		
c. Implement strategies to enable rapid access to palliative care beds (or their equivalent) when appropriate		
Service action elements • Review existing care pathways for palliative care patients requiring emergent care. • Develop a direct admission policy and/or procedure. • Establish case management models of care for palliative care patients. • Establish systems and resources to enable case conference meetings with all care providers when appropriate.	**Measurable outcomes** 1. The HHS has implemented strategies to enable rapid access to palliative care beds (or their equivalent).	**Identified resources required** • Within HHS resources.
d. Establish mechanisms to provide specialist psychosocial support for patients and their families/carers		
Service action elements • Review the availability of psychosocial, respite and bereavement services and ensure support	**Measurable outcomes** 1. The HHS has a bereavement service in place including demonstrated availability of psychosocial	**Identified resources required** • To meet increasing service demand will require additional resources to be negotiated between

available at each facility is in line with that articulated for the relevant CSCF level. • Implement routine psychosocial risk assessments for patients with care needs at the end of life care and their families/carers • Facilitate access to written grief and bereavement resources utilising centrally available resources where they exist.	resources for patients and/or carers.	DoH and HHS.
e. Assess the quality of care provision and patient satisfaction with care provided at the end of life		
Service action elements • Identify key quality measures and implement regular audit to measure the quality of care provided. • Implement appropriate methods for assessing patient and/or family satisfaction with services provided.	**Measurable outcomes** 1. An annual report will be provided on patient and/or family satisfaction and audit data relating to the quality of care provided at the end of life.	**Identified resources required** • Within HHS resources.

4.4 Service Direction 4: Provision

What do we want to achieve?

*The strategic capability and configuration of services for care at the end of life in QLD is **strengthened to maximise their delivery and performance,** to ensure the QLD population has **access to appropriate services into the future** and to ensure available resources are used effectively.*

Short term service actions to be achieved by 2018		
a. Undertake a local needs analysis for care at the end of life at the catchment level to develop plans to meet future need		
Service action elements • Undertake a local needs analysis for care at the end of life. • Local health service planning to include non-government and community based services where appropriate.	**Measurable outcomes** 1. The HHS has undertaken a local needs analysis.	**Identified resources required** • As per 4.1.a.
b. Develop and upscale palliative care inpatient and consulting service capability and capacity to provide daily coverage and accessibility throughout the HHS (to highest appropriate CSCF level for community)		
Service action elements • Ensure palliative care services are provided at an appropriate CSCF level to meet service demand and optimise accessibility for catchment population.	**Measurable outcomes** 1. Where required an increase in CSCF (v3.2) level of service for palliative care is in place or planned for.	**Identified resources required** • Increasing capability will require additional resources to be negotiated between DoH and HHS.
Medium term service actions to be achieved by 2020		
c. Strengthen and/or formalise relationships between HHS, general practitioners, community based palliative care services and organisations to promote an integrated and coordinated approach to care at the end of life, especially for patients in isolated or remote areas		
Service action elements • Undertake collaborative mapping of patient	**Measurable outcomes** 1. The HHS has established a process for regular	**Identified resources required**

journeys/care providers within and between HHS and non-government providers to improve systems and communication. • Establish the systems and resources needed to enable case conferences between hospital health professionals; GPs and community based palliative care providers as required. • Hold combined education events and/or workshops with all care providers. • Establish pathways and contacts for rural and remote care providers to access specialist palliative care (or their equivalent) support. • Develop mechanisms to ensure patients nearing the end of life are flagged when moving within and between HHS.	documented multidisciplinary case meetings across settings. 2. The HHS has established a process for regular documented health professional meetings/workshops to ensure collaborative relationships and improve care provided at the end of life across settings.	• Within HHS resources.
d. Coordinate effective interagency responses for children and young people to facilitate access to short breaks/family respite and medical equipment		
Service action elements • Develop service delivery models that support community care of children and young people and their families/carers. • Liaise with Children's Health Queensland HHS.	**Measurable outcomes** 1. Families and carers have access to short breaks/family respite and medical equipment as necessary.	**Identified resources required** • To meet increasing service demand will require additional resources to be negotiated between DoH and HHS.
Long term service actions to be achieved by 2025		
e. Promote patient uptake of the federal electronic health record system (My Health Record) to support care at the end of life		
Service action elements • Information about My Health Record provided to all patients on admission/discharge. • Implement national strategies to increase uptake.	**Measurable outcomes** 1. HHS provides all patients with information about the My Health Record on admission to public health services. 2. Evidence education has been provided to clinicians to increase use of My Health Record.	**Identified resources required** • Within HHS resources.

5. Project Management

5.1 Methodology

The Service Needs, Access and Planning Branch, Health Commissioning Queensland led the development of the Implementation Plan. The project team applied Queensland Government endorsed project management methodologies and utilised the following policy and planning frameworks and guiding documents:

- *Guide to Health Service Planning Version 2 (2012)*[3] and associated supplements
- *Clinical Services Capability Framework for Public and Licensed Private Health Facilities version 3.2*[4]
- *Australian Government Guide to Implementation Planning*[5]

The DoH Divisions, Commercialised Business Units and HHS Chief Executives were asked to nominate a contact to be involved in implementation planning, after which, two phases of consultation were undertaken.

In the initial consultation phase each contact was provided with a template detailing service actions from the Strategy that were relevant to their area. HHS contacts were asked to provide information on existing and planned or potential components of service delivery that aligned with the Strategy in their HHS, as well as their estimated resource implications. DoH Divisions were asked to comment on how departmental level service actions might be implemented; which branch and/or unit would be responsible; the potential resource implications and who additional stakeholders were. Initial consultation occurred with the PCSN, the SGMCN and the QCS around the full breadth of the service actions.

Draft implementation plan development was also informed by previous work including (but not limited to):

- *Statewide strategy for end of life care 2015*[2]
- *Parliamentary Committees Palliative and community care in Queensland: toward person-centred care*[1]
- *Government Response to Recommendations Health and Community Services Committee Palliative and community care in Queensland: towards person centred care (Report 22)*[6]
- HHS strategies and/or plans where they existed.

In the second phase of consultation, the draft Implementation Plan was provided to nominated contacts and other key stakeholders for feedback and proposed amendments with follow up via individual HHS teleconferences.

5.2 Governance structure

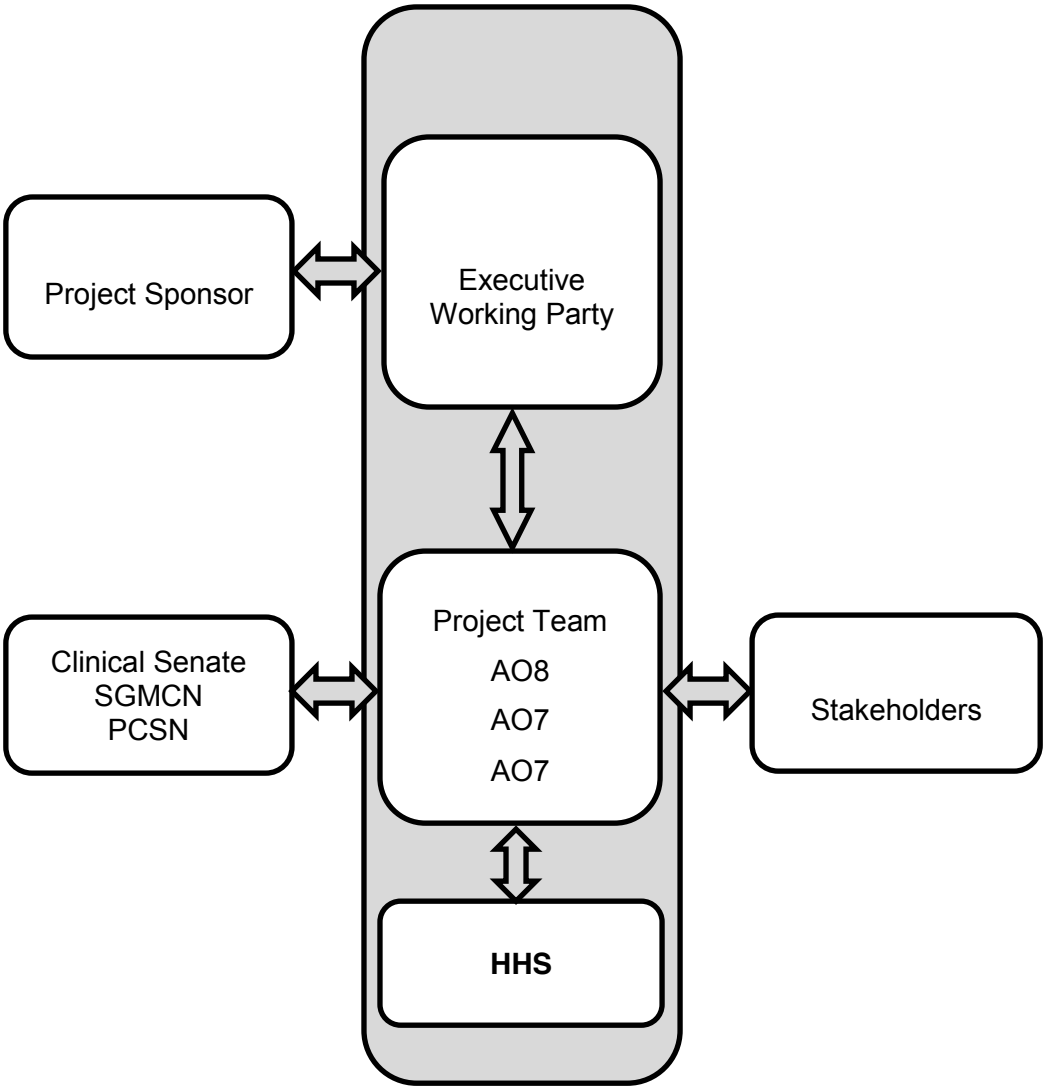
Responsibility for implementing service actions at a local level will remain with each HHS; however, the DoH will monitor and evaluate HHS progress towards achieving identified objectives.

Responsibility for implementing DoH service actions will be allocated to a temporary project team that will:

- be governed by, and report to, a dedicated executive working party with high level executive support and sponsorship
- collaborate closely with the SGMCN, the PCSN and key stakeholders including HHS and non-government providers of care at the end of life that receive government funding, and
- form for an initial period of 12 months to enable early commencement of implementation.

Implementation governance arrangements are detailed in Figure 1.

Figure 1: Implementation Governance Structure



5.3 Monitoring and evaluation

Reporting and review

Reporting on the progress of implementation is required on an annual basis. In addition, review points are planned for the third year (2018), fifth year (2020) and tenth year (2025). These review points have been extended a year past those originally stated in the Strategy due to implementation planning not beginning until 2015.

Based on the outcomes of the review, a revision of the Strategy may be considered to ensure the service directions remain relevant and implementation efforts are achieving the Strategy's objectives.

5.4 Resource management

A variety of resource implications are identified within this implementation plan. The identification of ideal proposed resources does not indicate that the resources have been secured, but does provide a framework to guide future investment as additional resources become available.

Identified resource requirements

- DoH
  - Resources to support a project team for one year, including 1.0 FTE AO8 and 2 FTE AO7/NO7[3] at an estimated cost of $423,103 per annum (includes on costs) for up to three years. The project teams' location within the DoH is yet to be determined, however, once established it will report to an executive working party and will liaise directly with the QCS, SGMCN and PCSN.
  - Costs for public awareness strategy information development, production and dissemination have been estimated as $50,000 by Integrated Communications Branch. Costs associated with electronic uploads, hosting and electronic marketing are expected to be met within current workforce and equipment resources.
- HHS
  - Each HHS has identified the need for project officer/s (total cost of $4,602,199 per annum) to initiate the implementation of short term service actions and commence work towards the medium and long term service actions identified in the Implementation Plan. Each HHS has identified the need for project officer support for a minimum of one year. The project officer/s will work collaboratively with the HHS multidisciplinary group for care at the end of life and the DoH project team to establish aspects of the implementation plan identified as HHS local requirements.

[3] Potential project officer/s costed at a Nurse Grade 7 as this provided the highest potential funding compared to an Administration Officer Grade 7 and Health Professional Grade 5. It will be at the discretion of the DoH which professional stream they chose to employ to.

- It has been identified that some HHS have palliative care services where an increase in capability is required, new services are planned and additional workforce capacity to meet service demand is necessary. For each of these requirements additional funding will need to be negotiated between DoH and HHS.

- Non-financial resources
  - Non-clinical members of the executive working party and program sponsor.
  - Monitoring and evaluation will occur as part of the usual responsibilities of staff within DoH in line with current standard practice and without additional financial resources.

Appendix 1 - Additional information to support HHS implementation

Service Direction 1 –Knowledge	
Did you know?	The QLD DoH funded CPCRE has a range of educational resources for health professionals on care at the end-of- life, provides information on education opportunities and facilitates access to the Program of Experience in the Palliative Approach (PEPA).
HHS spotlight	Children's Health Queensland HHS has secured Commonwealth funding to undertake a project titled: "Paediatric Palliative National Education and Quality Improvement Collaborative". The project will use a "pop-up" (face-face or telehealth) model of education, networking and web based resources to build the capacity of local communities to care for children and families with palliative care needs.
	Darling Downs HHS is planning to develop health professional training modules for care at the end of life.
Service Direction 2 –Access	
HHS spotlight	Metro South HHS have engaged General Practitioners (GP) and Residential Aged Care Facilities (RACF) to ensure patients' wishes for care at the end of life are documented using standardised ACP forms and that the information is shared between care providers via a centralised ACP Office.
	West Moreton HHS: • has integrated a system that triggers a review of the patients' care plan if their hospital stay is greater than five days • had audits of terminal phase care added to their HHS Quality Audit Schedule • has a Hospital at Night Program and After Hours Grade 7 Nurses that undertake evening rounds to identify patients of concern and ensure they receive appropriate care • has enabled Clinical Emergency Response Teams to refer patients of concern directly to the palliative care service.

	The Royal Brisbane and Women's Hospital Palliative and Supportive Care Service has secured non-recurrent funding through the Metro North HHS Support, Explore, Excel & Deliver (SEED) program to undertake a point prevalence survey of hospital inpatients. The survey seeks to identify the group of patients that is likely to be in the last year of life, the characteristics of these patients and to assess evidence of goals of care and Advance Care Planning.
Opportunity for Collaboration	Establish a temporary cross HHS working party to explore service models that support children and young people with care needs at the end of life to integrate into adult services.
Service Direction 3 –Quality and Safety	
HHS spotlight	Several HHS have developed ACP packs that have led to increased identification of patients who could benefit from an ACP discussion. Since the introduction of these packs in Toowoomba Hospital, referrals to the Palliative Care Outpatient Department for ACP have increased by nearly 100%.
	Several HHS are training dedicated facilitators to provide ACP services.
	Sunshine Coast HHS: • is undertaking a pilot study to assist in reporting against NSQHS Standard 2 'Partnering with Consumers'. The pilot involves patient's providing feedback at the point of care via an iPad device. The outcomes of the study will inform future service planning and consumer engagement including for care at the end of life. • has implemented a community palliative care program that supports and strengthens the relationships between patients and General Practitioners. The program supports patients to continue to receive care at their place of residence supported by SCHHS specialist palliative care consultation via telehealth. The consultation is coordinated by the palliative care community nurses and delivered by a mobile computer device.
Opportunities for Collaboration	Engage in a cross HHS care at the end of life roundtable/workshop led by the PCSN (to be confirmed).

	Form a cross HHS working party to develop a 'Grief and Bereavement Pack' for families/carers that can be used by all HHS and adapted to local needs.
Case study	**Establishing a Committee for Care at the End of Life in the Darling Downs HHS** We developed the End of Life Committee within the Darling Downs after recognising opportunities to improve the care of patients at the end of life. We also identified significant gaps in ACP whilst undergoing accreditation against the National Standards of Safety and Quality in Health Care. This led to the formation of the End of Life Committee and an associated working party. Whilst the committee initially formed in Toowoomba, as interest grew its membership broadened to include staff from across the HHS including non-government organisations. The committee is made up of general medicine, palliative care and emergency medicine doctors, general physicians, nurses, social workers, pastoral carers and staff from the Medicare Local and local residential aged care facilities. In partnership with the Medicare Local we have held two meetings with primary care members looking at various areas of care at the end of life. This included an evening workshop on ACP, having difficult conversations, palliative medicine in the community and "pathways" for care at the end of life. Over 50 people attended from all disciplines of care and we have since developed better care pathways between acute and aged facilities for patients with care needs at the end of life. We continue to meet with our working group and are currently in the final stages of implementing the ACP forms developed by Metro South HHS. The development of this committee has been quite easy. There are many groups who are trying to have this conversation, and so as soon as this started, we were inundated by "volunteers" to the group. We have kept the governance flexible and have no formal terms of reference so far, but we are looking at developing into a more formalised group over the next six months. There is great support from Executive and Board, and we continue to collaborate with the Medicare Local, (and soon to be Primary Health Network). *Dr Martin Byrne, Director Clinical Governance Darling Downs HHS*

Service Direction 4 -Provision	
Did you know?	Endorsed Health Service Planning Guidelines for *Adult Palliative Care Beds* are available as well as the *Guide to health service planning version 3 (2015)*
	Palliative Care Australia has produced a service provision guide *Palliative care service provision in Australia: A planning guide* as well as *The Guide to Palliative Care Service Development: A population-based approach.*
	Palliative Care Australia has developed the National Palliative Care Standards (*Standards for Providing Quality Palliative Care for all Australians, 2005*), which can be used by HHS to guide their local health service planning for care at the end of life.
HHS spotlight	The Toowoomba Hospital palliative care service holds weekly meetings with representatives from the Toowoomba Hospice, Blue Care, Ozcare and Private Hospitals to facilitate the care of palliative patients who are at home.
	Wide Bay HHS has developed care at the end of life resource folders for rural and remote facilities.
	Sunshine Coast HHS has gained non recurrent funding from the Centre of Health Care Improvement to appoint a temporary project officer to develop a long term strategy for ACP within the HHS.
	The Royal Brisbane and Women's Hospital Palliative and Supportive Care Service has secured non-recurrent funding through the Metro North HHS SEED program to trial the introduction of a seven day specialist palliative care service utilising a clinical nurse led model of care to provide weekend support.

Abbreviations

ACP	Advance Care Planning
AMAQ	Australian Medical Association of Queensland
CALD	Culturally and Linguistically Diverse
CPCRE	Centre for Palliative Care Research and Education
CSCF	Clinical Service Capability Framework
DoH	Department of Health
FTE	Fulltime equivalent
GP	General Practitioner
HHS	Hospital and Health Services
NSQHS	The National Safety and Quality Health Service
NGO	Non-Government Organisation
PCSN	Palliative Care Sub Network
SGMCN	Statewide General Medicine Clinical Network
QIP	Quality Incentive Payment
QCS	Queensland Clinical Senate
QLD	Queensland

References

1. Parlimentary Committee, Palliative and community care in Queensland: toward person-centred care Report No. 22. 2013, Health and Community Services Committee: Brisbane.
2. Queensland Health, Statewide strategy for end of life care 2015, State of Queensland (Department of Health): Brisbane.
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5. Department of the Prime Minister and Cabinet, Guide to Implementation Planning, Cabinet Implementation Unit. 2014, Commonwealth of Australia: Canberra.
6. Government Response to Recommendations Health and Community Services Committee Palliative and community care in Queensland: towards person centred care (Report 22)

Health Innovation Fund

Evaluation of Round 1 Project

Final Outcome Evaluation Report – March 2017

Comprehensive Aged Residents Emergency and Partners in Assessment Care and Treatment (CARE-PACT)

Queensland Government

Health Innovation Fund – Final Outcome Evaluation Report 2017

Published by the State of Queensland (Queensland Health), March 2017

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Contents

Executive Summary

Context

In response to increasing demand and patient expectations, continuous improvements and innovative service delivery models must be embraced and evaluated within all health services. The Queensland Department of Health (DoH) has established the Health Innovation Fund (HIF) to support improvement in service delivery and patient care by providing grants for innovative solutions with the potential for state-wide application.

Round 1 of this funding saw the implementation of seven unique projects over a 3-year period; each project addresses one of four priority areas:

- Chronic Disease Management
- Access to Health Services for Rural and Remote Queenslanders
- Expansion of Acute Hospital Substitution Models
- Reducing Waiting Time for EDs, Outpatient and/or Elective Surgery

The overall goal of the Comprehensive Aged Residents Emergency and Partners in Assessment, Care and Treatment (CARE-PACT) project is to improve quality of care and reduce Emergency Department (ED) presentations and hospital admissions for Residential Aged Care Facilities (RACF) residents.

CARE-PACT aims to provide benefits to frail elderly patients beyond direct intervention through RACF knowledge-specific up-skilling focused in the following areas:

- Hospital-based resource and early discharge clinicians – including improving efficient clinical care planning and optimisation of nursing resources in acute hospital environments
- Mobile emergency assessment, care and treatment teams – including ED-equivalent RACF assessment services, acute hospital substitution service, and education and collaboration for RACF staff and General Practitioners (GPs).

Evaluation Overview

Deloitte was engaged to conduct an evaluation of the HIF round 1 innovation projects. The evaluation consists of three types of evaluation – process, impact and outcome. Deloitte worked with the project team to establish an evaluation framework which included a program logic, evaluation questions, key indicators and implementation plan in alignment with the timeframe of the project.

The evaluation is grounded in the Program Logic which establishes processes, outputs, and short, medium and long term outcomes. The Report on Government Services (ROGS) Framework outlines five key domains; these include Effectiveness, Efficiency, Equity, Appropriateness and Acceptability and Sustainability. The domains have been applied to consider components of the project and shape evaluation questions. Indicators have been developed to address each evaluation question and where required data tools developed support reporting on indicators outlined in Table 2.

To date, a Process Evaluation Report, Impact Evaluation Report and two Outcome Evaluation Reports have been conducted. This Report represents the third Outcome Evaluation Report for the KK Project and builds on the results discussed in the two previous Outcome Evaluation Reports (2015 and February 2016).

Key findings

The CARE-PACT project has proven to be successful in meeting its objectives of improving the quality of care for people living in residential aged care facilities (RACFs), through a multimodal approach of telephone triage, mobile ED assessment, ED or hospital resource team, and a

focus on building capacity of RACF staff and GPs; key findings are summarised in Table 1. There has been consistent engagement of key stakeholders and high levels of satisfaction reported by stakeholders throughout the duration of the pilot phase. Overwhelmingly, it was evident that strong clinical leadership and a dedicated delivery team was a critical success factor for the results this project has been able to achieve.

In terms of the impact that the service had on acute services, it is estimated that 1,522 ED presentations of RACF residents were avoided over the project duration, in addition to 2,329 hospital admissions. These avoided ED presentations and hospital admissions have resulted from support and education to provide the most appropriate care for RACF residents, in the most appropriate setting, i.e. in-situ at the RACF if appropriate. The focus on capacity building for RACF staff and GPs has included the development of clinical care guidelines with management algorithms for common clinical issues, including key decision points regarding escalation or referral to acute services (and the CARE-PACT service), appropriate use of investigations, and medication recommendations suitable for this older cohort of patients who are often complex to manage. In addition, another focus of the service has been education of RACF staff about advance care planning (ACP), aiming to increase the number of ACPs in place to allow patient-centred decisions to be made in acute situations regarding where, and how much, care will be provided. In the event that patients are appropriately referred to hospital and admitted, there was also an observed reduction in the LOS, likely to be a combination of the impact of facilitation of improved discharge planning with knowledge of the patient and the capabilities of their RACF and increased use of interim medication records for discharge. In addition, the observed high rates of gerontric screening being undertaken on presentation to hospital (including cognition, delirium, skin integrity, and falls risk) also has the potential to reduce LOS.

From a telephone triage and outreach perspective, the inclusion of an ED physician in the team, compared with the nurse-led models that have been used in other jurisdictions, has allowed for not only the “low hanging fruit” of common potentially preventable hospitalisations to be avoided, but potentially more complex presentations as well.

In terms of efficiency of the model, avoided activity in the acute setting means that the benefits of the CARE-PACT model are realised in released capacity; benefits were valued using National Efficient Prices. The reduction in ED presentations over the period was valued at $1.16 million, and associated saving in Queensland Ambulance Service (QAS) transfer costs to (emergency) and from (non-emergency) the hospital amounted to $2.34 million. In addition, reduction in hospital admissions was valued at $9.77 million, and reduction in inpatient LOS was valued at $3.83 million; these calculations were based on National Weighted Activity Units (NWAU) for the avoided admissions in this cohort. The total value of savings over the project duration amounted to $17.1 million resulting in a ROI of 6.1.

This ROI is calculated from the Queensland Health perspective, accounting for their investment compared with the theoretical avoided costs of purchased activity. However, considering the ongoing sustainability of this model from a HHS perspective, it was acknowledged that available funding under activity-based funding (ABF) may not be sufficient to sustain the model, as ABF is not optimised to incentivise hospital avoidance and demand management activity. In view of this, further analysis regarding the actual cost of providing care to this complex patient cohort compared with the NWAU for the activity would be useful in determining the investment benefits of the model at a local level.

Table 1: CARE-PACT Key Outcome Findings

Domain	Major Findings
Effectiveness	• The vast majority of stakeholders surveyed, including representatives from RACFs, general practice, and HHSs, agreed that the CARE-PACT project had achieved its objectives to a great or significant extent. • Over the course of the pilot project phase, an estimated 1,522 ED presentation were avoided, and an estimated 2,329 hospital admissions were avoided. • Over the course of the pilot project phase, the median LOS of admitted patients from RACFs was reduced by 1 day. • Compliance with gerontric screening of RACF residents presenting to hospital (including cognition, delirium, skin integrity and falls risk) exceed benchmarks for all components.
Efficiency	• The reduction in ED presentations over the period was valued at $1.16 million • The reduction in hospital admissions was valued at $9.77 million • The reduction in inpatient LOS was valued at $3.83 million. • Overall, the total value of savings over the project duration amounted to $17.1 million, realised in released capacity. This resulted in a ROI of 6.1.
Equity	• Over the course of the pilot period, the majority of project team members and stakeholders did not perceive there to be major access barriers to the service for disadvantaged groups (i.e. rural and remote, people with a disability, Aboriginal and Torres Strait Islander, culturally and linguistically diverse). As CARE-PACT provides telephone and outreach support to these facilities, access is generally aligned with access to the RACF itself. • There was, however, some uncertainty from stakeholders regarding whether there were access barriers for rural and remote populations, which is likely to reflect awareness of the geographical scope of the service.
Appropriateness & Acceptability	• The majority of stakeholders were highly supportive (55.0%) with a further 35.0% of respondents rating support between 7 and 9 on the 10-point scale. • There were 2 respondents indicating low levels of support; these respondents were from RACFs, and perceived the service had a tendency to assume a low level of capability and knowledge of RACF staff, when this is not always the case. • In general, stakeholders were either extremely satisfied or very satisfied with the project overall, education and training provided, and support materials provided.
Sustainability	• Project team and stakeholders largely agreed that the model in principle was sustainable, and aligned with the need to manage increasing demand • It was acknowledged that there were barriers to sustainability under current funding models that incentivise activity rather than demand management and hospital avoidance. • Overall, project team members reported that CARE-PACT had built the skills and knowledge of key personnel to support sustainability and continue to improve clinical care of RACF residents. • Stakeholders were largely in agreement, with 95.0% agreeing they have a good understanding of the model, and 75.0% agreeing that the project had built their skills and knowledge regarding care of RACF residents

1. Overview

Introduction

Aim of the project

The overall goal of the CARE-PACT project is to improve quality of care and reduce ED presentations and hospital admissions for RACF residents within a framework of patient safety and choice.

CARE-PACT aims to provide benefits to frail elderly patients beyond direct intervention through RACF knowledge-specific up-skilling focused in the following areas:

- Hospital-based resource and early discharge clinicians – including improving efficient clinical care planning and optimisation of nursing resources in acute hospital environments; and
- Mobile emergency assessment, care and treatment teams – including ED-equivalent RACF assessment services, acute hospital substitution service, and education and collaboration for RACF staff and General Practitioners (GPs).

The key objectives of the CARE-PACT Project include:

- RACF patients of in-scope facilities having their acute health needs met by the right health service, at the right time and in the right place, on completion of the project, by:
  - Reducing avoidable ED presentations
  - Reducing re-presentations
  - Improving timeliness of care
- On completion of the project, mortality and morbidity measures for RACF patients with acute health care needs serviced by the ED-equivalent CARE-PACT assessment service are equivalent with ED care, across all in-scope facilities
- On completion of the project, the clinical markers of care for RACF patients enrolled in the CARE-PACT acute care substitution arm of CARE-PACT are equivalent to in-hospital care, across in-scope facilities
- RACF patients of in-scope facilities presenting to EDs receive high quality care, on completion of the project
- Ensuring RACF patients of in-scope facilities admitted to hospital have high quality gerontic nursing care, on completion of the project
- Reducing inpatient length of stay (LOS) for RACF patients admitted to hospital from in-scope RACFs
- Increasing the percentage of inpatient admissions where a part or the whole of the admission is undertaken via an acute substitutive care admission

In addition to the individual objectives of the project, the CARE-PACT project contributes towards the Priority Area: *Reducing waiting times for Emergency Departments (EDs), outpatient and/or elective surgery services*. The objective of this priority area is to develop and test programs/models which result in improving access in these settings in a cost effective manner and to determine if these models could be implemented state wide.

Background

Ageing population trends create a strong fiscal and clinical imperative for Queensland Health to develop and support sustainable and safe models of care that reduce the impact of population ageing and consequent dependence on hospital systems. South-east Queensland is Australia's fastest growing metropolitan region, with the population expected to increase by 30% by 2025, with the 70 years-plus population expected to grow by 224%.[1] Metro South Hospital and Health Service (MSHHS) catchment has 79 RACFs with 7179 beds in 2012 (4184 high-care beds, 2995 low-care bed). This represents a 9.9% increase in total bed numbers since 2008 and a 27% increase in high-care bed numbers – similar changes are being faced in all Queensland metropolitan areas. Furthermore, the former Greater Metro South Brisbane Medicare Local (GMSBML) "Whole of Region Needs Assessment" has identified aged care services as one of the key issues requiring attention in MSHHS.[2]

The 2011 Productivity Commission inquiry into caring for older Australians identified residents of aged care facilities as being marginalized in terms of both access to and quality of appropriate medical care. It was identified that continuity of care for RACF residents with acute health care needs is poor and that there is a need to improve access to information of available services[3] – CARE-PACT fills these needs.

Reported rates of presentation of RACF patients to EDs range from 0.1 to 1.5 ED transfers per RACF resident bed / year,[4] with rates of admission of these patients varying from 40 to 60% of ED presentations.[5,6]

Patients and their families consistently express a desire to receive acute treatment in their home environments, [7] and increasing demand is expected with the aging population. CARE-PACT is a unique demand management program, which focuses on up-skilling the environment around the frail elderly providing trail benefits beyond the patients enrolled.

Cost containment due to reduced transfers/ED occasions of service and reduction of length of stay of residents admitted as inpatients (as demonstrated in the pilot), due to avoidance of in-hospital delirium and confusion, will occur at the facility level managing this potential demand risk.

The need for CARE-PACT acute hospital substitution:

Barriers to servicing of RACF residents by traditional acute care substitution services, which are addressed with a CARE-PACT model of care, include:

- Focus on "traditional" patient cohorts and their DRGs, with failure to consider the unique, accredited professional environment of RACFs, enabling safe treatment of a wider array of DRGs, despite evidence of safety of this approach for a variety of disease states[8,9]

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[1] Queensland Health Aged Care Strategy 2002-2007, Queensland Health, Brisbane, 2002.
[2] GMSBML Whole of Region Needs Assessment: local needs, local action, Greater Metro South Brisbane Medicare Local, March 2012,http://www.gmsbml.org.au/images/files/GMSBML Whole of Region Needs Assessment.
[3] Caring for older Australians, Australian Government Productivity Commission, chapters 9&10, 2011, http://www.pc.gov.au/projects/inquiry/aged-care/report, accessed 15/5/2013.
[4] Arendts G, Howard K. The interface between residential aged care and the emergency department: a systematic review. Age Ageing. 2010;39(3):306-12.
[5] Ackermann RJ, Kemle KA, Vogel RL, Griffin RC, Jr. Emergency department use by nursing home residents. Ann Emerg Med. 1998;31(6):749-57.
[6] Finn JC, Flicker L, Mackenzie E, Jacobs IG, Fatovich DM, Drummond S, et al. Interface between residential aged care facilities and a teaching hospital emergency department in Western Australia. Med J Aust. 2006;184(9):432-5
[7] Carusone SC, Loeb M, Lohfeld L. Pneumonia care and the nursing home: a qualitative descriptive study of resident and family member perspectives. BMC Geriatr.2006;6:2.
[8] Loeb M, Carusone SC, Goeree R, Walter SD, Brazil K, Krueger P, et al. Effect of a clinical pathway to reduce hospitalizations in nursing home residents with pneumonia: a randomized controlled trial. Jama. 2006;295(21):2503-10
[9] Caplan GA, Ward JA, Brennan NJ, Coconis J, Board N, Brown A. Hospital in the home: a randomised controlled trial. Med J Aust. 1999;170(4):156-60

- Failure to address the complex array of factors that influence RACF staff to transfer patients to hospital, including the RACF staff skill mix and resources, perceived risk, and patient functional and cognitive impairment [10]
- Absence of clearly defined clinical governance, resulting in reticence of families, GPs and RACF staff to engage in alternate models
- Lack of stream-lined entry to acute care substitution programs, resulting in admission becoming the default, easy solution to RACF patient ED presentation

The need for CARE-PACT telephone triage and clinical care planning:

- Addresses the identified information-gap in knowledge of ED-alternative services that contributes to burdening EDs[11] – shown to achieve a 31.17% reduction in ED presentations of RACF patients aged 65 years and older by linking patients to existing health professional services and providing clinical advice that meets the patients acute care needs without unnecessary ED presentations.
- Overcomes the barrier of existing models of care relying solely on GP / RACFs to refer to the service by incorporating a QAS-referral pathway, utilising a referral algorithm.
- Provides a dedicated point of contact for stakeholders within a complex to navigate health system

The need for CARE-PACT ED-equivalent assessment service in the RACF:

- Reduces ED presentations to facilitate ED flow, supporting National Emergency Access Target (NEAT) compliance.
- Assessment within the patients' own geriatric focussed environment:
    - Reduces the transfer of frail RACF patients to the frightening, unfamiliar environment of the hospital and reduces QAS demand
    - Reduces risk of iatrogenic complications that may be associated with the transfer alone or with hospitalisation of this frail elderly group, including confusion, urinary complications, constipation, faecal incontinence and pressure areas [12,13,14]
- ED-physician led mobile assessment service enables case identification for streaming to acute hospital substitution services.
- Provides on-site up-skilling via experiential learning.

The need for CARE-PACT ED and inpatient resource and early discharge service:

- Shown to reduce average inpatient length of stay (LOS) of RACF patients by 26% or 1.7 days. With the planned district-wide expansion of the ED and inpatient resource and early discharge service, and addition of the mobile emergency assessment, care and treatment team (hospital avoidance and substitution arm), the savings in average LOS are projected to increase further.
- Improved compliance with pressure area assessment on RACF patient arrival in ED (110.3% increase in PRIME reporting of pressure areas on elderly patient arrival in ED since institution of pilot program).

[10] Teresi JA, Holmes D, Bloom HG, Monaco C, Rosen S. Factors differentiating hospital transfers from long-term care facilities with high and low transfer rates. Gerontologist. 1991;31(6):795-806

[11] GMSBML Whole of Region Needs Assessment: local needs, local action, Greater Metro South Brisbane Medicare Local, March 2012,http://www.gmsbml.org.au/images/files/GMSBML Whole of Region Needs Assessment. pdf,accessed 9/5/2013.

[12] Arendts G, Howard K. The interface between residential aged care and the emergency department: a systematic review. Age Ageing. 2010;39(3):306-12.

[13] Caplan GA, Ward JA, Brennan NJ, Coconis J, Board N, Brown A. Hospital in the home: a randomised controlled trial. Med J Aust. 1999;170(4):156-60.

[14] Boockvar KS, Gruber-Baldini AL, Burton L, Zimmerman S, May C, Magaziner J. Outcomes of infection in nursing home residents with and without early hospital transfer. J Am Geriatr Soc. 2005;53(4):590-6.

2. Methodology

Using the ROGS Performance Indicator Framework as a foundation the evaluation domains have been defined below:

- *Effectiveness:* Refers to how well the outputs of a service achieve the stated objectives of that service
- *Efficiency:* Relates service outputs to inputs (technical efficiency) or service outcomes to inputs (cost effectiveness)
- *Equity:* Measures the gap between service delivery outputs or outcomes for special needs groups and the general population. Equity of access relates to all Australians having adequate access to services, where the term adequate may mean different rates of access for different groups in the community
- *Appropriateness & Acceptability:* The service is appropriate if it meets a client's needs. Appropriateness indicators seek to measure how well services meet client needs and also identify the extent of any underservicing or over servicing
- *Sustainability:* Involves gauging the capacity of the program to sustain workforce and infrastructure, to innovate and respond to emerging needs.

Evaluation Questions, Performance Indicators and Data Sources

Performance indicators were identified in order to address each of the outcome evaluation questions; these are outlined in the Table 2. In some cases multiple performance indicators were selected to provide a range of perspectives and data sources, enabling triangulation and validation of the evaluation findings.

There are a number of indicators unable to be reported on at this time due to delays in access and other data linkage activities. It is anticipated that these indicators will be included in subsequent reports.

Table 2: CARE-PACT Outcome Performance Indicators

Outcome evaluation domains	Outcome evaluation questions	Performance indicators	Data source
Effectiveness	• How effectively has the CARE-PACT project delivered on its intended objectives? ○ Do RACF patients of in-scope facilities have their acute health needs met by the right health service, at the right time and in the right place?	• Number of RACF ED presentations that are classified as avoidable, by facility*	Retrospective case finding tool analysis of EDIS data for pre CARE-PACT data versus CARE-PACT database post-project
	○ Have avoidable ED presentations reduced?	• Number of RACF ED presentations (high and low care), by ED facility*	Retrospective case finding tool analysis of EDIS data for pre CARE-PACT data versus CARE-PACT database post-project
	○ Have re-presentations been reduced?	• Number of RACF ED presentations (high and low care), per 1,000 RACF beds*	Retrospective case finding tool analysis of EDIS data for pre CARE-PACT data versus CARE-PACT database post-project
		• Number of RACF hospital admissions (high and low care), per 1,000 RACF beds, by ED facility*	Retrospective case finding tool analysis of EDIS data for pre CARE-PACT data versus CARE-PACT database post-project
	○ Has timeliness of care been improved?	• Total proportion of hospital separations for RACF patients with a component of acute substitutive care admission in the episode of care (CARE-PACT, Hospital in the home (HITH) or ASIS admissions)	HBCIS Clinical Database
		• Change in proportion of inpatient RACF	CARE-PACT

Outcome evaluation domains	Outcome evaluation questions	Performance indicators	Data source
		admissions with acute substitutive care admission in the episode of care	Clinical Database
	• Are mortality and morbidity measures for RACF patients with acute health care needs serviced by the ED-equivalent CARE-PACT assessment service comparable to patients treated in ED?	• Mortality rates for RACF patients with ED-equivalent assessment (excluding palliative patients)	CARE-PACT Clinical Database
		• Mortality rates for admitted patients (excluding palliative patients)	CARE-PACT Clinical Database
	• Are the clinical markers for RACF patients with acute health care needs serviced by the ED-equivalent CARE-PACT assessment service comparable to patients treated in	• Time from referral to CARE-PACT to ED service delivery episode commencement compared to the time from referral to ambulance to ED service delivery episode commencement time	CARE-PACT Clinical Database
		• Mean ED LOS for RACF patients	Retrospective case finding tool analysis of EDIS data for pre CARE-PACT data matched to EDIS data for post-project
		• Percentage of RACF patients discharged with a discharge letter, summary and interim medication order	Retrospective case finding tool analysis of EDIS data for pre-CARE-PACT matched to CARE-PACT database for post-project CARE-PACT data base matched to EDIS & Pharmacy records for post CARE-PACT
		• Mean LOS of inpatient RACF	Retrospective

Outcome evaluation domains	Outcome evaluation questions	Performance indicators	Data source
		patients	case finding tool analysis of EDIS data for pre-CARE-PACT matched to HBCIS and CARE-PACT database for post-project
		• Percentage of CARE-PACT patients discharged via criteria led discharge protocol	CARE-PACT Database & HBCIS
		• Comparison of NEAT performance for relevant DRGs, pre and post intervention	Retrospective case finding tool analysis of EDIS data for pre CARE-PACT data matched to EDIS data for post-project
		• Percentage of inappropriate referrals/ compliance with referral pathways	EDIS & CARE-PACT Database
	• Do RACF patients of in-scope facilities presenting to EDs receive high quality care?	• Patient/family reported continuity of care provided by CARE-PACT team	HIF Team Consumer Survey yet to be developed
	• Do RACF patients of in-scope facilities admitted to hospital receive high quality gerontic nursing care? • Has clinical safety been maintained or improved?	• Incident rates for inpatients and ED-equivalent assessment service in terms of incidence of: ○ Pressure ulcers ○ PRIME reports ○ Falls ○ Blood stream infections ○ Medication ○ incidents	PRIME Reports for Falls, PU & Medication Incidents and AUSLAB for Blood Stream Infections
	• Has the CARE-PACT project improved awareness and knowledge of RACF resident's management amongst stakeholders?	• Reported awareness and knowledge of CARE-PACT in managing RACF patients by hospitals, GPs, RACFs, QAS and other community service organisations	Stakeholder Outcome Survey
	• How satisfied were RACF residents with their	• Reported satisfaction by patients and	CARE-PACT GP

Outcome evaluation domains	Outcome evaluation questions	Performance indicators	Data source
	treatment?	families in RACFs with treatment and communication	Satisfaction Survey (via Quality & Safety Unit as per HHS process)
	• How satisfied were GPs with the CARE-PACT project?	• Reported satisfaction by GPs with CARE-PACT project overall, communication and education	CARE-PACT GP Satisfaction Survey (via Quality & Safety Unit as per HHS process)
	• What are the motivating factors and barriers to achievement of objectives?	• Reported motivating factors and barriers to implementing by CARE-PACT project team members	Project Team Outcome Survey
	• What are the cultural, social-environmental and design factors which increase the effectiveness of the CARE-PACT project?	• Reported cultural, social-environmental and design factors which increased the effectiveness of the CARE-PACT project, by the CARE-PACT team members	Project Team Outcome Survey
	• What aspects of the CARE-PACT project have been successful and/or most valued by stakeholders?	• Reported aspects of the CARE-PACT project most valued by stakeholders	Stakeholder Outcome Survey
Efficiency	• Did the CARE-PACT project result in a return on investment for QH?	• Return on investment upon CARE-PACT project completion	Various Sources
	• Has there been a reduction in pressure/ cost on the acute setting?	• Average per unit cost of an RACF patient, measured pre and post CARE-PACT project implementation (note limitation, cost differential for older persons)	Queensland Health Admitted Patient Dataset matched to retrospective case finding tool analysis of EDIS data for pre CARE-PACT and matched to CARE-PACT database for post project
	• Is the CARE-PACT project transferable to other sites? Is it scalable? Are there any specific critical success factors that need to be considered?	• Reported transferability and scalability to other sites by CARE-PACT project team members, EDs, RACFs, GPs, and QAS	Stakeholder and Project Team Outcome Survey

Outcome evaluation domains	Outcome evaluation questions	Performance indicators	Data source
		• Reported intention/barriers to continue with the CARE-PACT project by the project team members, EDs, RACFs, GPs, and QAS • Reported critical success factors by CARE-PACT project team members, EDs, RACFs, GPs, QAS, and other community service organisations	

Equity	• Did disadvantaged groups have appropriate access to the CARE-PACT project or were there barriers?
	• Did disadvantaged groups achieve the same outcomes?
		• Number of RACF ED presentations that are classified as avoidable, by facility
		• Number of RACF hospital admissions (high and low care), by facility, and by:
		  ○ Cognitively impaired patients
		  ○ Patients under adult guardianship
			EDIS

		• Morbidity rates for inpatients and ED-equivalent assessment service in terms of incidence of, by facility, by patient groups - cognitively impaired & patients under adult guardianship:
		  ○ Pressure ulcers
		  ○ PRIME reports
		  ○ Falls
		  ○ Blood stream infections
		  ○ Reported barriers to access for disadvantaged groups by project team members and stakeholders
		• Reported barriers to access for
			CARE-PACT database
			
			PRIME reports for Falls, PU & Medication Incidents and AUSLAB for blood stream infections
			
			Project Team & Stakeholder Outcome Survey

Outcome evaluation domains	Outcome evaluation questions	Performance indicators	Data source
		disadvantaged groups by project team members and stakeholders	
Appropriateness & Acceptability	• Is the CARE-PACT project accepted by stakeholders? How was the CARE-PACT project received?	• Number and proportion of RACFs and GPs which comply with the CARE-PACT pathway • Reported views on the level of support for the project by stakeholders	CARE-PACT database Stakeholder Outcome Survey
		• Reported acceptability and appropriateness of information and education by GPs, families, patients and community service organisations	CAREPACT Consumer Satisfaction Survey
	• What strategies and interventions are CARE-PACT project team members using at each site to increase acceptability? What is the rationale for using these?	• Reported strategies/interventions to increase acceptance by CARE-PACT project team members	Project Team Outcome Survey
Sustainability	• How sustainable is the CARE-PACT project? What can be done to enhance its sustainability?	• Reported intentions/ barriers to continuing with the CARE-PACT project by CARE-PACT project team members, EDs, RACFs, GPs, QAS and other community service organisations	Project Team and Stakeholder Outcome Survey
	• Has the CARE-PACT project built the skills and knowledge of key personnel to support sustainability?	• Reported knowledge and skills of CARE-PACT project team members to implement the CARE-PACT project, care for RACF patients independently in their environment	Project Team Outcome Survey
		• Change in score on Capability Assessment Tool, for sustainability	HIF Capability Assessment Tool
	• How could the CARE-PACT project be embedded in the HHSs as 'business as usual'?	• Reported feedback on how the CARE-PACT project could be embedded by CARE-PACT project team members and key stakeholders into HHS	Project Team and Stakeholder Outcome Survey

Outcome evaluation domains	Outcome evaluation questions	Performance indicators	Data source
		business as usual	

Program Logic

A program logic was used to establish the key short term and medium to long term outcomes for the CARE-PACT project. Program logic maps are used to depict the anticipated cause-and-effect relationships between inputs, activities, outputs, and outcomes, and to provide a platform for an evaluation framework which documents the achievements of the HIF Program. The program logic model for the CARE-PACT project is illustrated in Figure 1.

Figure 1: CARE-PACT Program Logic

Expansion of acute hospital substitution models	To develop and test substitution models which result in reducing pressure and cost in the acute setting. To determine if these models could be implemented across the DoH QLD
Goal	To improve quality of care and reduce ED presentations and hospital admissions for RACF residents

CARE-PACT	Inputs	Process	Outputs	Impacts	Outcomes	
				Year 1	Year 2	Year 3

Comprehensive Aged Residents Emergency and Partners in Assessment, Care and Treatment (CARE-PACT)
 	
Objectives
• RACF patients of in-scope facilities have their acute health needs met by the right health service, at the right time and in the right place, on completion of the project, by:
  ◦ Reducing avoidable ED presentations
  ◦ Reducing representations
  ◦ Improving timeliness of care
• On completion of the project, mortality and morbidity measures for RACF patients with acute health care needs serviced by the ED-equivalent CARE-PACT assessment service are equivalent with ED care, across all in-scope facilities
• On completion of the project, the clinical markers of care for RACF patients enrolled in the CARE-PACT acute care substitution arm of CARE-PACT are equivalent to in-hospital care, across in-scope facilities
• RACF patients of in-scope facilities, presenting to EDs receive high quality care, on completion of the project
• To ensure that RACF patients of in-scope facilities admitted to hospital have high quality gerontic nursing care, on completion of the project
• To reduce inpatient LOS for RACF patients admitted to hospital from in-scope RACFs
• To increase the percentage of inpatient admissions where a part or the whole of the admission is undertaken via an acute substitutive care admission
	HUMAN RESOURCES
	• Medical officers
	• Nurse practitioners
	• Nurses
	• Administrative supports
	
	Technology
	• LifePak 15 with 12-lead ECG, O2 saturations, non-invasive blood pressure monitoring capability
	• i-STAT X 2
	• Computers x 8
	• Clinical database
	
	Other
	• Clinical consumables
	
	Financial resources
	$3,714,612
		Implementation Processes
		• Draft and Final Project Plan
		• Complete Ethics Submission
		• Employ required staff
		• Undertake operations for telephone triage/ ED/ inpatient consultative service
		• Develop collaborative care pathway manual for RACFs / GPs
		• Develop manual available in electronic format
		• Produce performance reports
		• Design and undertake GP education sessions
		• Develop brochure for families & GPs
		• Develop handbook of community services
		• Design care pathways and referral pathways to CARE-PACT
		• Identify and implement standardised assessment tools for use across the care-continuum for RACF patients in MSHHS with acute health-care needs
		
		Patient Processes
		RACF patients with acute deterioration are referred to CARE-PACT team by:
		• GPs
		• RACF staff in consultation with the patient's GP
		• QAS advanced paramedic staff
		• ED staff
		• Inpatient staff
		
		• RACF patients receive acute health care support by mobile ED team when clinically appropriate
		• Or telephone advice is provided if appropriate
		• Knowledge transfer between senior clinicians and RACF staff
		
		Patient is linked to the most appropriate service according to the care need of the patients:
		• Referral of the patient to an existing health care professional community or hospital outreach team
		• Deployment of the ED- equivalent assessment service to the RACF
		• Direct admission to the acute care substitution
		• Streamlined referral to palliative care
		
		• Provide the most appropriate treatment in the most appropriate care setting
		• Discharge patients to the RACFs at an appropriate time point through collaborative discharge plan.
			GPs and RACF staff receive and apply the CARE-PACT Manual
			
			Patients, families, GPs and RACF staff receive CARE-PACT brochure
			
			GPs attend GP education sessions
			
			Interim medication orders are available at all involved hospitals, and the ability to write these orders is available
			
			The GMSBML Yellow Envelope Initiative will be actively supported by CARE-PACT and its use promoted across the care continuum
			
			Increase in referrals to CARE-PACT via the standard referral pathways
			
			Increased utilisation of the handbook of community services
			
			Increase in referral of patients to community services via the established referral pathways
			
			Increase in the application of standardised assessment tools in the assessment of acutely unwell RACF patients across MSHHS
			
			Increase in CARE-PACT patients discharged via the criteria led discharge protocol
				Increased awareness among clinical stakeholders of all community and hospital-based resources available for RACF patients experiencing acute deterioration
				
				A functioning streamlined case referral process to CARE-PACT through-out MSHHS
				
				Increased awareness of ways to manage patients transition to RACFs (compared to discharging a patient to an independent living situation)
				
				Enhanced continuity of care
				
				Equivalence in LOS of acute substitutive RACF patients and inpatients for the same DRG groups
				
				Equivalent or reduced readmission rates for the same DRG under acute care substitution admission compared to inpatient treatment
				
				Increased involvement of GPs in referral process to other support services
				
				Improved information sharing with GPs regarding patients care
				
				QAS &RACF staff upskilled to allow appropriate patient selection and provide required information to the CARE-PACT team on referral of an RACF patient, to allow CARE-PACT triage of the patient to an appropriate service
				
				Increase in RACFs with end-of-life medication
				
				Improved relationships with patients, families, GPs and RACFs
					Increased referrals to alternative community services
					
					Reduction of high-care avoidable presentations
					
					Reduction of low-care avoidable presentations
					
					Reduced presentations of RACF patients to ED and improved time to service delivery in RACF patients
					
					Replace 30% of inpatient RACF admissions with a component of acute substitutive care admissions
					
					Low adverse event rates for RACF patients with acute substitutive care
					
					Mean ED length of stay for RACF patients will be <4hours
					
					Reduced costs for service providers compared to current hospital-based model. Ie. Radiology & pathology
					
					GPs have an improved knowledge of support services
					
					Paramedics refer to CARE-PACT and comply with care pathway
					
					Patients & families exercise choice on where they are treated
						Informed collaborative care planning between clinicians
						
						Improved NEAT performance for RACF patients with selected DRGs
						
						Increase in referrals to community and hospital based resources without CARE-PACT inputs
						
						Improved timeliness of services
						
						Improved or equivalent RACF patient health outcomes
						
						Large cohort of RACF data informs government decision making
						
						Patients & families feel more empowered to make decisions and manage care
						
						Improved clinician satisfaction
						
						Improved clinical networks and increased collaboration between clinicians
						
						GPs have a single point of contact for RACF patients
						
						GPs and RACF staff can confidently care for RACF patients independently in their environment
						
						Improved patient & family experience
						
						Gold standard of care is provided across all facilities for acutely unwell RACF patient care

External Influences				
Availability of other services	**Policies/Processes**	**Other Programs**	**Socio-demographic factors**	**Location Factors**
• Availability of GPs to undertake collaborative care • Availability of after-hours GP services • Skills and staff availability within RACFs • Availability of telehealth equipment • Changes in RACF beds.	• Changes in QAS responses to RACF patients	• DoH QLD – Purchasing Framework • Hospital in the Home • In-hospital team provide external service coordination • MSHHS Residential Aged Care Palliative Team • Dementia outreach nurse practitioner • Behavioural advice & support of DBMass • PEG Care • Respiratory equipment support • KCI community nurse educator • Ongoing operation and success of hospital based services that may result in avoidance or unnecessary ED presentations • Telehealth projects • Medicare Local services	• Ageing population which impacts on demand and capacity of RACFs	Potential differences in locations of implementation which impact on success

Data Collection Tools

Semi-structured interviews

Semi-structured interviews were undertaken by the Deloitte team with project team members and key stakeholders regarding the outcomes of the project to date.

Project Team Outcome Survey

An online survey was distributed to the CARE-PACT Project Team members, requesting detail on key aspects of their projects' delivery and outcomes observed.

This survey was circulated to five team members, with three team members responding to this survey. This equated to a response rate of 60.0%.

CARE-PACT Stakeholder Outcome Survey

An online survey was distributed to the key Stakeholders, as identified by the CARE-PACT Project Team. This survey requested detailed on Stakeholders views on the effectiveness of the Project, its barriers or enablers to delivery, outcomes observed and views on the scalability and transferability of the Project.

This survey was circulated to 113 Stakeholders, with 21 responding to this survey. This equated to a response rate of 18.6%.

CARE-PACT database

The CARE-PACT database serves as a clinical data record and also allows extraction of data items for reporting and research purposes. The database allows collection of clinical and administrative data items and links to HBCIS to import additional administrative data. Data is able to be collected in real time across the care continuum and is then able to be integrated into the residents' hospital record.

Clinical data items captured include those relevant to reporting on project outcomes across telephone triage, mobile ED assessments, initial hospital contact assessments, inpatient reviews, acute substitutive admissions and follow-up.

This database will serve as a significant repository of information to contribute to current and future research to improve understanding of acute health care needs of this patient cohort. Assessment of the CARE-PACT project will encompass a formal research approach with data linkage planned across EDIS, PRIME data, CARE-PACT database, inpatient data, death data, pathology and radiology databases and QAS data. This will allow a multi-dimensional clinical and economic assessment of the program.

3. Outcome Evaluation Findings

3.1 Effectiveness

3.1.1 How effectively has the CARE-PACT project delivered on its intended objectives?

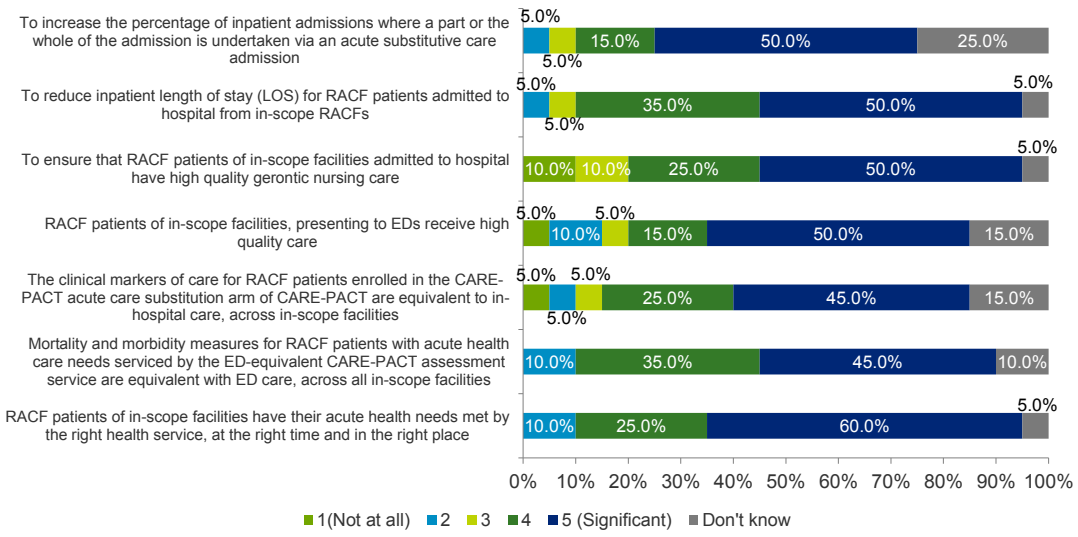
To assess how effective the CARE-PACT project has been in meeting its intended outcomes, the following sections measure and report on the project against a series of qualitative and quantitative performance indicators...

As part of the qualitative assessment, relevant stakeholders from RACFs who utilised the service were asked to report on the extent to which they believed the CARE-PACT project had delivered on its intended objectives. The results of the stakeholder survey are presented in Chart 1. Of the 20 stakeholders who responded to the survey, the majority rated degree of achievement 4 or 5 on a 5-point scale. The two objectives that most stakeholders agreed had been achieved were:

- To reduce inpatient LOS for RACF patients admitted to hospitals from in-scope RACFs; and
- RACF patients of in-scope facilities have their acute health needs met by the right health services, at the right time and in the right place.

There was a small number of stakeholders unsure about the extent to which objectives were being met. A quarter of respondents reported not knowing whether the project had increased the percentage of inpatient admissions where a part of or the whole of the admission was undertaken via an acute substitutive care admission. This suggests that by better communicating the results of CARE-PACT, these stakeholders may have had an improved understanding surrounding the CARE-PACT project's key achievements.

Chart 1: Stakeholders' rating of the achievement of objectives



Source: Stakeholder Outcome Survey

n=20

Stakeholders also reported on the way in which they believed achievement of outcomes could be improved, and there was a common theme regarding extension of operating hours due to

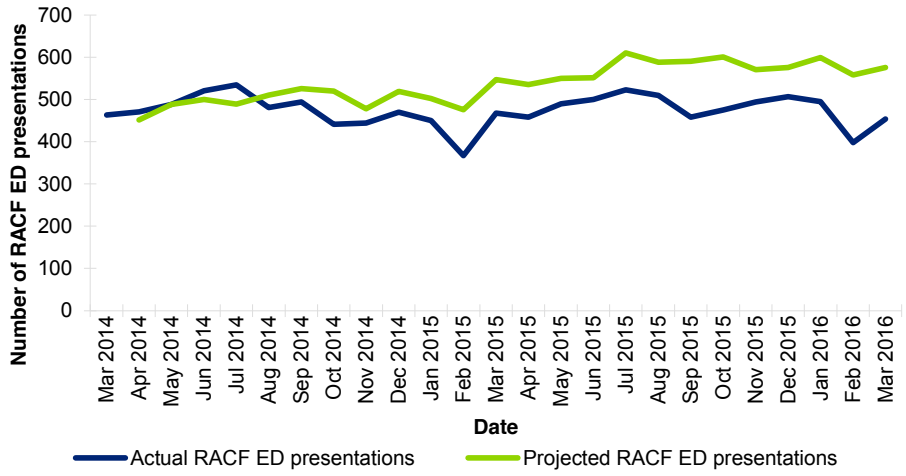
lack of GP support and availability during this time. Some stakeholders also noted that additional education for RACF staff could contribute to these outcomes.

There were also small number of stakeholder respondents who noted that improvements in communication, particularly the consistency and timeliness of information sharing at the transfer interface between CARE-PACT, RACFs and the acute system, could serve to enable better outcomes..

3.1.2 Do RACF patients of in-scope facilities have their acute care needs met by the right health service, at the right time and in the right place?

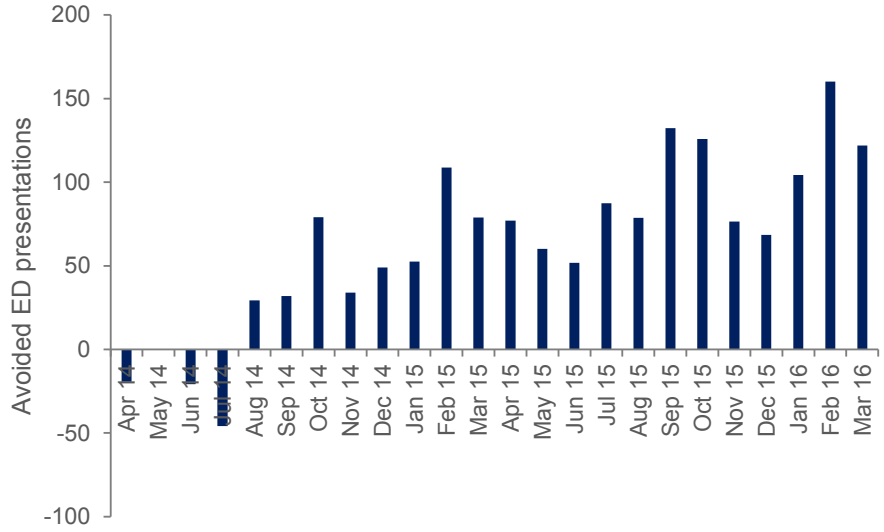
Based on 6 years of historical presentation data across the CARE-PACT sites, the projected number of ED presentations from RACF residents over the project duration was modelled, and Chart 2 compares this to the actual presentations over the same period. It is evident that following an initial ramp up period, there has been a consistent avoidance of ED presentations from RACF residents since August 2014. Chart 3 shows that the avoided presentation rate has continued to trend upwards over the project duration, with month to month fluctuations; the greatest number of avoided presentations observed in February 2016. Over the duration of the project, based on activity projections, it is estimated that 1,522 ED presentations from RACF residents have been avoided.

Chart 2: RACF ED presentations: actual vs projected



Source: EDIS; CARE-PACT

Chart 3: Number of RACF ED presentations avoided



Source: EDIS; CARE-PACT

In addition to avoided RACF ED presentations, Chart 4 shows the difference between projected hospital admissions from RACFs compared to actuals RACF hospital admission over the period since the CARE-PACT project commenced. The number of avoided hospital admissions of RACF residents is shown in Chart 5, and is noticeably higher than the reduction in RACF ED presentations shown in Chart 3. This is to be a result of the additional value of the CARE-PACT service in assessment and management of RACF residents who present to the ED, including coordination and liaison with the RACFs to facilitate timely and appropriate transfer back to the facility. In addition, the project team identified that a proportion of RACF patients presenting to ED are appropriately discharged and deferred to palliative pathways rather than admission. The number of avoided admissions has continued to rise over the project period, peaking at the last month of collection, March 2016. Over the duration of the project, based on activity projections, it is estimated that 2,329 hospital admissions of RACF residents have been avoided.

In addition to the impact of the CARE-PACT team in direct provision of care and support, the role of clinical guidelines in enabling earlier intervention and management in situ is also potentially contributing to the reduction in both ED presentations and hospital admissions through early intervention demand management. This capacity building and skills transfer component of the model has been consistently recognised as a valuable aspect from the stakeholder and project team perspective.

Considering more closely the types of admissions being avoided, hospital admission data for this patient cohort within in-scope facilities was broken down by Australian Refined Diagnosis Related Groups (AR-DRG). Based on historical data from the 2 years immediately prior to commencement of the CARE-PACT project, and the 2 years prior to that, projections were calculated for the duration of the project period. These projections were then compared with actual presentations over the project period, sorted by AR-DRG.[15] The top ten avoided AR-DRGs were:

1. J65B: Trauma to the Skin, Subcutaneous Tissue and Breast W/O Cat or Sev CC
2. L63A: Kidney and Urinary Tract Infections W Catastrophic or Severe CC
3. G70B: Other Digestive System Diagnoses W/O Catastrophic or Severe CC
4. E62A: Respiratory Infections/Inflammations W Catastrophic CC

[15] This analysis was undertaken by the CARE-PACT team's statistician. Source data has not been independently verified.

5. E62B: Respiratory Infections/Inflammations W Severe or Moderate CC
6. X60B: Injuries W/O Catastrophic or Severe CC
7. E65B: Chronic Obstructive Airways Disease W/O Catastrophic CC
8. L63B: Kidney and Urinary Tract Infections W/O Catastrophic or Severe CC
9. F62B: Heart Failure and Shock W/O Catastrophic CC
10. F60B: Circulatory Disorders W AMI W/O Invasive Cardiac Inves Pr W/O Catastrophic CC

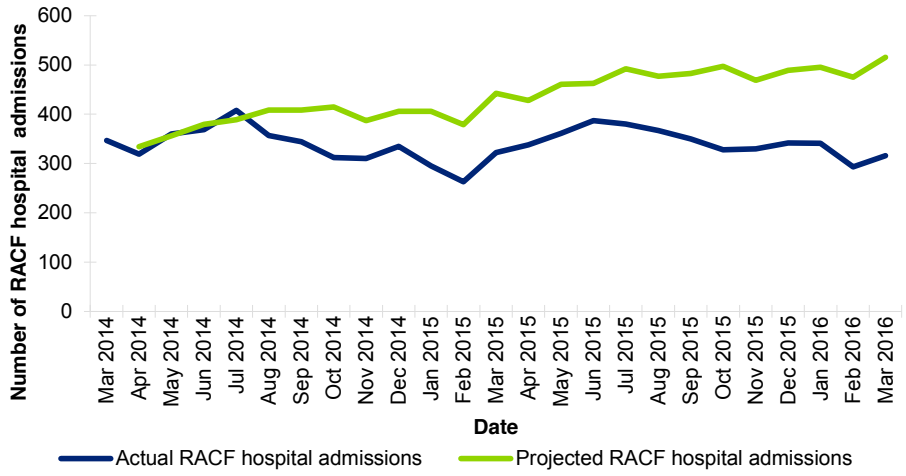
Notably, this list of AR-DRGs includes a number of more complex admissions compared to data from Brisbane South Primary Health Network on potentially preventable hospitalisations (PPHs)[16], showing that the top three PPHs in the catchment are:

1. L63B: Kidney and Urinary Tract Infections W/O Catastrophic or Severe CC
2. J64B: Cellulitis W/O Catastrophic or Severe CC
3. E65B: Chronic Obstructive Airways Disease W/O Catastrophic CC

This difference in the acuity of the admissions being avoided in the CARE-PACT model demonstrates the additional value of the inclusion of an ED physician in the team, as compared with nurse-led models. This means that the team has the capability and capacity to manage higher-acuity patients (e.g. aforementioned DRGs with complications). In addition, education and clinical guidelines are also likely to be contributing to earlier appropriate intervention to avoid these admissions.

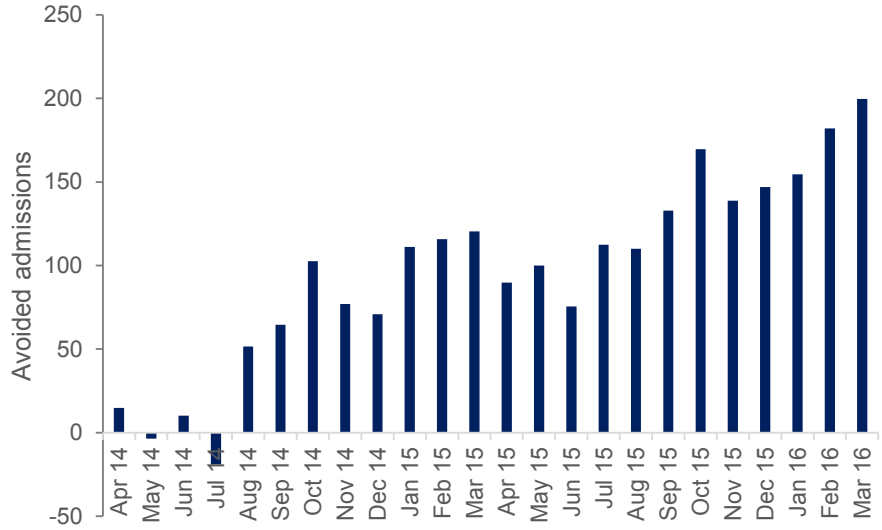
[16] Australian Government, Australian Institute of Health and Welfare, My Healthy Communities, Potentially preventable hospitalisations 2013-14. Available from: http://www.myhealthycommunities.gov.au/interactive/potentially-preventable-hospitalisations/

Chart 4: RACF hospital admissions: actual vs projected



Source: HBCIS; CARE-PACT

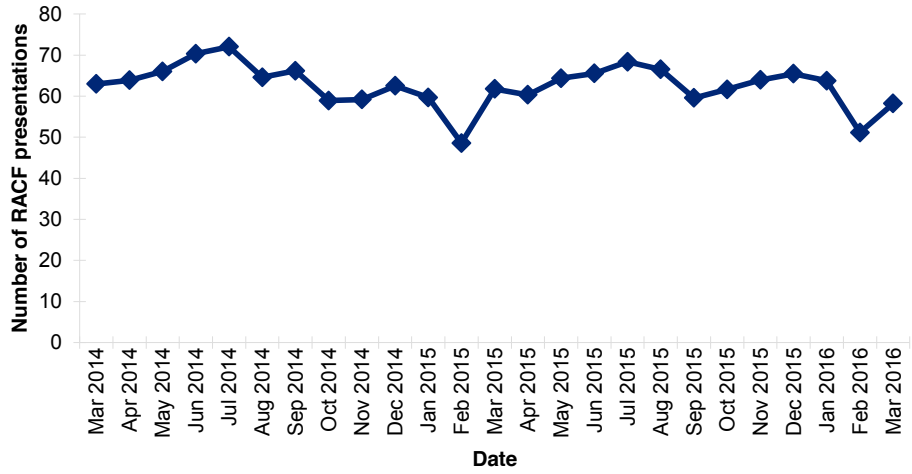
Chart 5: Number of RACF hospital admissions avoided



Source: HBCIS; CARE-PACT

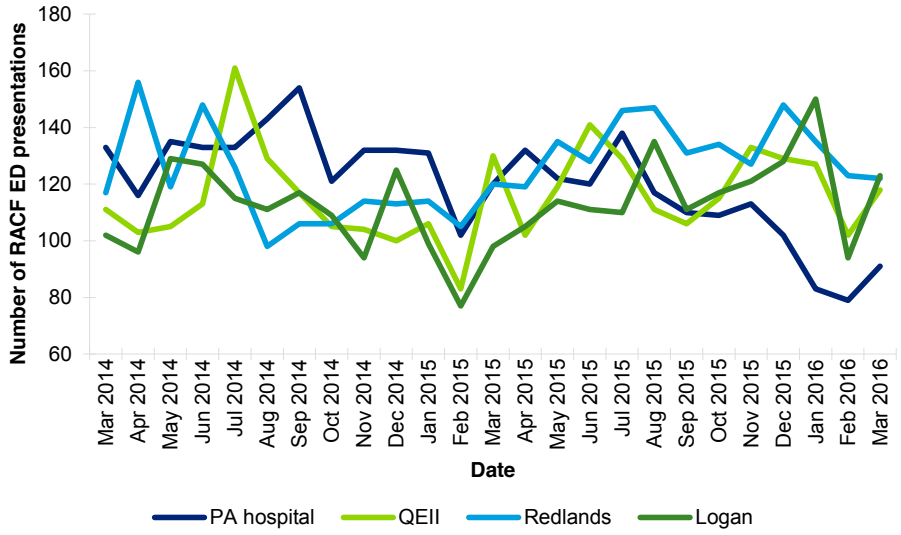
In general, over the course of the CARE-PACT project, the number of ED presentations from RACF residents has stayed reasonably stable across the 4 sites (Logan, PAH, QEII, and Redland). Chart 6 demonstrates dips in February 2015 and February 2016, which are also seen in the site-by-site breakdown shown in Chart 7. This stable rates of RACF ED presentations is in the context of a history of year-on-year growth observed over the last 6 years driven by a number of factors including population growth and access to after-hours services, as outlined in Section 3.1.2. Thus, to inform an accurate understanding of the impact of the project, it was important to model the *expected* demand and growth of ED presentations. Notably, over the last 4 months of the project, the PAH deviated from the cluster of hospitals demonstrating rates of presentations that are the lowest they had been over the course of the project.

Chart 6: Number of RACF ED presentations (high and low care), per 1,000 in-scope RACF beds



Source: Process Evaluation Tool (reported from EDIS)

Chart 7: Number of RACF ED presentations (high and low care) by ED facility



Source: Process Evaluation Tool (reported from EDIS)

3.1.3 Are the clinical markers for RACF patients with acute care needs serviced by the ED-equivalent CARE-PACT assessment service comparable to patients treated in ED?

This evaluation question considers the timeliness of management provided by the CARE-PACT team compared to QAS for assessment and management, in addition to the length of stay of RACF patients who are admitted for management.

Table 3 shows both the mean and median time from referral to being seen for RACF patients receiving usual care compared to receiving management by the CARE-PACT ED mobile assessment team. These results show that both the mean and median time from referral to assessment is lower for patients receiving care from the CARE-PACT team compared to the QAS, indicating that timeliness of care is not only maintained, but potentially substantially improved. This reduced demand from RACF residents for QAS also has the potential to improve the timeliness of care for non-RACF patients also.

Table 3: Mean and median time from call to being seen

Measure	Usual care (time from QAS call to being seen in ED)	CARE-PACT ED mobile assessment (time from triage call to being seen in RACF)	Reduction in time (minutes)
Mean time from referral to be seen	79.00	72.47	6.53
Median time from referral to be seen	91.53	50.00	41.53

Source: CARE-PACT

For RACF patients requiring inpatient admission, the mean and median LOS in days, pre and post CARE-PACT, are shown in Table 4. Both the mean and median LOS have decreased in 2-year period of the CARE-PACT program, in comparison to the 2-year period prior to the program commencement. The CARE-PACT service has the potential reduce LOS for patients from in-scope facilities through coordination and liaison with RACFs to facilitate timely and appropriate discharge.

The results of Table 4 should be considered in the context of the reduction in RACF hospital admissions shown in Chart 5. The cohort of patients being admitted in the post-CARE-PACT period are likely to be higher acuity overall compared to the distribution in the pre-CARE-PACT period. The pre-CARE-PACT LOS may have been reduced by the lower acuity patient cohort who, in the post-CARE-PACT period would receive substitutive care in-situ at the RACF.

Table 4: Mean and median LOS of inpatient RACF patients

Measure	Pre-CARE-PACT inpatient LOS (days)	Post-CAREPACT Inpatient LOS (days)	Reduction in inpatient LOS (days)
Mean length of stay	4.78	4.12	0.67
Median length of stay	4	3	1

Source: CARE-PACT

The results in Table 5 show change in mean and median LOS for the pre and post-CARE-PACT period broken down by the top 10 diagnosis related groups (DRGs) for the RACF cohort. Mean LOS has reduced in all but one DRG, Septicaemia with catastrophic complication or

comorbidity; median LOS reduced in the majority of DRGs also. Of note, the most marked change is in patient presenting with chronic obstructive pulmonary disease (COPD) with catastrophic complication or comorbidity and Stroke and Other Cerebrovascular Disorders with catastrophic complication or comorbidity. Statistical significance of these differences was not determined.

Table 5: Mean and median inpatient LOS for RACF patients for top 10 DRGs

DRG	Diagnosis	Pre-CARE-PACT 1/4/2012 to 31/3/2014		Post-CARE-PACT 1/4/2014 to 31/3/2016		Change in ALOS	Change in Median LOS
		ALOS	Median LOS	ALOS	Median LOS		
E62A	Respiratory Infections/Inflammations W Catastrophic CC	5.78	5	5.10	4	-0.68	-1.0
L63A	Kidney and Urinary Tract Infections W Catastrophic or Severe CC	5.07	4	4.25	3	-0.82	-1.0
T60A	Septicaemia W Catastrophic CC	6.00	5	6.05	5	0.05	0.0
F62A	Heart Failure and Shock W Catastrophic CC	6.49	5	5.76	5	-0.72	0.0
E62B	Respiratory Infections/Inflammations W Severe or Moderate CC	3.37	3	3.13	3	-0.23	0.0
E65B	Chronic Obstructive Airways Disease W/O Catastrophic CC	3.90	3	3.07	2	-0.83	-1.0
F62B	Heart Failure and Shock W/O Catastrophic CC	3.94	3	2.91	2	-1.03	-1.0
E65A	Chronic Obstructive Airways Disease W Catastrophic CC	5.73	5	4.26	4	-1.47	-1.0
I08A	Other Hip and Femur Procedures W Catastrophic CC	8.86	9	8.15	7	-0.71	-2.0
B70A	Stroke and Other Cerebrovascular Disorders W Catastrophic CC	7.84	6	6.29	4	-1.55	-2.0

Source: Inpatient admission data (collected by the CARE-PACT team)

3.1.4 Do RACF patients of in-scope facilities admitted to hospital receive high-quality gerontic nursing care?

To determine whether or not patients of in-scope facilities admitted to hospital receive high-quality gerontic nursing care, compliance with a number of best practice indicators are presented in Table 6. Benchmarks are based on published literature regarding process quality indicators for care of older people in emergency departments.

Compliance with all 6 indicators is above the benchmark rate; of particular note is delirium screening, falls risk screening, and written discharge communication to primary care provider. This demonstrates that the impact of the CARE-PACT team extends beyond support and outreach provided in situ at RACFs, but also improves the quality of care provided to RACF residents with acute hospital presentations. This element of the service is likely to have also contributed to the observed reduction in LOS.

Table 6: Proportion of RACF residents with acute hospital presentations receiving each of: cognition screen; skin integrity check; delirium screen; falls risk screen; cognition-appropriate pain assessment; written discharge communication to primary care provider

Indicator	Benchmark Compliance (%)*	Compliance CARE-PACT sites January to July 2016 (%)
Cognition screening	74%	85%
Skin integrity check	Not available	89.5%
Delirium screening	24%	93%
Falls risk screen	49%	84.5%
Cognition appropriate pain assessment	66%	90.9%
Written discharge communication to primary care provider	26%	97%

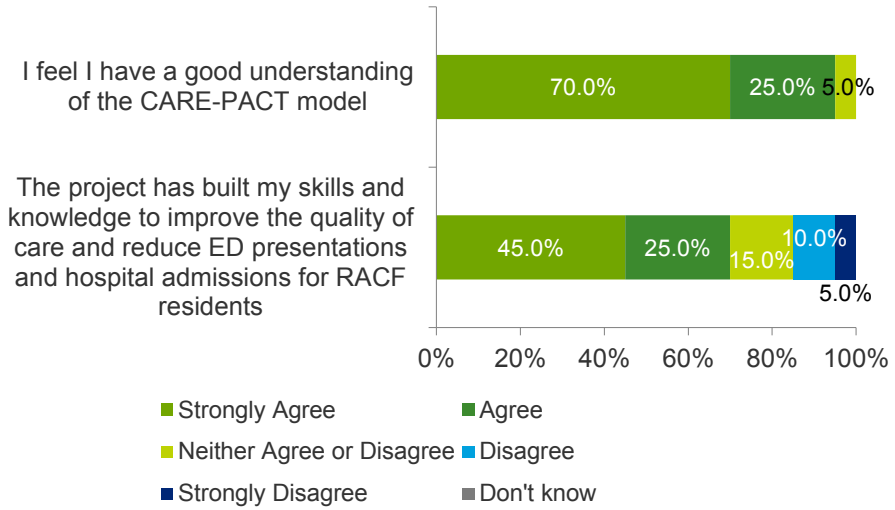
* Schnitker L, Martin-Khan M, Burkett E, Beattie E, Jones R, Gray L. Process quality indicators targeting cognitive impairment in emergency departments. Acad Emerg Med 2015 22(3): 285-98; Burkett E, Martin-Khan M, Schnitker L, Gray L. Process quality indicators for older persons in ED. Pre-publication

3.1.5 Has the CARE-PACT project improved awareness and knowledge of RACF resident's management amongst stakeholders?

Project team members and stakeholders reported that skills and knowledge of managing RACF residents has improved amongst RACF staff and hospital staff. Stakeholders reported that practitioner skills are improving with exposure to the CARE-PACT model and interaction with the CARE-PACT team, as shown in Chart 8; in addition, the following points were highlighted:

- Education tools and support, including the clinical handbook, has enabled RACF staff to identify immediate needs of residents, and provided a process to follow to streamline the engagement of CARE-PACT in clients' care; clinical handbook has also been valuable for new graduates
- Education has also been useful for families
- Support to enable more care to be provided in RACFs through support and problem solving resulting in fewer transfers between the RACF and the hospital; this is delivering optimal patient centred care
- Model has improved the capability of ED staff to appropriately manage older people when they present.

Chart 8: Stakeholders' reported awareness & knowledge built



Source: Stakeholder Outcome Survey

n=20

3.1.6 What are the motivating factors and barriers to achievement of objectives?

Project team members and stakeholders reported enablers and barriers to achieving objectives of the CARE-PACT project. These were largely consistent with those that were reported in earlier evaluations, and included strong clinical leadership and governance, engagement of stakeholders within MSHHS and the broader continuum of care providers in the district, including Brisbane South PHN, the flexibility of the model to provide patient-centred care, and the capacity building component in knowledge sharing and development of clinical guidelines to improve clinical care of RACF residents.

Barriers to achieving the objectives of the program that were cited included the security of funding, which was consistently reported in earlier evaluations.

3.1.7 What are the cultural, social-environmental and design factors which increase the effectiveness of the CARE-PACT project?

Project team members cited contextual factors that have influenced the effectiveness of the model, which included the benefit of existing relationships with RACFs from the prior Aged Care Early Intervention and Management (ACEIM) project, the support of the MSHHS executive and the local culture of safety and success, as well as the colocation of the project team with the Centre of Online Health, which facilitated the telehealth aspects of the program.

3.1.8 What aspects of the CARE-PACT project have been successful and/or most valued by stakeholders?

Stakeholders reported the aspects of the CARE-PACT project that they valued most, and there were common themes regarding patient-centred care, education and teamwork. In terms of patient-centricity, the value of providing high-quality care to residents in familiar environments, particularly those with cognitive impairment, was highlighted by a number of stakeholders. In terms of education and skills transfer, stakeholders highlighted the value of the contact with the team and the CARE-PACT guidelines in building capacity of the RACF staff. A number of stakeholders also reported the value derived from the teamwork and communication between RACFs and the CARE-PACT, including the benefit of having a central point of contact at the hospital.

Project team members reported their perceptions of what aspects of the program were most valued by stakeholders, and overall these were consistent with those reported by the stakeholders themselves, including patient-centricity of care, education and resources, and communication. In addition, the project team noted that patient advocacy in the hospital system was another valuable aspect of the program, as well as improved continuity of care through initiatives such as the introduction of EDMARs (ED medication administration records) and improved delivery of IMARs (interim medication administration records), and the 'Yellow Envelope Project' in partnership with Brisbane South PHN.

3.2 Efficiency

3.2.1 Did the CARE-PACT project result in a return on investment for QH?

The costs accounted for in calculating the ROI were in the categories of human and capital expenditure for the CARE-PACT team. Over the operating period of the CARE-PACT Project, total expenditure was $2,422,051; this was less than the initial budgeted investment due to issues with recruiting into both nursing and medical roles at the anticipated capacity. The main expenditure item was staffing, with key characteristic of the model being the emergency physician and nurse practitioner involvement, and specialist geriatric nursing expertise. Other expenditure included capital equipment, consumables, and transport.

As per the original business case, benefits of the CARE-PACT model were broken down into 6 categories:

- Reduction in ED presentations
- Reduction in ambulance transfer costs
- Reduction in hospital admissions
- Inpatient admissions replaced by acute substitutive care
- Reduced inpatient LOS
- Revenue due to telehealth consults

Over the 24-month data collection period, it is estimated that 1522 ED presentations were avoided, and 2329 admissions were avoided, across the four sites (see Section 3.1.1 for further detail). This avoided activity in the acute setting means that the benefits of the CARE-PACT model are realised in released capacity. Purchase prices (i.e. national efficient prices) were used to value these benefits, with yearly prices applied to when benefits were realised. All values were discounted to 2014 Australian dollars.

The reduction in ED presentations over the period was valued at $1.16 million, based on the assumption that RACF residents who are able to be appropriately managed in situ are triage category 3[17]. In addition, associated saving in Queensland Ambulance Service (QAS) transfer costs to (emergency) and from (non-emergency) the hospital amounted to $2.34 million over the project period, based on the assumption that all RACF patients would use QAS transfer to and from the hospital, and that no patients die in hospital. This benefit therefore may be an overestimate of the saving, depending on mortality and use of alternative transport.

In terms of reduction in hospital admissions, including acute care substitution, the reduction in admissions over the period was valued at $9.77 million. This value was based on a number of assumptions regarding the type of admissions that would be likely to be avoided as a result of the service. The top 10 avoided admissions for the cohort over the project duration (see Section 3.1.2) were used to estimate the savings in purchase price based on the National Weighted Activity Units (NWAU) and National Efficient Price (NEP)[18] according to volume of admissions avoided in each financial year of the project.

The reduction in inpatient LOS was valued at $3.83 million. This value was based on the data shown in Table 5 of the top 10 DRGs of admitted patients from RACFs. As purchase price was used as the basis for valuation, the reduction in LOS across 9 of the 10 DRGs did not result in a transition from inlier to short stay outlier, therefore a change in purchase price would not apply.

[17] Average NWAU based on assumption of 50% of patients admitted from ED, 50% discharged from ED
[18] Note: Inlier NWAU used.

This benefit was hence based on the reduced LOS for Stroke and Other Cerebrovascular Disorders W Catastrophic CC (B70A). It should be noted that any change in LOS, regardless of the change in purchase price, releases capacity in the acute setting.

The value of revenue from telehealth was not able to be valued.

The total value of savings over the project duration amounted to $17.1 million resulting in a ROI of 6.1. This ROI is calculated from the Queensland Health perspective, considering their investment compared with the avoided costs of purchased activity. However, considering the ongoing sustainability of this model from a HHS perspective, it was acknowledged that activity-based funding (ABF) may not be sufficient to sustain the model, as ABF is not optimised to incentivise hospital avoidance and demand management activity. In view of this, further analysis regarding the actual cost of providing care to this complex patient cohort compared with the NWAU for the activity would be useful in determining the investment benefits of the model at a local level.

3.2.2 Has there been a reduction in pressure/ cost on the acute setting?

As outlined in Section 3.2.1, the program has had an impact on the acute setting through releasing capacity in both the emergency department and inpatient wards, at an estimated value of $12.3 million over the initial 2 years of service provision. This release in capacity can be realised in bed-day savings in ED and in inpatient wards, with the potential to reduce pressure on the acute setting by improving patient flow.

3.2.3 Is the CARE-PACT project transferable to other sites? Is it scalable? Are there any specific critical success factors that need to be considered?

All project team members agreed that the CARE-PACT model conceptually was transferable to other sites, noting aspects that enable the transferability of the model, such as:

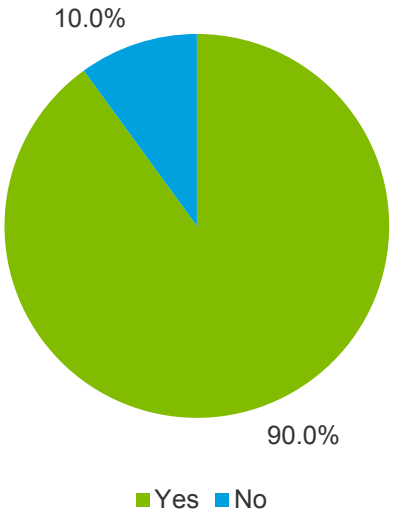
- Commonality of the challenges of managing this population cohort;
- Design of resources, policies and procedures (e.g. clinical guidelines, structured gerontic assessments, patient information sheets) to be easily adapted for local contexts;
- The model is easily modified to allow a module-style adoption of specific components as required for local needs;

The vast majority of stakeholders also agreed that the model was transferrable and scalable, as shown in Chart 9 and Chart 10, respectively. Key components reported by stakeholders enabling transferability included:

- Transferability of the resources, policies and procedures;
- Structural and operation simplicity of the program;
- The upskilling and capacity building component for RACFs, ED staff and GPs;
- Local rather than central provision of the service; and
- The flexibility in the way RACFs engage with the service.

It was also recognised that strong clinical leadership and advocacy, which has been a success factor in MSHHS, may not necessarily be present at other sites, and this may limit ability to realise the same outcomes as the pilot program.

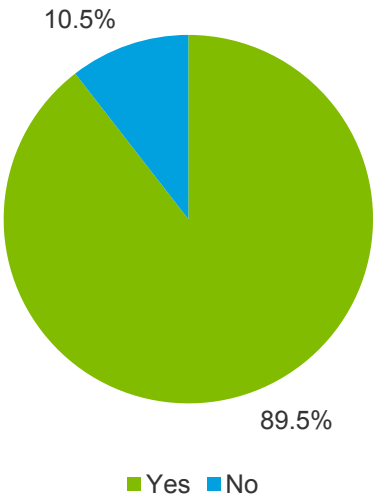
Chart 9: Stakeholder's views on the transferability of the CARE-PACT model



Source: Stakeholder Outcome Survey

n=20

Chart 10: Stakeholders' views on the scalability of the CARE-PACT model



Source: Stakeholder Outcome Survey

n=19

3.3 Equity

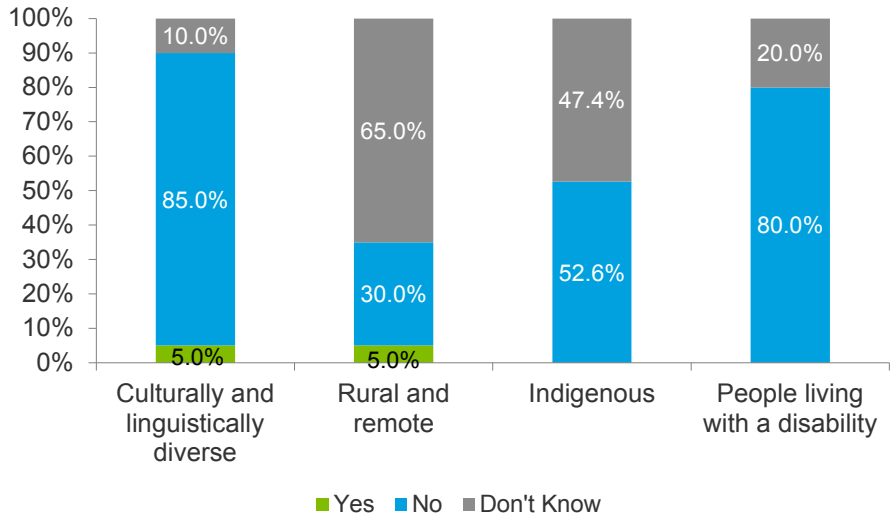
3.3.1 Did disadvantaged groups have appropriate access to the CARE-PACT project or were there barriers?

Stakeholders reported their views on whether there were barriers to accessing the CARE-PACT service for CALD population, people in rural and remote areas, Aboriginal and Torres Strait Islander People, and people with a disability; the results are shown in Chart 11. As CARE-PACT provides telephone and outreach support to these facilities, access is generally aligned with access to the RACF itself.

There was the highest degree of uncertainty from stakeholders regarding whether there were access barriers for rural and remote populations, which is likely to reflect awareness of the geographical scope of the service. The use of telehealth was used in some instances to improve access for these populations.

It was noted in previous evaluation reports that the RACF Advisory Group, comprising representation from community, GPs, RACFs and QAS, were engaged early to identify deficits and design the model to address these.

Chart 11: Stakeholders' views on barriers to access for CARE-PACT



Source: Stakeholder Outcome Survey

n=20

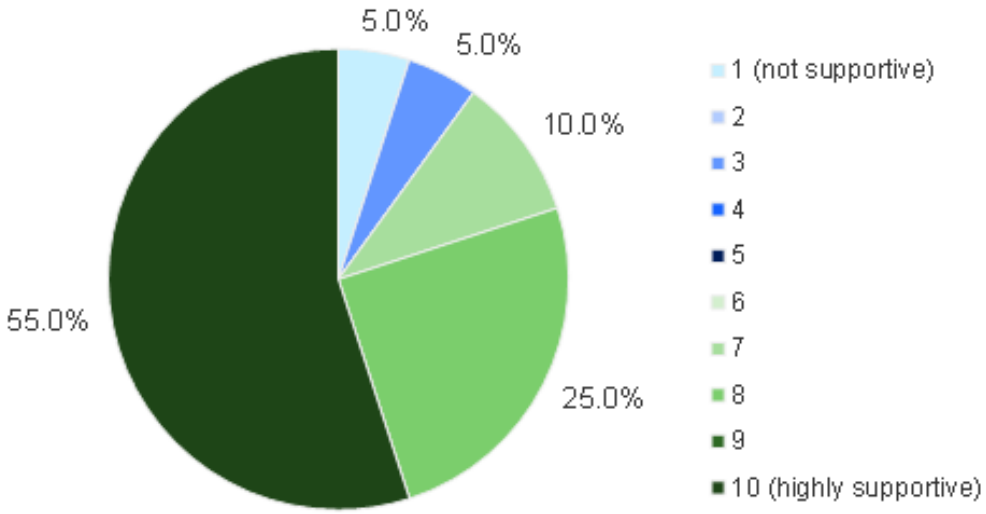
3.4 Appropriateness & Acceptability

3.4.1 Is the CARE-PACT project accepted by stakeholders? How was the CARE-PACT project received?

Stakeholders rated their level of support for the CARE-PACT program scale of 1 to 10, shown in Chart 12. The majority of respondents were highly supportive (55.0%) with a further 35.0% of respondents rating support between 7 and 9 on the 10-point scale. There were 2 respondents indicating low levels of support; these respondents were from RACFs, and perceived the service had a tendency to assume a low level of capability and knowledge of RACF staff, when this is not always the case.

Stakeholders also rated their satisfaction with certain aspects of the CARE-PACT project, shown in Chart 13. In general, stakeholders were either extremely satisfied or very satisfied with the project overall, education and training provided, and support materials provided. There was a small number expressing low levels of satisfaction, and these respondents were those who also reported low levels of support.

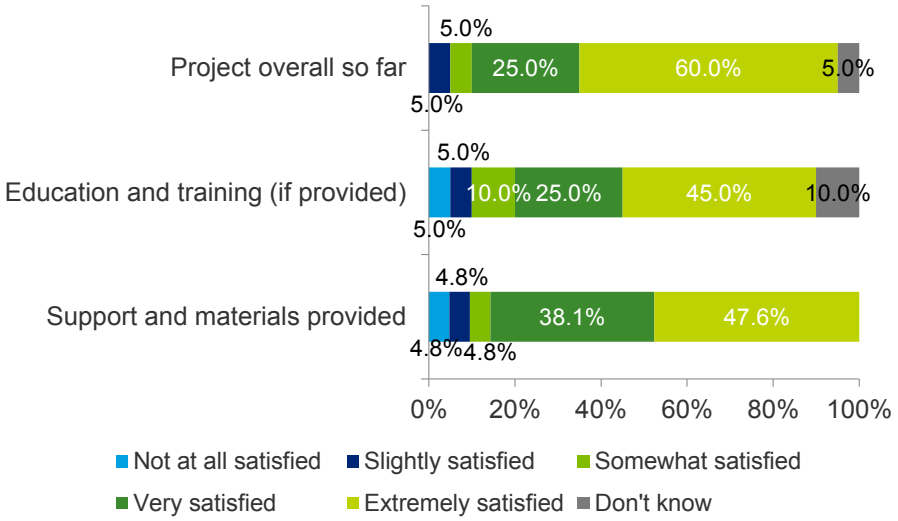
Chart 12: Stakeholders' level of support for the CARE-PACT project



Source: Stakeholder Outcome Survey

n=20

Chart 13: Stakeholders' satisfaction with the CARE-PACT project



Source: Stakeholder Outcome Survey

n=21

Stakeholders also reported ways in which they thought that the program could be improved. There were common themes in terms of extended hours of operation, and wider spread implementation of the clinical pathways. A small number of respondents also believe that communication flows in both directions and could be improved to enable better outcomes.

3.4.2 What strategies and interventions are CARE-PACT project team members using at each site to increase acceptability? What is the rationale for using these?

The project team reported the strategies that had been employed to improve acceptability of the CARE-PACT models at each site, and these included:

- Involvement of RACF staff, GPs, ED & inpatient specialists and consumers in the development of the model and ongoing input through project steering committee resulting in high levels of engagement across the care continuum
- Participation of patients (or their alternate health decision makers), RACFs & GPs in care planning to improve levels of stakeholder acceptability
- Skills sharing approach to ensure improved understanding of skills across the care continuum
- Use of evidence-based practices to improve consistency of care across the continuum and improve patient outcomes
- Flexibility of the project team allowed engagement in preferred manner with each stakeholder group
- Use of culturally sensitive approach to ensure engagement with culture-specific RACFs
- Direct contact with the RACF staff and GPs has helped engage and educate the staff and GPs about the service
- Having a strong medical lead, which was essential to facilitate the acceptance of GPs
- Utilisation of nurse-practitioner / ED specialist mobile ED assessment team has allowed for increased work-force capacity

Sustainability

3.4.3 How sustainable is the CARE-PACT project? What can be done to enhance its sustainability?

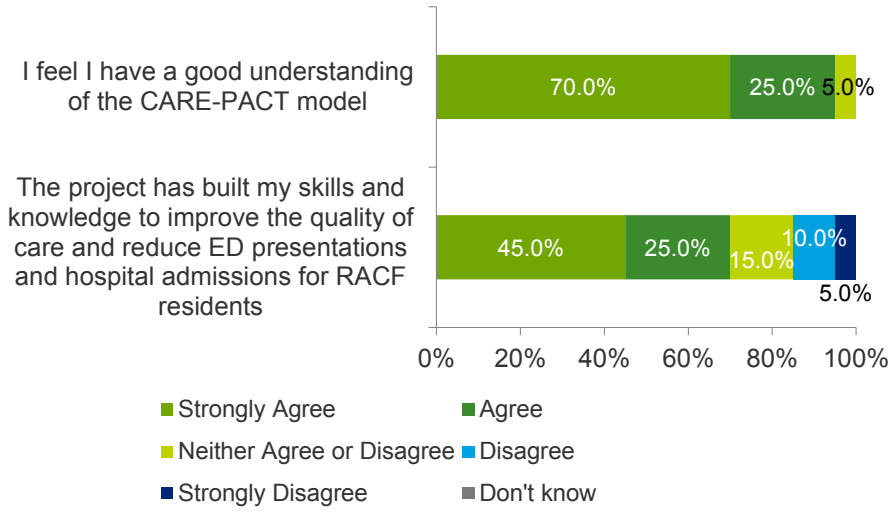
Consistent with earlier evaluation reports, project team and stakeholders largely agreed that the model in principle was sustainable, and aligned with the need to manage increasing demand. It was however acknowledged that the current funding model incentivises activity, rather than demand management and hospital avoidance; this has an impact on the financial sustainability of the CARE-PACT project.

It was identified that ongoing strong stakeholder engagement was required to sustain CARE-PACT; this is particularly important in the context of the current funding models. Beyond the local HHS level, the engagement of strategic stakeholders and decision makers to demonstrate success of projects focused on demand management and hospital avoidance should enhance the conversation of funding and financing reform.

3.4.4 Has the CARE-PACT project built the skills and knowledge of key personnel to support sustainability?

Overall, project team members reported that CARE-PACT had built the skills and knowledge of key personnel to support sustainability and continue to improve clinical care of RACF residents. Stakeholders were largely in agreement, with 95.0% agreeing they have a good understanding of the model, and 75.0% agreeing that the project had built their skills and knowledge regarding care of RACF residents, as shown in Chart 12.

Chart 14: Stakeholders' views on skills built throughout the Project



Source: Stakeholder Outcome Survey

n=20

3.4.5 How could the CARE-PACT project be embedded in the HHSs as 'business as usual'?

As reported in previous CARE-PACT evaluation reports, project team members and stakeholders in general agreed that the model could be embedded as business as usual, and noted some success factors for this to happen. Common themes that emerged from both the project team members and stakeholders were regarding funding, education and ongoing communication and engagement.

The project team also noted the importance of clear clinical governance arrangements, ensuring patient choice is enhance, not restricted, by service implementation, and the critical role of strong links with GPs and RACFs to strengthen the service and its sustainability.

Stakeholders noted continued communication and education in RACFs was important given the high turnover of staff, and it would be important to engage clinical staff at RACFs in a mutually respectful and consultative way would improve capacity building and resultant sustainably of the service. A function for more regular feedback from RACFs on the service was also suggested to allow for continual and ongoing monitoring and improvement of the service going forward.

4. Summary

The table below summarise the key findings from the evaluation by domain.

Domain	Major Findings
Effectiveness	• The vast majority of stakeholders surveyed, including representatives from RACFs, general practice, and HHSs, agreed that the CARE-PACT project had achieved its objectives to a great or significant extent. • Over the course of the pilot project phase, an estimated 1,522 ED presentation were avoided, and an estimated 2,329 hospital admissions were avoided. • Over the course of the pilot project phase, the median LOS of admitted patients from RACFs was reduced by 1 day. • Compliance with gerontic screening of RACF residents presenting to hospital (including cognition, delirium, skin integrity and falls risk) exceed benchmarks for all components.
Efficiency	• The reduction in ED presentations over the period was valued at $1.16 million • The reduction in hospital admissions was valued at $9.77 million • The reduction in inpatient LOS was valued at $3.83 million. • Overall, the total value of savings over the project duration amounted to $17.1 million, realised in released capacity. This resulted in a ROI of 6.1.
Equity	• Over the course of the pilot period, the majority of project team members and stakeholders did not perceive there to be major access barriers to the service for disadvantaged groups (i.e. rural and remote, people with a disability, Aboriginal and Torres Strait Islander, culturally and linguistically diverse). As CARE-PACT provides telephone and outreach support to these facilities, access is generally aligned with access to the RACF itself. • There was, however, some uncertainty from stakeholders regarding whether there were access barriers for rural and remote populations, which is likely to reflect awareness of the geographical scope of the service.
Appropriateness & Acceptability	• The majority of stakeholders were highly supportive (55.0%) with a further 35.0% of respondents rating support between 7 and 9 on the 10-point scale. • There were 2 respondents indicating low levels of support; these respondents were from RACFs, and perceived the service had a tendency to assume a low level of capability and knowledge of RACF staff, when this is not always the case. • In general, stakeholders were either extremely satisfied or very satisfied with the project overall, education and training provided, and support materials provided.
Sustainability	• Project team and stakeholders largely agreed that the model in principle was sustainable, and aligned with the need to manage increasing demand • It was acknowledged that there were barriers to sustainability under current funding models that incentivise activity rather than demand management and hospital avoidance. • Overall, project team members reported that CARE-PACT had built the skills and knowledge of key personnel to support sustainability and continue to improve clinical care of RACF residents. • Stakeholders were largely in agreement, with 95.0% agreeing they have a good understanding of the model, and 75.0% agreeing that the project had built their skills and knowledge regarding care of RACF residents

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RESEARCH ARTICLE Open Access

Mobile radiography services in nursing homes: a systematic review of residents' and societal outcomes

Elin Kjelle[1*] and Kristin Bakke Lysdahl[2]

Abstract

Background: Demographic changes are leading to an ageing population in Europe, and predict an increase in the number of nursing home residents over the next 30 years. Nursing home residents need specialised healthcare services such as radiology due to both chronic and acute illnesses. Mobile radiography, x-ray examinations performed in the nursing homes, may be a good way of providing services to this population. The aim of this systematic review was to identify the outcomes of mobile radiography services for nursing home residents and society.

Methods: A systematic review based on searches in the Medline, Cochrane, PubMed, Embase and Svemed + databases was performed. Titles and abstracts were screened according to a predefined set of inclusion criteria: empirical studies in the geriatric population, and reports of mobile radiography services in a clinical setting. All publications were quality appraised using MMAT or CASP appraisal tools. Data were extracted using a summary table and results were narratively synthesised.

Results: Ten publications were included. Three overarching outcomes were identified: 1) reduced number of hospitalisations and outpatient examinations or treatments, 2) reduced number of transfers between nursing homes and hospitals and 3) increased access to x-ray examinations. These outcomes were interlinked with the more specific outcomes for residents and society reported in the literature. For residents there was a reduction in burdensome transfers and waiting time and adequate treatment and care increased. For society, released resources could be used more efficiently, and overall costs were reduced substantially.

Conclusions: This review indicates that mobile radiography services for nursing home residents in the western world are of comparable quality to hospital-based examinations and have clear potential benefits. Mobile radiography reduced transfers to and from hospital, increased the number of examinations carried out and facilitated timely diagnosis and access to treatments. Further research is needed to formally evaluate potential improvements in care quality and cost-effectiveness.

Keywords: Mobile radiography service, Nursing homes, Socio-economics, X-ray, Telemedicine

Background

Increased interest in demographic changes in our society leading to an ageing population highlights the need for healthcare services to be more effective maintaining high quality standards [1]. An increase in the number of persons living in nursing homes is expected over the next 30 years [1]. Today, nursing home residents are living with several chronic illnesses and up to 80% have dementia [2–4]. In addition, there is a high incidence of acute illnesses such as infections, cardiovascular incidents and injury due to falls [3, 4]. Both chronic illnesses and acute illnesses increase the need for specialist healthcare services for these residents compared to the rest of the population [3]. According to Graverholt and Riise [4] almost 45% of admissions to hospital from nursing homes are related to falls, respiratory infections and diseases of the digestive system [4]. For these indications, conventional x-ray examinations such as chest,

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musculoskeletal and abdominal images are important diagnostic tests [5, 6]. Today, nursing home residents often require transfer to a hospital or an emergency room (ER) to attend radiological services. The sudden change in environment for the nursing home residents, and especially persons suffering from dementia, can affect the person's orientation and sense of security. Transportation and new surroundings such as the x-ray department in a hospital may lead to increased anxiety or disorientation [7]. Inadvertently transfer to hospital may do more harm than good for a nursing home resident, thus hospitalisation should be avoided [2, 5]. In addition, the transfer may affect cost and acceptability of radiological services [8].

It is possible to perform conventional x-ray examinations in nursing homes as a telemedicine service [8, 9]. Mobile radiography services use small, lightweight, portable x-ray equipment with a digital detector [8]. The radiographer drives a vehicle equipped with a wheelchair ramp carrying the equipment and performs the examination with assistance from the nursing home staff in the resident's room [8]. The images can be quality assessed on site and transferred to the radiology department for interpretation [8]. Image quality of examinations in nursing homes is adequate for making a diagnostic decision [10]. Mobile radiography services have been set up in a few countries, for instance in Australia, Canada, Norway, Sweden and the USA [8, 11–14]. However, further knowledge is needed about the outcomes of mobile radiography services for nursing homes residents.

The aim of this systematic review was to identify the outcomes of mobile radiography services for nursing home residents and for society in general.

Methods

To the authors' knowledge, this is the first systematic review aiming to identify outcomes of mobile radiography services for residents and society.

Eligibility criteria

Empirical studies of mobile radiography services in a clinical setting for geriatric nursing home study populations were considered. The focus was on higher-level outcomes of diagnostic imaging on the levels "therapeutic", "patient outcome" and "societal" efficacy, as described by Fryback and Thornbury [15]. In this review, the following designs were eligible: randomised controlled trials, non-randomised trials, descriptive studies, mixed-methods studies, socio-economic evaluations and qualitative studies.

Literature search

The following databases were searched: MEDLINE Ovid, Cochrane Library, PubMed, Embase Ovid and Svemed+. The search strategy was developed in MEDLINE (Ovid) (Table 1), and was further adapted for the other databases. The terms used were derived from two categories: the population (nursing home resident) and intervention (mobile/portable radiography service OR mobile/portable x-ray service). The complete search strategy used is available in (Additional file 1: Table S1). The literature searches were carried out from December 2015 to February 2016, the last search on February 5th 2016.

No language filters or date restrictions were used in the searches. The search was expanded by snowballing techniques screening for citations of the selected studies (Google scholar), reference lists and conference programmes. Grey literature like socio-economic evaluations were searched for using Google. The keywords used in Google are available in (Additional file 1: Table S2).

Selection of records and methodological quality appraisal

The records were archived using Thomson Reuters EndNote X7.4 library and duplicates were removed. All titles and abstracts were screened by EK for eligibility, and a 10% sample was double-checked by KBL.

Mixed Methods Appraisal Tool (MMAT) was used for appraisal of the methodical quality of all studies, except economic evaluations. MMAT is considered appropriate for appraisal of qualitative, quantitative as well as mixed methods studies [16]. The Critical Appraisal Skills Program (CASP) tool [17] was used to appraise the methodological quality of the economic evaluation studies. EK and KBL read all the publications selected for full-text screening, appraised them, and agreed on the final grades and inclusion through discussions.

Table 1 Search strategy in MEDLINE (Ovid)

#	MEDLINE Ovid
1	nursing homes/or intermediate care facilities/or skilled nursing facilities/
2	Homes for the Aged/
3	(nursing adj (home* or facilit*)).tw.
4	(home? for the aged or home? for the elderly).tw.
5	((intermediate or long-term or longterm) adj care facilit*).tw.
6	2 or 3 or 4 or 5
7	exp Diagnostic Imaging/
8	((diagnostic or medical) adj (radio* or x-ray* or x ray*)).tw.
9	exp Radiography/
10	(mobile adj (radio* or x-ray* or x ray*)).tw.
11	(portable adj (radio* or x-ray* or x ray*)).tw.
12	exp Telemedicine/
13	(telemedicine adj (radio* or x-ray* or x ray*)).tw.
14	7 or 8 or 9 or 10 or 11 or 12 or 13
15	6 and 14

Data extraction and synthesis

Data were extracted using a summary table based on recommendations by Støren [18]. The summary table was composed of the following categories: author, title and year, background, objective, research question, keywords, design, population, methods, results, conclusion, further questions, clinical implications and limitations. EK extracted data from all publications and KBL from 30% of the publications for quality assurance purposes.

A narrative synthesis was chosen due to the variety of methodologies used in the studies included in this review. This narrative synthesis included a familiarisation process of the results, methodological appraisal and transformation of quantitative data. Further, description and tabulation of data and performing a content analysis, and finally the authors discussed the synthesis through critical reflection until agreement was achieved [19].

Results

Database searches, Google searches and snowballing identified 2548 individual records, which was reduced to 2238 after duplicates were removed. Two thousand two hundred twenty one excluded publications did not report on mobile radiography services. After screening, 17 full text publications were appraised.

Seven publications were excluded because of overlapping publications (from the same study), non-clinical settings, non-empirical designs or being technical or diagnostic accuracy efficacy assessments. An overview of excluded articles is available in Additional file 1: Table S3. No publications were excluded because of language. Figure 1 shows the selection process in detail.

Ten publications were included in this review: eight articles, one conference abstract, and one socio-economic evaluation.

Characteristics of the included publications

Among the included publications are; one randomised controlled trial (RCT), one qualitative focus group interview study and three socio-economic analysis. The rest of the included publications reported on outcome of mobile radiography services based on different quantitative descriptive methods. Publications in English, Norwegian and German were included in the review. Further characteristics of the publications are listed in Table 2, along with scores for methodological quality. The detailed assessment of methodological quality, in MMAT or CASP forms, for each publication are available in (Additional file 1: Tables S4 and S5 respectively).

In the analysis, it was found that the outcomes were on different levels and highly interlinked. Some outcomes were overarching in the sense that they are likely to influence or can explain other outcomes. Overarching outcomes of mobile radiography services are presented

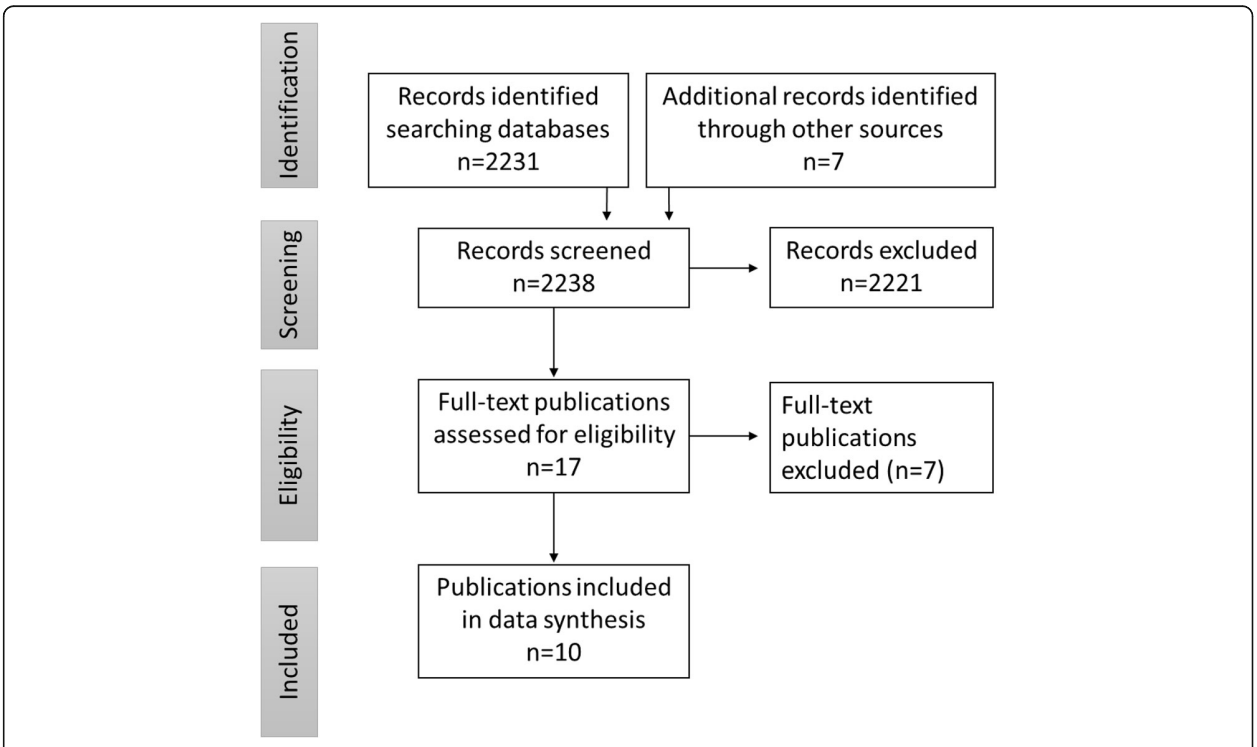

Fig. 1 Flowchart of the selection process

Table 2 Characteristics and methodological quality score of the publications included in the review

Author and year	Aim/objective	Design	Methods	Scope and type of data	Respondents	Area and nationality	MMAT/ CASP grade[a]
Eklund 2011 [25]	Investigate the usefulness of a mobile radiography service for radiological assessment of patients in nursing homes from the patient and staff perspectives	Prospective, descriptive, quantitative study	• Questionnaire for nurses and residents • Registration form for image quality Telephone survey of outcome and treatment	123 nursing homes residents	Registered nurses at 25 nursing homes 62 residents	Lund, Sweden	****
Forat Sadry 2010 [22]	Investigate satisfaction with mobile services among referring physicians and nursing home staff	Prospective, descriptive, quantitative study	Questionnaire	318 nursing home residents using the mobile radiography service in 2007	Referring physicians and nursing home staff	BaselStadt, Baselland and Genf, Switzerland	*
Lærum 2005 [23]	Consequences for residents transferred to hospital for examination and treatment	Prospective, descriptive assessment	Questionnaire	714 nursing home residents	Nursing home staff at six nursing homes	Oslo, Norway	****
Lærum, Sager, Oswold 2005 [20]	Investigate feasibility of mobile services for residents, referring physicians and the nursing homes compared to outpatient services	Prospective, descriptive, quantitative study	Questionnaire	197 nursing home residents	Nursing home staff at 31 nursing homes	Oslo, Norway	***
Montalto 2015 [21]	Measure the impact of the mobile x-ray service on emergency department attendances by residents of residential aged care facilities who require plain X-ray services	Retrospective before-and-after cohort	Registry data analysis	Residents of 30 nursing homes frequently using the mobile x-ray service	n/a	Melbourne, Australia	****
Richauda 2011 [27]	Explore the quality of imaging and clinical outcomes of using mobile, light-weight x-ray equipment to provide radiologic examinations to frail elderly patients at home	Randomized controlled trail (RCT)	a) Confusion Assessment Method b) Delirium Rating Scale European Guidelines on Quality Criteria	69 immobilized or chair bound patients, acutely ill at intermediate or high risk of delirium in need of a radiological examination	7 radiologists	Torino, Italy	****
Thingnes & Stalsberg 2010 [26]	Explore aspects that nurses, nurse assistants and radiographers perceive important when implementing mobile radiography services to nursing homes	Qualitative	Focus group interviews	Health care personnel from one nursing home and one hospital	Radiographers, nurses and nurse assistants	Norway	***
Dozet 2015 [29] (abstract)	The aim of this study was to investigate whether mobile radiography was more cost-effective from a societal perspective, compared to hospital based radiological examinations.	Cost-effectiveness analysis	Prospective cost-minimization analysis	X-ray examinations in nursing homes (315 residents) compared to outpatient examinations (77 residents)	n/a	Lund, Sweden	*
Price Waterhouse Coopers 2006 [28]	Socio-economic cost-benefit analysis of shifting to mobile radiological services	Socio-economic cost-benefit evaluation	Literature review, interviews and valuing monetized effects	Registry data, reports and pilot project	Key personnel	Seven cities or areas of Norway	****
Randers 2005 [24]	Estimate socio-economic costs comparing two different ways of performing x-ray examinations of nursing home residents	Socio-economic cost evaluation	Costs analysis	Resources used and related cost statistics for mobile and stationary services	n/a	Norway	***

[a]In MMAT, papers are graded from 25% (one criteria met = *) to 100% (all criteria met = ****) [16]. In the CASP economic evaluation checklist, section B "How were costs and consequences assessed and compared?" publications were graded from 25% (1–2 criteria met = *) to 100% (all criteria met = ****)

separately. Figure 2 shows an overview of the main findings and indicates how they may be interrelated.

Overarching outcomes of mobile radiography services

First, mobile radiography services reduced the amount of hospitalisations, outpatients treatment and examinations in hospital or ER. Examination in the nursing home facilitated for instance, treatment of pneumonia in the nursing home instead of at the hospital or ER [5, 11, 20, 21]. Laerum and Sager [20] reported a 6% reduction in hospitalisation of nursing home residents after introducing mobile radiography services in Oslo. According to Montalto, Shay [21], nursing home residents' presentation at the ER decreased by 11.5% the first year after introducing mobile radiography services in Melbourne.

Second, mobile radiography services reduced the use of ambulance and taxi transportation of nursing home residents for treatment or examination in hospitals or ERs. Two studies reported a 90–94% reduction in transfer of residents for outpatient x-ray examinations after introduction of mobile services [20, 22]. If the mobile radiography services had not been available, 50–88% of residents would have needed ambulance transportation and the rest would have needed a wheelchair taxi, regular taxi or private car [20, 22, 23].

One study reported on staff needed to accompany residents in transfer, and found that 75% of the residents needed nursing home staff to accompany them in transfer and while waiting [23]. Further, the next of kin accompanied 25% of the residents, and a few residents were accompanied by both staff and next of kin [23]. In addition, mobile radiography services reduced the time spent per examination. Randers [24] estimated a total of approximately 25 min per examination in a nursing home (from the arrival of the vehicle to departure). Two studies reported residents to be away for 4–5 h on average when going to an outpatient clinic in an urban area [23, 25]. According to Eklund, Klefsgård [25] and Thingnes and Stalsberg [26] most of this time was spent waiting or in transfer.

Finally, the number of necessary examinations performed increased when mobile radiography services were introduced. Laerum, Sager [20] reported 10% of the residents in their study were not able to be transferred for an outpatient examination. Further, residents often refuse to be transferred to hospital because they are scared according to Thingnes and Stalsberg [26]. Thus, mobile radiography services provided access to a radiological service for these residents and increased the number of residents receiving diagnostic services.

Outcome for nursing home residents

There were two main outcomes for nursing home residents: First, avoiding hospitalisation, outpatient examination/treatment and transfer reduced the negative consequences for nursing home residents [23, 26, 27]. Second, radiological tests facilitated more adequate treatment and care [20, 25, 27].

Three studies reported the negative potential consequences for residents. According to Laerum, Åmdal [23] outpatient examinations were responsible for exhaustion and in certain cases confounded with confusion in 45% of the residents in their study [23]. Ricauda, Tibaldi [27] found that 17% of residents examined at the hospital developed delirium within a few hours after the examination. X-ray examination at the nursing home had an insignificant impact on residents [23] and none developed delirium [27]. In the qualitative study, the nurses and nurse assistants described residents to be confused, scared, restless and in pain when examined at the hospital.

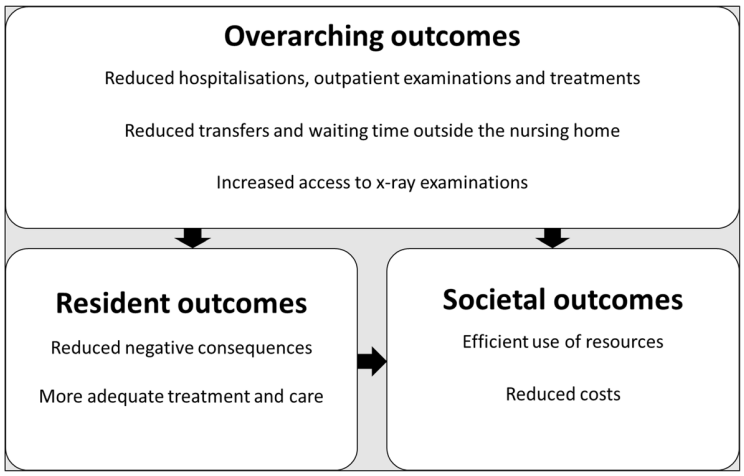

Fig. 2 Outcomes of mobile radiography services. The arrows indicate links between overarching, residents' and societal outcomes

Furthermore, nursing home residents can cause disturbance for other patients at the radiology department [26].

Laerum, Åmdal [23] reported that the negative consequences for residents increased with the amount of time spent away from the nursing home. More than two and a half hours gave a significant ($p < 0.001$) increase in negative consequences for residents [23]. As previously described, residents are on average 4–5 h at the hospital for an outpatient x-ray examination [23, 25].

X-ray examinations provided important information for the treatment and care of nursing home residents. Three studies described the therapeutic outcome of examinations. For 58–70% of the examinations, the assumed diagnosis was confirmed and for 40% the tentative diagnosis was disproven [20, 27]. This was similar to examinations performed in a hospital [27]. According to Eklund, Klefsgård [25], 29% of the examinations in their study demonstrated significant pathology. Laerum, Sager [20] described that the findings of the mobile examinations had consequences for the medical treatment for 85% of the residents, and for care plans for 71% of the residents [20]. Hence, mobile services improved the adequacy of the treatment and care of nursing home residents.

Societal outcomes

To invest in a vehicle and new equipment in addition to reorganising the way the radiographers work may have led to an increase in costs [24, 28]. However, the reduction in hospitalisations, transfers, staff accompanying residents and hospital/ER treatment reduced costs in both hospitals and nursing homes, thus for society as a whole [24, 28, 29].

When up to 75% of residents needed to be accompanied by healthcare staff and they were away on average 4–5 h [23, 25] the absence of staff have negative potential consequences for the other residents at the nursing home and the remaining nursing home staff, because the home is left short-handed [23, 26]. However, additional staff may be called in, which led to an additional increase in costs [28]. For society, 25% of the residents needed their next of kin to accompany them; this may have reduced effectiveness in the rest of society when employees have to take the day off work to take care of their family member [23].

Three publications from local projects in Norway and Sweden compared the cost of mobile radiography services with the cost of outpatient examinations, resulting in 30–60% cost reduction per examination. The size of the reduction depended on the distance between the nursing home and the hospital, in addition to the number of residents examined per visit [24, 28, 29].

Discussion

The purpose of this systematic review was to create a better understanding of the outcomes of mobile radiography services compared to conventional x-ray examinations. Ten publications were included.

Outcome of mobile radiography services

This review indicates three overarching outcomes of the introduction of mobile radiography services: a reduction in transfers from nursing homes to hospital or the ER for examination, treatment or care, a reduction in burdensome waiting time in hospital, and increased access to radiological procedures.

These overarching outcomes reduced the negative potential consequences for nursing home residents in need of x-ray examinations, and improved access to radiological tests for residents who for various reasons were unable to be transferred [20]. Furthermore, an x-ray examination facilitated more appropriate treatment and care [20, 24, 27]. This was of course dependent on the image quality being adequate for diagnosing. Studies comparing image quality in examinations carried out in hospitals and in nursing homes reported adequate diagnostic quality regardless of where the examination took place [10, 25, 27]. When examined at the nursing home, more residents would also be treated locally [20, 21]. This may have led to greater responsibilities for the nursing home staff, which may influence decisions about whether to send resident for acute treatment or examination at a hospital or to wait for the radiography services [26]. Conversely, treatment given locally facilitated coordination and continuity of treatment and care, which is important for this fragile population [23, 30].

For society, this review indicates that mobile radiography services could reduce healthcare costs by using resources more efficiently [24, 28, 29]. Both reduction in transfers with accompanying staff and changes in where treatment were given contributed to a cost reduction of 30–60% per examination [21, 24, 26, 28, 29]. Family members who accompanied residents to hospital, may be absent from work for one whole day. This would generate negative economic impact at a societal level.

Population demographics in the western world are changing with increasing life expectancy and fewer births. Ageing populations with increased healthcare needs and thus, increase in costs coupled with constrained resources creates efficiency pressures on healthcare services [31–33]. The European Commission calls for the use of telemedicine, new technology and a personalised healthcare system to meet these challenges [8, 33]. This review suggests that mobile radiography services can provide an effective alternative to outpatient x-ray examination for nursing home residents [24, 28, 29], in addition this can contribute to meet the challenges for healthcare efficiency. To date, only a few countries have introduced mobile radiography services. Barriers within the healthcare systems may prevent the establishment of these kind

of services. Generally, in Europe telemedicine services are limited to local small-scale projects [9]. Hence, these barriers may be common for services that are organised differently than "ordinary" healthcare services. The way telemedicine services are organised may not fit the system of reimbursement from the health authorities. This may cause co-payment to be applied, which in turn may affect service provision or use [9]. Another reason may be lack of knowledge among decision-makers working in healthcare of the beneficial outcomes of mobile radiography services.

Strengths and limitations

The search in the databases was systematic, and no language or date restrictions were used, thus the search strategy was exhaustive and it is likely to have been complete. The term mobile radiography services is also used to describe mobile radiography services within a hospital intensive care unit or at the emergency department. However, this did not cause any irrelevant hits because mobile/portable radiography/x-ray was combined with various terms for nursing home/home for the aged etc. Still, there were few studies and evidence was scarce. The variety in quality of the included publications limited the strength of the conclusions made in this review. The quality of evidence in systematic reviews are reflected in the level of confidence in the findings in the included studies [34]. The included publications were mostly related to programmes for introducing mobile radiography services in a community, which may have led to a bias towards positive outcomes of these services. However, with limited studies published it is important to identify existing knowledge in order to facilitate further research. Thus, publications were included despite suboptimal quality grading. Further, the types of studies included makes a narrative synthesis of results to be the best solution.

Notwithstanding its limitations, this review identified important benefits for nursing home residents and for society. Healthcare policies call for changes in organisation and efficiency, in addition to the use of new technology and telemedicine to reduce the strain on specialist healthcare [1, 9, 33, 35, 36]. Further research is needed to evaluate the outcome of these services in larger scale studies from different geographical areas (urban and rural). In addition, the outcome for individual residents and next of kin should be studied in more depth. The latter is presently unknown. There is a need for robust cost-effectiveness analyses from larger areas and more countries. Further, research is also needed to examine potential barriers to the implementation of telemedicine services in healthcare systems [9].

Conclusion

This review indicates that mobile radiography services for nursing home residents in the western world are of comparable quality to hospital-based examinations and have clear potential benefits. Mobile radiography reduced transfers to and from hospital, increased the number of examinations carried out and facilitated timely diagnosis and access to treatments. Reduction in transfers, waiting times and exposure to unfamiliar environments contributed to the psychosocial well-being of nursing home residents and reduced disruption for carers and families of residents. Further research is needed to formally evaluate potential improvements in care quality and cost-effectiveness.

Additional file

Additional file 1: Includes a complete search strategy, reasons for excluded articles and the MMAT and CASP checklists for all included articles. **Table S1.** Search strategy. **Table S2.** Searches in Google and Google Scholar. **Table S3.** Excluded articles with reasons. **Table S4.** Mixed Methods Appraisal Tool (MMAT) assessment of included studies. **Table S5.** CASP appraisal of economic evaluations included in the review. (DOCX 60 kb)

Abbreviations

CASP: Critical Appraisal Skills Program; ER: Emergency room; MMAT: Mixed Methods appraisal tool; RCT: Randomized controlled trial

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Availability of data and materials

The complete search strategy is available in Additional file 1: Tables S1-S2. The data sets supporting the conclusion of this article are included within the article and its additional file.

Authors' contributions

Both EK and KBL contributed to the conception of the study and to the development of the protocol of this review. EK performed the searches, did most of the screening and drafted the manuscript. Both authors took part in the interpretation of the data, revision and approval of the final manuscript.

Competing interest

The authors declare that they have no competing interests.

Consent for publication

Not applicable.

Ethics approval and consent to participate

Not applicable.

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