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IMPACT: Investigating the impact of Models of Practice for Allied health Care in subacuTe settings. A protocol for a quasi-experimental mixed methods study of cost effectiveness and outcomes for patients exposed to different models of allied health care

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ABSTRACT

Introduction This protocol considers three allied health staffing models across public health subacute hospitals. This quasi-experimental mixed-methods study, including qualitative process evaluation, aims to evaluate the impact of additional allied health services in subacute care, in rehabilitation and geriatric evaluation management settings, on patient, health service and societal outcomes.

Methods and analysis This health services research will analyse outcomes of patients exposed to different allied health models of care at three health services. Each health service will have a control ward (routine care) and an intervention ward (additional allied health). This project has two parts. Part 1: a whole of site data extraction for included wards. Outcome measures will include: length of stay, rate of readmissions, discharge destinations, community referrals, patient feedback and staff perspectives. Part 2: Functional Independence Measure scores will be collected every 2–3 days for the duration of 60 patient admissions. Data from part 1 will be analysed by linear regression analysis for continuous outcomes using patient-level data and logistic regression analysis for binary outcomes. Qualitative data will be analysed using a deductive thematic approach. For part 2, a linear mixed model analysis will be conducted using therapy service delivery and days since admission to subacute care as fixed factors in the model and individual participant as a random factor. Graphical analysis will be used to examine the growth curve of the model and transformations. The days since admission factor will be used to examine non-linear growth trajectories to determine if they lead to better model fit.

Ethics and dissemination Findings will be disseminated through local reports and to the Department of Health and Human Services Victoria. Results will be presented at conferences and submitted to peer-reviewed journals. The Monash Health Human Research Ethics committee approved this multisite research (HREC/17/MonH/144 and HREC/17/MonH/547).

Strengths and limitations of this study

► The opportunity to investigate three different models of additional allied health across three health services concurrently.
► This study is not a randomised controlled trial, so the trial design may lead to selection biases.
► Risk of bias due to inability to blind personnel in the intervention and control wards.
► Use of only a single measure—the Functional Independence Measure—as the primary outcome to map the functional improvement of patients.

INTRODUCTION

Allied health service managers consider a range of factors when deciding how to allocate staff across different clinical streams of care (eg, cardiopulmonary, oncology, geriatric rehabilitation) and service settings (eg, acute inpatients, subacute rehabilitation, outpatient services).[1] One factor relates to the impact of the service, in terms of both patient outcomes and cost-effectiveness. However, allied health managers commonly rely on personal experience or benchmarking with other services to inform their decisions, as they perceive that relevant, reliable evidence is not commonly available to address their particular research question.[1]

One area where there are high levels of involvement of allied health staff and a range of service delivery options available is inpatient, subacute care, which includes services for patients receiving rehabilitation and geriatric evaluation and management

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(GEM). In Victoria Australia, inpatient rehabilitation is goal-focussed care provided within a team environment to patients of any age who may be experiencing injury or chronic illness or living with a physical disability.[2] GEM is care in which the treatment goal is functional improvement for a person whose medical needs are primarily associated with ageing.[3] Separate specialist rehabilitation services are also available for acquired brain injury or progressive neurological disorders.[4] Traditionally, these services are provided over 5 days (Monday to Friday). In this study, both GEM and rehabilitation subacute care will be considered.

Allied health services in subacute hospital settings commonly include a core staff group of: occupational therapists, physiotherapists, social workers, dietitians, speech pathologists and allied health assistants.[3] These allied health professionals assess patients' needs, goals, premorbid and current level of functioning and provide inpatient therapy accordingly. Their roles aim to improve patients' capacity to regain functioning, to maximise independence and to support the patient and their family through the processes of discharge planning. Allied health staff can also refer as required to other allied health professionals outside this core team including: psychologists and/or neuropsychologists, podiatrists, oral hygienists, exercise physiologists, music therapists and spiritual care practitioners. Additional allied health service delivery models in subacute settings are often based on the idea that providing a greater amount of allied health services, patients will experience faster rates of improvement. Providing additional allied health resources may also facilitate earlier completion of the discharge planning process, resulting in reduced length of stay and cost to the health system. However, there are only a small number of trials that have directly examined the impact of additional allied health resources in subacute populations,[5–7] and none that have modelled whether increasing the amount of allied health therapy services changes the trajectory of improvement in functional independence using more than two measurements of this outcome within a hospital admission.

Studies that have examined the impacts of providing additional services in subacute care have reported contrasting findings. A trial of Monday to Saturday rehabilitation showed outcomes including higher functional independence and health-related quality of life on discharge.[5] There was also indication that providing 6 days of allied health service may have reduced length of stay.[5] Another study in Victoria, Australia, that evaluated the introduction of Saturday inpatient rehabilitation (ie, an additional day of service) reported no impact on length of stay; however, improvement in functional outcomes was noted.[6] A study conducted in South Australian general medical acute wards reported increased allied health services (increased staffing and provision of weekend allied health services) contributed to reductions in length of stay.[8] The uncertainty in models of care and

their impact on length of stay and optimising functional improvement raise the need for further health services research. Previous studies have indicated contrasting findings. There is a need to further understand the impact of additional allied health services on both patient and service outcomes to assist in clarifying best practice and efficacy of different models of care.

This study aims to evaluate the impact of providing additional allied health services in subacute care, both in rehabilitation and GEM settings, on patient, health service and societal outcomes. As part of the aim to evaluate patient outcomes, we plan to determine the association between functional trajectories of patients exposed to different allied health models of care. A secondary aim of this study is to explore if service model differences change the amount of services actually delivered. There is limited understanding of models of care change and its impact on community-based services including downstream cost shifting. Therefore, it is important to understand if subacute-based allied health models of care, involving provision of additional services, can improve economic efficiency of bed-based services. In addition, this study will also investigate whether the staff estimation of a patient's functional independence target for discharge is being met by the date of discharge. Exploring these outcomes has benefits for healthcare as well as for broader society. It seeks to provide an insight into allied health service effectiveness and help informed decision making in regard to allied health staffing levels in subacute units.

METHODS AND ANALYSIS
Study design
This study will compare additional allied health service models to standard allied health service models at each of the three Victorian public health services (figure 1). This protocol presents three separate trials on the same programme of research. There are two parts of the study. Part 1 of this study is a quasi-experimental, pre-post intervention study with parallel control groups. Part 2 is an observational, repeated measures, dose-response study nested within the larger study. Both parts of the study will be conducted across three health services, Peninsula Health, Monash Health and Eastern Health, Victoria, Australia. These three Victorian public health services recently introduced additional allied health staffing models in some of their rehabilitation and GEM wards.

PATIENT AND PUBLIC INVOLVEMENT
This is health service research designed to understand health service models. Different health services have developed their models based on consumer feedback; however, this has not been explicit in the design. Patients and the public will not be involved in anything other than an anonymised data collection about their experience.
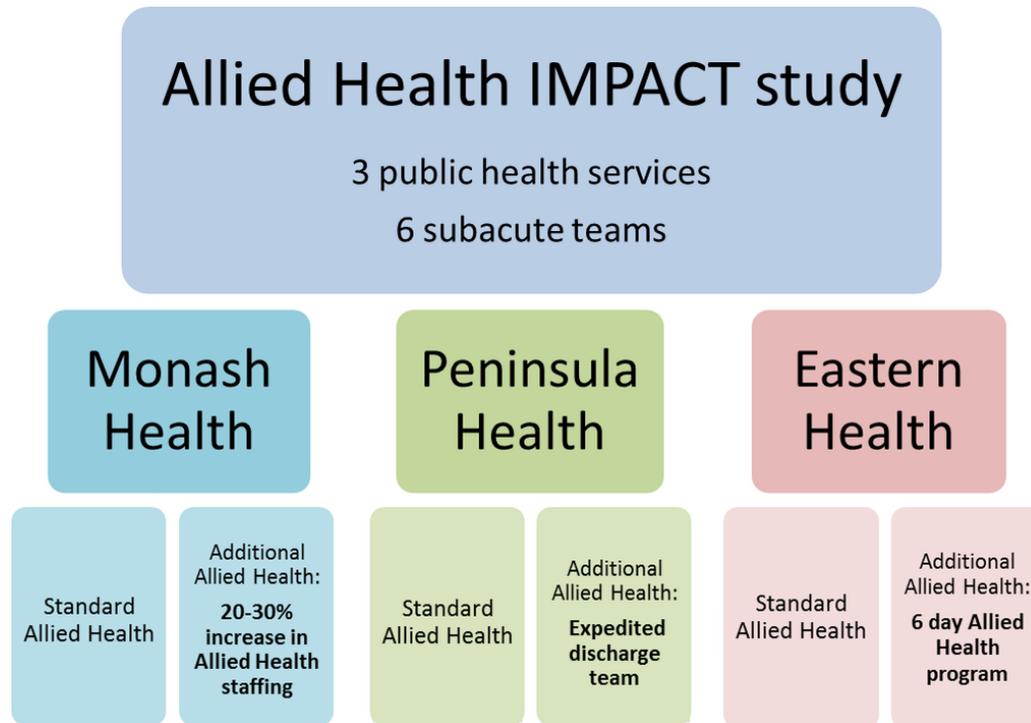
Figure 1 Study design. IMPACT: Investigating the impact of Models of Practice for Allied health Care in subacuTe settings

SETTINGS AND INTERVENTIONS

Each health service has applied a different model of care that will be trialled over a 6-month period.

Site 1: Peninsula Health

Peninsula Health provides health services to the metropolitan and regional areas on Victoria's Mornington Peninsula, with a population of over 300 000 people.[9] At Peninsula Health, an additional five full-time equivalent allied health clinicians (two physiotherapists, two occupational therapists, a part-time social worker and one allied health assistant) will be introduced to manage selected patients across three subacute wards at The Mornington Centre. This team has a primary focus on providing greater intensity allied health services to patients who meet the programme criteria. These internal health service criteria are based on patient goals, capacity to participate in intensive therapy, level of social support required to support early discharge and suitability for ongoing therapy in the community post discharge. Patients accepted into the programme are predominantly GEM; however, rehabilitation patients are also eligible. The primary aim is to facilitate early discharge and greater intensity of allied health intervention.

Site 2: Monash Health

Monash Health is the largest public health service in Melbourne and provides clinical services to almost a quarter of the population in metropolitan Melbourne.[10] At Monash Health, there will be an increase of 20% to 30% in allied health staffing added to the existing staffing complement within one subacute ward. This increase will include additional physiotherapy, occupational therapy and social work. The participants for this study will be those admitted to the subacute ward and classified as GEM patients.

Site 3: Eastern Health

Eastern Health is a metropolitan and outer metropolitan service providing clinical services to over 750 000 people in the eastern community.[11] At Eastern Health, an additional day of week (Saturday) service will be trialled on one subacute GEM ward for a period of 6 months. The additional service will consist of two additional occupational therapists, two physiotherapists, two social workers and two allied health assistants working a 7.6-hour shift on a Saturday equivalent to the same per-day staffing level as the Monday to Friday service. There will also be an on-call service for allied health professions including speech pathology, psychology and dietetics for the period of the study.

CONTROL: STANDARD MODELS OF ALLIED HEALTH STAFFING AT ALL SITES

Each of the three health services will have a control subacute ward with similar patient cohort. At Peninsula Health, both GEM and rehabilitation patients from an equivalent subacute ward at a different site at Peninsula Health will be included; at Monash Health, patients with a GEM classification from an equivalent subacute ward at the same site will be included; and at Eastern Health, patients from an equivalent GEM ward at a different site will be included. These control wards provide usual care with the standard allied health models of care as per current working protocols. Wards and their locations have been chosen to minimise contamination. The

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control patient data may be collected at a parallel time, or a sequential and equivalent time frame.

PART 1
Outcomes

Pragmatic trials require a range of outcome measures rather than a single primary outcome.[12] In this study, a number of domains to measure the impact will be examined. Primary outcome measures will be obtained through a whole of site data extraction for the period of the additional allied health trial. This will be for a 6-month period at each site.

Primary outcome 1

Length of stay relative to expected length of stay: The total days each participant stays on each ward. Length of stay information will be obtained through data extraction at each site for the duration of the intervention. Length of stay will be calculated by days between admission and discharge. This will be compared with expected length of stay. Expected length of stay is predicted on admission through the admission code according to patient diagnosis and admission Functional Independence measure (FIM) score.[13] Length of stay information is consistently used to gauge hospital service efficiency and is accessible from all health services.

Primary outcome 2

Rate of unplanned hospital readmissions within 30 days of discharge: This information is routinely recorded by health services and will assist in understanding effectiveness of treatment and discharge planning.

Primary outcome 3

Functional independence at discharge (adjusted for baseline value): Routinely recorded FIM scores at admission and discharge across will be extracted. These scores measure patients' level of functional independence and capture change in functioning from admission to discharge.

Secondary outcome 1

Patient discharge destination: This will be recorded as home, Transition Care Programme, residential care or transfer to an acute or other inpatient ward. This information will establish whether patients were discharged to a new destination on discharge.

Secondary outcome 2

Referrals to community services: The number of referrals from inpatient subacute to community services will be tallied. Referrals will be extracted from patient medical records. This outcome will provide an insight into downstream effects of the allied health models and any potential impact on the volume of referrals to community services.

Secondary outcome 3

Patient satisfaction and feedback: Compliments and complaints arising from the wards will be included in this study. Consideration of the number and nature of the compliments and complaints.

Secondary outcome 4

Cost of subacute treatment per patient: Measured costs for each patient's subacute hospitalisation using each hospital's clinical costing data.

Process measures include

Allied health occasions of service (patient level data): Data on the number of allied health occasions of service for patients on wards included in this study will be collected. This is to establish the amount of therapy patients receive.

Qualitative outcomes

Staff perspectives and feedback will be sought at the conclusion of the study. This will be conducted through an online staff survey and focus groups held at each intervention site. Focus groups will be audio recorded and the data transcribed verbatim.

DATA ANALYSIS

For part 1, a linear regression analysis will be conducted for continuous outcomes using patient-level data. A logistic regression analysis will be used for binary outcomes (eg, unplanned hospital readmission). The examination of functional independence at discharge will include statistical adjustment for admission scores. The cost data will also be adjusted for expected length of stay. There will be analysis of all data with a main effect of additional resources versus non-additional resources. We will follow this with examination of any site by additional resource interaction effect.

The qualitative data collected through focus groups will be analysed using a deductive thematic analysis approach with constant comparison.[14] A process of coding will be undertaken by the principal investigators. The data at each of the three sites will be analysed separately. The results from the online survey will be analysed using descriptive statistics and deductive thematic analysis to explore themes arising from short answer questions.[14] Qualitative data analysis will be managed using NVivo V.11 software.

PART 2

This component of this study aims to determine how long it takes patients to reach the minimum requirements for functional independence to be discharged (as judged by their treating team) prior to their actual discharge for patients receiving standard and additional allied health services.

PART 2 PARTICIPANTS AND SETTING

Data for this component of the study will be collected from the intervention and control wards of each participating service. Thirty patients (10 from each of the three sites) from the wards receiving additional allied health services and 30 patients (10 from each of the three sites) from the usual care wards will be included. All sequentially admitted patients to the control and interventions ward will have their FIM scores collected from the treating team every 2 to 3 days. The FIM is an instrument that measures changes in a patient's functional ability during their admission. The FIM is routinely recorded in subacute settings at admission and discharge. Patients are scored on 13 motor items and five cognitive items, rating these items on a seven-point scale (1=total assistance to 7=complete independence.) The FIM is mandated by the Department of Health and Human Services, Victoria, Australia for all GEM admissions.[3]

If the patient is discharged with less than three FIM scores recorded, their scores will be excluded from the study. A minimum of three or more FIM scores (including routine admission and discharge FIMs) are required to map functional improvement over time. Staff will also set FIM scores that will be the minimum functional independence target that the team assesses the patient would need to achieve in order to be discharged. As staff do not routinely set target FIM scores, there is a potential for variation in scoring these goals across sites and this will be acknowledged when reporting results.

PART 2 OUTCOME MEASURES

The outcome measure will be the change, and the rate of change, of the FIM[15].

Collected length of stay data is detailed in the part 1 study outcome measures.

Procedure

Each health service will have 10 participants recruited from an intervention ward (receiving an additional allied health model) and 10 participants recruited from a control ward (receiving a standard allied health model). These participants will be the first 10 consecutive admissions on intervention and control wards. In addition to FIM scores recorded on admission and discharge, additional FIM scores will be collected every 2–3 days during a patient's admission to track the trajectory of their improvement until discharge. Target goals for discharge will also be collected from the treatment team. These target goal scores will be collected at patient admission and rerecorded if there is a significant change in the patient's presentation during their admission potentially impacting on the goal for discharge. Score rerecording will take place if the nature of the patient's change in presentation consequently impacts the goal for their discharge. As a patient's rate and nature of functional improvement may change as a result of their presentation, it is important to reflect this in what can be expected at discharge. Where possible, goal scores will be reassessed approximately every 2 weeks, irrespective of significant change, to incorporate any new information that may be discovered in regard to the patient's functioning. This is to ensure the FIM goal scores for discharge are sensitive and reflective of the team's aims for the patient.

FIM scores will be decided by the treating team of allied health, Nursing and Medical staff and will be collected by a member of the research team. This person will telephone in or attend ward meetings to document the scores for target patients. As these are observational, no enrolment of participants will be undertaken. There will be no recording of scores within the patient file, other than the routinely recorded admission and discharge FIM scores, to avoid recall bias.

PART 2 DATA ANALYSIS

A linear mixed model analysis will be conducted using therapy service delivery and days since admission to subacute care as fixed factors in the model and individual participant as a random factor. Graphical analysis will be used to examine the growth curve of the model and transformations of the days since admission factor will be used to examine non-linear growth trajectories to determine if they lead to better model fit.

ADVERSE EVENTS

It is not anticipated that this research design is likely to result in adverse events provided there are no changes to routine practice.

ETHICS AND DISSEMINATION

The results will be disseminated through published manuscripts and conference presentations. Additionally, the reported outcomes may be placed on the Victorian Department of Health and Human Services website. This protocol presents three separate trials on the same programme of research. While individual studies may be published separately, this present study seeks to evaluate a programme of initiatives.

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