

**Allied health transdisciplinary models of care in hospital settings:  
A scoping review**

Author

Martin, AK, Green, TL, McCarthy, AL, Sowa, PM, Laakso, EL

Published

2023

Journal Title

Journal of Interprofessional Care

Version

Accepted Manuscript (AM)

DOI

[10.1080/13561820.2022.2038552](https://doi.org/10.1080/13561820.2022.2038552)

Rights statement

This is an Accepted Manuscript version of the following article, accepted for publication in Journal of Interprofessional Care. A.K. Martin, T. L. Green, A. L. McCarthy, P. M. Sowa & E-L. Laakso (2023) Allied health transdisciplinary models of care in hospital settings: A scoping review, Journal of Interprofessional Care, 37:1, 118-130. It is deposited under the terms of the Creative Commons Attribution-NonCommercial License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited.

Downloaded from

<http://hdl.handle.net/10072/429110>

Griffith Research Online

<https://research-repository.griffith.edu.au>

REVIEW ARTICLES



Q1

## Allied health transdisciplinary models of care in hospital settings: a scoping review

Q2 A.K. Martin<sup>a</sup>, T. L. Green<sup>b</sup>, A. L. McCarthy<sup>c</sup>, P. M. Sowa<sup>d</sup>, and E. L. Laakso<sup>e</sup>

<sup>a</sup>Faculty of Medicine, Mater Research Institute – the University of Queensland, Brisbane, Australia; <sup>b</sup>School of Nursing, Midwifery and Social Work, The University of Queensland – mnhs Surgical Treatment and Rehabilitation Service, Brisbane, Australia; <sup>c</sup>School of Nursing, Midwifery and Social Work, Mater Research Institute – the University of Queensland, Brisbane, Australia; <sup>d</sup>Centre for the Business and Economics of Health, The University of Queensland, Brisbane, Australia; <sup>e</sup>Allied Health, Mater Research Institute – the University of Queensland, Brisbane, Australia

### ABSTRACT

Improving the productivity of the allied health workforce is a global priority in response to the increasing incidence of chronic disease, associated healthcare costs, and insufficient workforce volume. Team-based healthcare, specifically allied health transdisciplinary teams, might be a solution to improve the utilization of workforce while maintaining high-quality and value-based healthcare. Allied health transdisciplinary teams are a valuable solution in settings where care is delivered by different allied health professionals. Transdisciplinary teams embrace overlapping skills and blur traditional professional boundaries, allowing one professional to deliver certain aspects of care without eroding the skills and knowledge that each profession offers. The objective of this scoping review is to systematically examine and map the characteristics, outcomes, facilitators, and barriers of contemporary allied health transdisciplinary models of care that have been implemented in hospital settings. The scoping review was guided by the Joanna Briggs Institute methodology and reported in line with the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR). Three screening rounds were completed by two independent reviewers. Included sources were synthesized using descriptive and tabular analysis. Nine studies that evaluated hospital-based allied health transdisciplinary teams were included. One study was a randomized controlled trial, five were experimental quantitative studies, two utilized qualitative analyses, and one was a conference abstract. Most studies reported improvements in time-efficiency, quality of care, and positive stakeholder perceptions. One study reported labor and capital cost savings. Barriers and facilitators of transdisciplinary teams were categorized by the authors as person/interpersonal, workflow, organizational or implementation factors. This review presents some evidence that demonstrates the potential of hospital-based allied health transdisciplinary teams, however high-quality evidence is scarce. Further primary research should focus on stakeholder perceptions, and labor and capital cost outcomes.

### ARTICLE HISTORY

Received 6 July 2021  
Revised 8 December 2021  
Accepted 30 January 2022

### KEYWORDS

Allied health;  
transdisciplinary; teams;  
value-based healthcare

## Introduction

Healthcare in hospitals is delivered by a diverse team of health professionals. Within this team, allied health professionals (AHPs) undertake profession-specific assessment to direct rehabilitation and discharge planning. While there is no universal definition, there is agreement within the literature that “allied health” includes occupational therapy, physiotherapy, speech pathology, social work, dietetics, podiatry, and music therapy (Allied Health Profession’ Office of Queensland, 2013; NHS England, 2021; The Department of Health, 2013). AHPs practice within legal boundaries that are based on clinical competencies, education standards, protecting the public, and the regulations and licensing bodies in the jurisdiction (Dower et al., 2013). Additionally, AHPs work within a professional scope of practice with distinct bodies of knowledge and competencies, as well as some overlapping skills (Dower et al., 2013; Eaton & Regan, 2015; Reinbott & Murtagh, 2019). Overlapping skills can lead to duplication of assessment and intervention, and/or underutilization of a professional’s skills (Eaton &

Regan, 2015; Reinbott & Murtagh, 2019). Reducing duplication and underutilization of skills by embracing these overlaps and reorganizing allied health workforce could result in higher productivity without eroding the valuable contribution made by each profession’s unique skills, approaches and knowledge base. These factors are important considerations due to the pressures being applied to health services by rapidly aging populations, rising incidence of chronic disease, associated healthcare costs, and perennially constrained health budgets (Fink-Samnack, 2019; Karam et al., 2018; Saxon et al., 2014).

To meet the escalating consumer demand, there are opportunities to improve the organization and productivity of the allied health workforce across hospital settings, especially when care must be delivered by different AHPs to meet clinical standards. In such settings, there is a growing focus in the literature that enhancing workforce productivity while maintaining excellent healthcare outcomes can be achieved through team-based healthcare (Sangaleti et al., 2017; Saxon et al., 2014; Will et al., 2019).

## Background

### 70 **Team-based care**

Team-based healthcare occurs when multiple professionals from different professions work with the patient and family, with the aim of delivering high-quality, effective, and coordinated healthcare (Fink-Samnack, 2019; Howard & Potts, 2019; Karam et al., 2018; Reeves et al., 2017; Will et al., 2019). There are many variations of team-based healthcare such as multi-disciplinary care, interdisciplinary care, transdisciplinary care, transprofessional care, and interprofessional collaboration (Fink-Samnack, 2019; Flores-Sandoval et al., 2020; Gordon et al., 2014; Howard & Potts, 2019; Innes et al., 2016; Kaltner et al., 2017; Karam et al., 2018; Karol & Jacobs, 2014; Kholed et al., 2017; Morphet et al., 2016; Sangaletti et al., 2017; Singh et al., 2018; Van Bewer, 2017; Watterson et al., 2019). While the interchangeable use of these terms has created conceptual confusion (Flores-Sandoval et al., 2020; Howard & Potts, 2019; Karol & Jacobs, 2014; Sangaletti et al., 2017; Van Bewer, 2017), standardized definitions were recently published in a Proposed Lexicon for the Interprofessional Field (Khalili et al., 2021). In other sources, a continuum of team-based healthcare delivery is described, where transdisciplinary teams are the most collaborative (Birkeland et al., 2017; Flores-Sandoval et al., 2020). Transdisciplinary teams are the focus of this review.

### 95 **Transdisciplinary teams**

The theoretical underpinnings of transdisciplinary thinking emerged in the 1970s and 1980s, in recognition of the complexity of factors determining health (Albrecht et al., 1998). In health research, the term transdisciplinary was first defined by Pat Rosenfield in 1992 (Albrecht et al., 1998). More recently, transdisciplinary teams are increasingly featured in healthcare literature due to the promise of improved efficiency and effectiveness in healthcare (Van Bewer, 2017).

Transdisciplinary teams embrace overlapping skills by blurring professional boundaries and working beyond traditional scopes of practice, hence, team members must be educationally prepared to undertake new skills sets (Gordon et al., 2014; Karol & Jacobs, 2014; Singh et al., 2018; Van Bewer, 2017). By embracing overlapping skills, AHPs can streamline work processes to make better use of their unique clinical skills and knowledge to work to the top of their professional scope. Working beyond professional boundaries necessitates new skill sets that are normally considered beyond professional scope and not part of a health professional's initial training (Karol & Jacobs, 2014). Apart from educational preparation, the success of transdisciplinary teams is determined by the level of communication between all members; shared decision-making; and collective willingness for role release via sharing of tasks, skills, and information that might traditionally belong to a single profession (Howard & Potts, 2019; Karol & Jacobs,

2014). In consideration of interchangeable use of terminology, this description of transdisciplinary teams is the foundation for this review.

For the purposes of this review, regardless of the terminology used to describe or label a healthcare team, transdisciplinary will refer to healthcare teams that have embraced overlapping skills to work beyond traditional professional boundaries. An allied health transdisciplinary model of care is defined as one where at least two AHPs with different professional titles (such as a physiotherapist and occupational therapist) combine elements of assessment, intervention, and/or discharge planning to allow a single AHP to work beyond traditional professional boundaries. The review could provide valuable findings and insights that have potential to inform future organization of the allied health workforce in hospitals.

### **Review objective**

A preliminary search of PROSPERO, MEDLINE, PubMed, SCOPUS, and the Cochrane Database of Systematic Reviews was conducted and no current or in-progress scoping reviews or systematic reviews on transdisciplinary teams were identified.

The objective of this scoping review is to systematically examine and map the characteristics, outcomes, facilitators, and barriers of contemporary allied health transdisciplinary models of care that have been implemented in hospital settings. The overarching research question is: in contemporary hospital-based allied health teams, which transdisciplinary models of care have been evaluated and what were the outcomes, compared to usual care? To answer this question thoroughly, three review sub-questions are also proposed:

- (1) Which AHPs are involved in hospital-based transdisciplinary models of care?
- (2) What are the labor and capital cost implications of implementing an allied-health transdisciplinary model of care in hospital settings?
- (3) What are the factors influencing successful and/or unsuccessful implementation of allied health transdisciplinary models of care in hospital settings?

### **Methods**

The scoping review was guided by the Joanna Briggs Institute methodology (Peters et al., 2020) and was conducted in accordance with the *a priori* protocol (Martin et al., 2021). Results are reported in line with the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR; Moher et al., 2018).

### **Inclusion Criteria**

#### **Context, concept, and population**

Studies were eligible for inclusion if they were published between 2011 and 2021 in the English language, and the full text was available electronically. The date range of 2011–2021

was selected to provide a contemporary update on transdisciplinary teams. To address the review objective and research questions, we considered sources that evaluated an allied health transdisciplinary model of care that was not necessarily labeled as transdisciplinary but met the following description:

- was conducted in any hospital setting, defined as emergency departments, acute inpatient wards, rehabilitation wards and/or hospital-situated specialist clinics; AND
- blurred role boundaries of at least two AHPs (i.e., where assessment and/or intervention and/or discharge is completed by a single professional); AND
- was implemented with adults (>18 years old) who were admitted as hospital in-patients with any diagnosis; AND
- evaluated at least one quantitative and/or qualitative outcome, including outcomes of time-efficiency, quality of care, labor and capital costs, and stakeholder perspectives; OR
- evaluated factors that facilitated and/or hindered successful implementation.

This review excluded transdisciplinary models implemented in aged care, primary care, community care, non-healthcare settings (e.g., research models or environmental settings), and in relation to interprofessional education (i.e., studies that did not evaluate transdisciplinary models in clinical healthcare practice).

### Study design

All levels of primary and secondary research were considered for inclusion including reviews, quantitative, qualitative, and mixed methods study designs. Additionally, as rigorously designed transdisciplinary studies are lacking, it was also important to consider gray literature such as clinical project reports and conference publications (including presentations, abstracts, and posters). Grey literature was excluded from the review when presented in other formats, the publication date was unavailable, or the hyperlink to the report was unavailable or not secure.

### Search strategy

An initial limited search of PubMed (Ovid) and CINAHL (EBSCO) was undertaken to identify articles on the topic and develop a full search strategy (see, Table 1). The electronic databases searched included PubMed (Ovid), CINAHL (EBSCO), Scopus (Elsevier), and The Cochrane Library. Unpublished studies and gray literature were located with the Google search engine. The reference lists of included articles were screened for additional papers.

### Source of evidence selection

Following the search, all identified records from databases were collated and uploaded into the systematic review management platform Covidence (VIC, Australia) and duplicates removed. Titles and abstracts were screened by two independent authors

**Table 1.** Search strategy.

Search	Query 1: conducted February 2021 in PubMed (Ovid), CINAHL (EBSCO), Scopus (Elsevier), and The Cochrane Library	Records retrieved
#1	(transdisciplinary[Title/Abstract] OR trans-disciplinary [Title/Abstract] OR transprofessional[Title/Abstract] OR transdisciplinarity[Title/Abstract]) AND (medical [Title/Abstract] OR hospital*[Title/Abstract] OR acute [Title/Abstract] OR emergency[Title/Abstract] OR care[Title/Abstract] OR healthcare[Title/Abstract] OR health care[Title/Abstract] OR rehab*[Title/Abstract] OR ward[Title/Abstract] OR inpatient[Title/Abstract] OR intervention[Title/Abstract])	1034
#2	(interprofession*[Title/Abstract] AND (staff[Title/Abstract] OR employee* OR personnel*[Title/Abstract] OR worker*[Title/Abstract] OR team*[Title/Abstract]) AND (trust[Title/Abstract]))	396
#3	(patient*[Title] OR client*[Title] OR consumer*[Title] OR carer*[Title] OR family[Title]) AND (perspective*[Title] OR experience*[Title] OR feedback[Title] OR opinion*[Title] OR satisfaction[Title]) AND (transdisciplinary[Title/Abstract] OR trans-disciplinary[Title/Abstract] OR transprofessional [Title/Abstract] OR transdisciplinarity[Title/Abstract] OR interprofessional[Title/Abstract]) AND (hospital*[Title/Abstract] OR healthcare[Title/Abstract] OR health care[Title/Abstract])	110
Limited to 2011–2021, English.		Total = 1540
<b>Search Query 2: conducted February 2021 in Google (search engine)</b>		
#1	Transdisciplinary care AND stroke	100
#2	Transdisciplinary care AND perceptions	100
#3	Transdisciplinary AND interprofessional trust	100
#4	Allied health AND national priorities	100
Limited to 2011–2021, English, first 100 results.		Total = 400

(AM and ELL) for assessment against the inclusion criteria. Full-text papers that did not meet the inclusion criteria were excluded. The role of the second reviewer (ELL) was to verify screening of records to ensure reliability. Any disagreements that arose between the authors were resolved through discussion. Citation details of all included sources were uploaded into EndNote X9 (Clarivate Analytics, PA, USA).

### Data extraction

Data were extracted from included papers by two independent authors using a data extraction tool developed by the reviewers in the *a priori* protocol (Martin et al., 2021). The data extracted included specific details regarding study aims and methodology; hospital-based allied health transdisciplinary models of care; key outcomes related to time-efficiency, quality of care, labor and capital costs; stakeholder perceptions; and factors influencing successful implementation of transdisciplinary models of care.

### Data synthesis and presentation

Simple frequency counts report the number of studies for key study characteristics. Tabular analysis synthesizes study characteristics and key outcomes. A narrative summary accompanies tabulated results to describe how the results relate to the review objective and questions.

## Results

### Study inclusion

245 A total of 1945 sources was identified, with 1410 titles and  
 250 abstracts and 146 full text papers subsequently screened for  
 eligibility. From the 147 full text papers, the main reasons for  
 exclusion were ineligible study design (n = 45), ineligible concept  
 (n = 44), and ineligible intervention (n = 23). A total of 9  
 sources were included in the scoping review. A flow chart of  
 the search results using the Preferred Reporting Items for  
 Systematic Reviews and Meta-Analyses for Scoping Reviews  
 (PRISMA-ScR) can be seen in Figure 1 (Moher et al., 2018).

### Characteristics of included studies

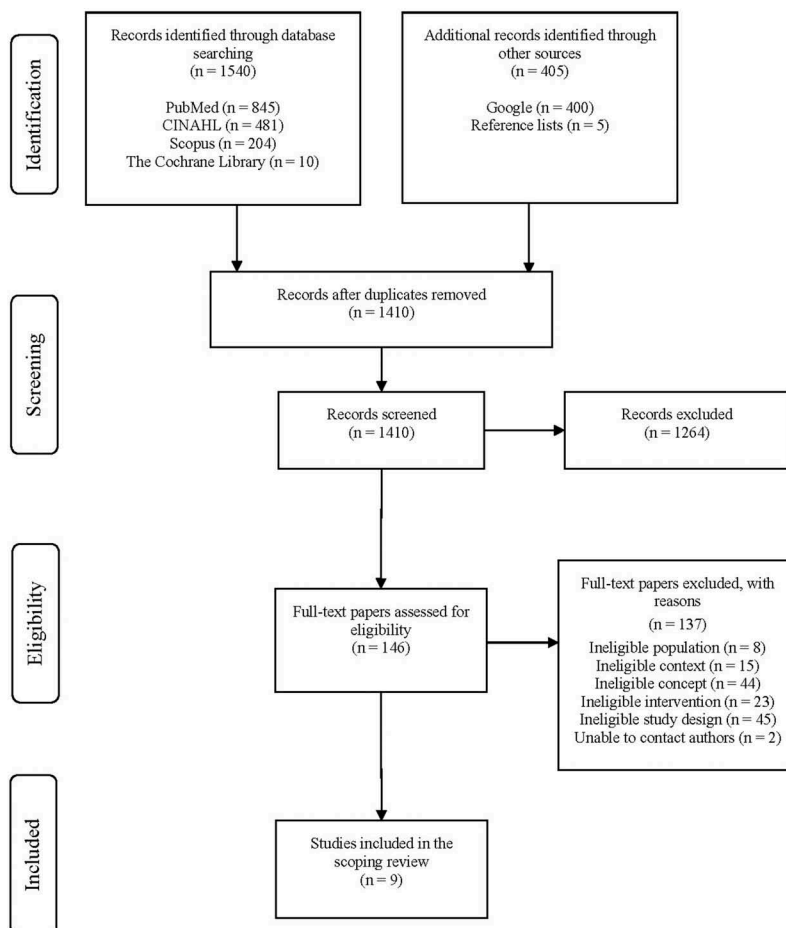
255 The nine studies included in the scoping review were published  
 since 2011, with six of the studies published in the last five  
 years. Seven of the studies were undertaken in Australia, and  
 one each in Chile and Canada. Of the nine studies, one was  
 a randomized controlled trial, five were experimental quanti-  
 260 tative studies (one of which was located in the gray literature),  
 two utilized qualitative analyses, and one was a clinical project  
 (located in the gray literature). Four studies recruited 50–100  
 participants and three studies recruited over 101 participants.  
 A summary of study characteristics can be seen in Table 2.

### Review findings

The following summary of findings is based on all nine studies  
 but results from the empirical studies (n = 6) take precedence  
 in the descriptions.

### Characteristics of hospital-based allied health transdisciplinary models of care

270 Nine unique allied health transdisciplinary models of care  
 meeting the inclusion criteria were identified in the literature  
 (see, Table 3 for detailed descriptions). The hospital settings  
 comprised rehabilitation wards (n = 1), acute stroke units  
 (n = 2), general medical wards (n = 3), and emergency depart-  
 275 ments (n = 3). The transdisciplinary model of care evaluated  
 almost always involved interventions (n = 8), assessments  
 (n = 7), or interventions and assessments (n = 6). Three studies  
 evaluated a transdisciplinary model across the continuum of  
 care including assessment, intervention, and discharge plan-  
 280 ning. One transdisciplinary model of care was an informal  
 process where the AHPs had the knowledge to work across  
 professional boundaries instead of waiting for input by other  
 clinicians (Cartmill et al., 2011). Seven studies described trans-  
 285 disciplinary models that used formalized assessments and/or  
 competencies. From these studies, four developed a new trans-  
 disciplinary assessment tool that combined aspects of allied  
 health and sometimes nursing assessments (Delany et al.,



Q25 Figure 1.



**Table 2.** Summary of studies evaluating allied health transdisciplinary models of care in hospital settings.

		Alvarez, 2020	Cartmill, 2010	Innes, 2015	Kaltner, 2016	Porter, 2014	Watterson, 2019	Morphet, 2016	Delany, 2019	Reinbott, 2019
Study design/ evidence type	Single-blind RCT	X	X	X	X	X	X	X	X	X
	Feasibility study									
	Observational study									
	Other quantitative study									
	Qualitative study									
Publication year	Conference abstract									
	2011–2015	X	X	X	X	X	X	X	X	X
Publication country	2016–2020									
	Australia	X	X	X	X	X	X	X	X	X
	Chile									
Healthcare /research setting	Canada									
	Acute stroke unit	X	X	X	X	X	X	X	X	X
	General medical ward									
Aspect of healthcare	Emergency department									
	Rehabilitation ward									
	Assessment	X	X	X	X	X	X	X	X	X
	Intervention			X	X	X	X	X		X
Allied health disciplines	Discharge			X				X		X
	Occupational therapy	X	X	X	X	X	X	X	X	X
	Physiotherapy	X	X	X	X	X	X	X	X	X
	Speech pathology	X	X	X	X		X	X	X	X
	Social work		X		X		X	X	X	X
	Dietetics				X				X	X
	Psychology				X					X
	Other (allied health)				X					
	Other (non-allied health)									
	Number of participants	< 50	X	X	X	X	X	X	X	X
50–100										
> 101										
Outcomes reported	Time-efficiency	X	X	X	X	X	X	X	X	X
	Cost-effectiveness		F	X	X		X	X	X	X
	Quality of care			B	X		X	F	F	X
	Clinician perceptions				B		X		B	X
	Patient perceptions						X			F
	Facilitators (F) or Barriers (B)						F	B		

Italics denotes gray literature

290 2019; Kaltner et al., 2017; Porter, 2014; Reinbott & Murtagh, 2019), and six studies developed transdisciplinary competencies that described the specific assessment, intervention and/or discharge tasks that a single AHP could complete (Innes et al., 2016; Kaltner et al., 2017; Morphet et al., 2016; Porter, 2014; Reinbott & Murtagh, 2019; Watterson et al., 2019). The ninth study did not develop transdisciplinary competencies, rather a software application that could be used with patients as a non-pharmacological intervention for delirium (Alvarez et al., 2020).

300 **Which AHPs are involved in hospital-based transdisciplinary models of care?**

305 The professions of occupational therapy, physiotherapy, speech pathology, social work, and dietetics were most frequently included (see, Tables 2 and 3). Occupational therapy and physiotherapy were involved in the transdisciplinary model of care in almost every study (88.9%; Alvarez et al., 2020; Cartmill et al., 2011; Delany et al., 2019; Innes et al., 2016; Kaltner et al., 2017; Morphet et al., 2016; Reinbott & Murtagh, 2019; Watterson et al., 2019), except one that implemented a transdisciplinary role combining dietetics and speech pathology assessment and intervention (Porter, 2014). Social

work was part of the transdisciplinary model in six studies (55.6%), speech pathology was included in five studies (33.3%), and dietetics in three studies (66.7%; Delany et al., 2019; Innes et al., 2016; Kaltner et al., 2017; Morphet et al., 2016; Porter, 2014; Reinbott & Murtagh, 2019; Watterson et al., 2019). Other health professions identified less frequently included podiatrists, geriatricians, critical care physicians, nurses, industrial engineers, computer engineers, graphical designers, kinesiologists, cognitive behavioral therapist, and return to work coordinators (Alvarez et al., 2020; Cartmill et al., 2011; Delany et al., 2019; Morphet et al., 2016).

325 **What are the outcomes of implementing an allied health transdisciplinary model of care in hospital settings?**

330 Studies used many outcome measures to capture time-efficiency, quality of care, labor and capital costs, and/or stakeholder perceptions. Six measures of time-efficiency were identified (see, Table 4). Four studies evaluated allied health time savings, three of which reported a transdisciplinary model resulted in AHPs spending less time completing clinical tasks compared to usual care (Kaltner et al., 2017; Reinbott & Murtagh, 2019; Watterson et al., 2019). Only one of these studies reported a statistically significant ( $p < .001$ ) time saving per patient of 2 hours 18 minutes 36 seconds (Watterson et al.,

315

320

325

330

**Table 3.** Characteristics of included studies.

First author, year	Country	Study aim	Study design	Publication type	Description of allied health transdisciplinary model of care
Alvarez, 2020	Chile	To develop a bedside software for hospitalized older adults admitted to a general medical ward to improve their access to non-pharmacological interventions to prevent delirium.	Feasibility pilot study	Journal article	The team of 1 geriatrician, 1 critical care physician, 2 occupational therapists, 1 nurse, 1 physiotherapist, 2 industrial engineers, 1 computer engineer, and 1 graphical designer selected non-pharmacological interventions to be included in the software application. The software for provided to patients and included interventions relating to time-spatial re-orientation, cognitive stimulation, early mobilization, promoting of the use of sensory supports, sleep hygiene, pain assessment, and education on delirium.
Cartmill, 2011	Canada	To understand whether the use of a transdisciplinary model is appropriate in the setting of a functional restoration program and what factors facilitate success in terms of clinician satisfaction and perceived quality of client care.	Qualitative study – grounded theory approach	Journal article	The Functional Restoration Program staff of physiotherapists, occupational therapists, kinesiologists cognitive behavioral therapists, and return to work coordinators worked with patients toward a specific goal, crossing the disciplinary boundaries where the clinician had the required knowledge (instead of waiting for the other clinician's input).
Delany, 2019	Australia	To skill share between AHPs treating patients with stroke to reduce duplication of tasks. To explore the benefits, barriers, and challenges to implementation of a skill sharing model from the perspective of staff within the transdisciplinary team.	Clinical project – not otherwise described	Conference abstract	An acute stroke screening tool was developed and implemented, combining assessments of nursing, social work, occupational therapy, physiotherapy, and speech pathology.
Innes, 2015	Australia	To critically evaluate the patient, carer, and staff perceptions of the transdisciplinary model of care in an Emergency Department in a Melbourne metropolitan hospital.	Qualitative study	Journal article	The transdisciplinary care team of emergency nurses, physiotherapists, social workers, and occupational therapists completed 20 transdisciplinary competencies to enable them to provide health services that might typically reside with another discipline (for example, gait and mobility aid prescription). A single member of the transdisciplinary team independently assesses and managed a patient presentation.
Kaltner, 2016	Australia	To examine the efficacy of a transprofessional role in the acute medical setting at Toowoomba Hospital, compared to standard multidisciplinary care.	Single-blind randomized controlled trial	Journal article	An allied health clinical leader (from occupational therapy and physiotherapy) and trained to provide transdisciplinary assessment and intervention in the acute medical wards. The transdisciplinary roles involved tasks and assessments from physiotherapy, occupational therapy, dietetics, speech pathology, podiatry, social work, and psychology, which were identified as appropriate for skill sharing.
Morphet, 2016	Australia	To report the outcomes of a trans-professional model of care in an Emergency Department in Victoria.	Retrospective audit of medical charts, matched with controls	Journal article	The trans-professional team consisting of nurses, physiotherapists, social workers, and occupational therapist completed transdisciplinary assessment and interventions including tasks related to social history, cognition, services/supports, previous level of mobility and function, and the home environment. A single member of the transdisciplinary team interdependently assesses and manages a patient presentation.
Porter, 2014	Australia	To improve time-efficiency and service access by developing and implementing a transdisciplinary screening tool (and the required training) that accurately identifies patients admitting to the general medical steam who are at risk of malnutrition, swallowing, communication, and cognitive difficulties.	Pre-post study	Journal article	Both the dieticians and speech pathologists could administer the transdisciplinary assessment and intervention for patients admitting to the general medical stream. For the transdisciplinary assessment, validated screening methods were used including: the malnutrition screening tool, the Butt Non-Verbal Reasoning Test, the Rowland Universal Dementia Assessment Scale, the Acute Screening of Swallow in Stroke/TIA, and the Western Aphasia Battery-Revised.
Reinbott, 2019	Australia	To introduce an innovative transdisciplinary short stay stroke service model at the Toowoomba Hospital, and compare the patient and service outcomes to standard multidisciplinary care in the management of mild stroke patients.	Observational pre-post study	Conference abstract	An advanced allied health practitioner conducted a transdisciplinary assessment, intervention, and community follow-up. The transdisciplinary service model combined tasks/assessments from occupational therapy, physiotherapy, speech pathology, social work, dietetics, and psychology.

(Continued)

Table 3. (Continued).

First author, year	Country	Study aim	Study design	Publication type	Description of allied health transdisciplinary model of care
Watterson, 2019	Australia	To explore cost-efficiency, safety, and acceptability of trans-disciplinary advanced allied health practitioners for acute adult general medicine inpatients.	Quasi-experimental feasibility study	Journal article	An advanced allied health practitioner (from occupational therapy, physiotherapy, and social work) delivered the transdisciplinary assessment and intervention that was comprised of 24 transdisciplinary skills. The practitioners also referred patients to another AHP if they required more complex services outside of the transdisciplinary role.

Italics denotes gray literature

2019). Four studies also evaluated time-in-hospital saved, which refers to the time increase or decrease of a patient's length of hospital stay compared to usual care. Only one study reported a statistically significant ( $p = .03$ ) time saving, where a patient's length of stay in the transdisciplinary model was 42 hours 14 minutes 24 seconds shorter than usual care (Watterson et al., 2019). Other studies reported statistically non-significant results, wherein two studies reported decreases in length of stay of 33 hours 54 minutes and 19 hours 15 minutes (Kaltner et al., 2017; Reinbott & Murtagh, 2019); and one study found length of stay increased by 13 minutes in the transdisciplinary care group (Morphet et al., 2016).

Other factors related to AHP workload were also examined in the identified studies (see, Table 4). Four studies evaluated the number of allied health occasions of service saved when compared to usual care. Across these studies, 0 to 5 occasions of service were saved in the transdisciplinary group (Delany et al., 2019; Kaltner et al., 2017; Reinbott & Murtagh, 2019; Watterson et al., 2019). Only two studies reported the mean number of AHPs involved in transdisciplinary model of care compared to usual care, and results showed very little difference between groups (Kaltner et al., 2017; Watterson et al., 2019). Two studies reported time saved from patient admission to allied health assessment or intervention commencement, where one study found a statistically significant ( $p = .05$ ) time saving of 43 hours 54 minutes for dieticians working in the transdisciplinary model of care (Porter, 2014). The same study also evaluated the time saved from patient admission to speech pathology or dietetics referral and found statistically significant time savings of 32 hours 24 minutes for speech pathologists ( $p = .01$ ), and 69 hours 42 minutes for dieticians ( $p = .001$ ) working in a transdisciplinary model of care (Porter, 2014).

Six studies measured quality of care associated with the transdisciplinary models (see, Table 4). The most frequently reported outcome measures were clinical risk indicators and unplanned re-admissions to hospital. Four studies that found patients receiving care under the transdisciplinary model experienced reduced clinical risk (e.g., malnutrition, swallowing difficulties, delirium, and falls; Alvarez et al., 2020; Kaltner et al., 2017; Porter, 2014; Watterson et al., 2019). Two studies found re-presentations to hospital at 6-months was the same or lower for the transdisciplinary group when compared to the standard care group (Kaltner et al., 2017; Reinbott & Murtagh, 2019). Conversely, one study found 34 participants in the transdisciplinary group were re-admitted at 28-days, compared to 10 participants in the standard care group (Watterson et al.,

2019). Patients in the transdisciplinary group were less likely to re-present to an emergency department (Morphet et al., 2016; Reinbott & Murtagh, 2019), received more comprehensive assessment (Kaltner et al., 2017; Reinbott & Murtagh, 2019), were more likely to be seen by AHPs due to the increase in referrals generated by the respective models of care (Kaltner et al., 2017; Porter, 2014), and experienced improved functional outcomes and quality of life post-discharge as measured on a variety of standardized scales (Kaltner et al., 2017; Watterson et al., 2019).

Six studies reported on stakeholder perceptions (see, Table 4). For healthcare staff working under a transdisciplinary model of care, high levels of satisfaction were reported in two studies (Reinbott & Murtagh, 2019; Watterson et al., 2019); perceived benefits were indicated in two studies (Delany et al., 2019; Innes et al., 2016); and staff identified barriers and/or facilitators in three studies (Cartmill et al., 2011; Delany et al., 2019; Innes et al., 2016). For patients receiving care under a transdisciplinary model, three studies reported either higher levels of patient satisfaction or no change in satisfaction compared to the control group (Kaltner et al., 2017; Reinbott & Murtagh, 2019; Watterson et al., 2019).

*What are the labor and capital cost implications of implementing an allied-health transdisciplinary model of care in hospital settings?*

Only one study evaluated the labor and capital cost implications associated with an allied health transdisciplinary model of care in an acute general medical ward (see, Table 4). Due to AHP time saved, the authors reported that average allied health staffing cost in the transdisciplinary group was \$217.83AUD per patient (calculated at Grade 3 year 4 AHP rate), whereas the cost in the control group was \$330.49AUD per patient (calculated at Grade 2 year 4 AHP rate; Watterson et al., 2019). In terms of cost associated with length of stay, actual cost minus expected cost of stay was significantly lower in the transdisciplinary group, but the authors advised that "expected cost for DRG [diagnostic related groups] was estimate only and should be interpreted with caution" (Watterson et al., 2019).

*What are the factors influencing successful and/or unsuccessful implementation of allied health transdisciplinary models of care in hospital settings?*

Seven sources identified one or more factors that influenced the success of the examined allied health transdisciplinary models of care. A total of 26 different factors were identified (listed in Table 5). Of these, six factors were categorized by the authors as person/interpersonal factors, eight were workflow



**Table 4.** Key outcomes of allied health transdisciplinary models in hospital settings.

	Alvarez, 2020	Cartmill, 2010	Innes, 2015	Kaltner, 2016	Porter, 2014	Watterson, 2019	Morphet, 2016	Delany, 2019	Reinbott, 2019
<b>Time-efficiency outcomes (N = 6)</b>									
AHP time saved in transdisciplinary model of care/patient (mean: hours, minutes, seconds)				46 min 48s		2 h 18 min 36s*		0	36 min 30s
Time in hospital saved in transdisciplinary model of care/patient (mean: hours, minutes)				19 h 15 min		42 h 14 min 24s*	+0 h 13 min	0	33 h 54 min
Occasions of service saved				1		5		0	2
Number of AHPs involved in transdisciplinary care (mean increase/decrease)				-0.1		-0.3			
Time saved from admission to AHP referral (hours, minutes)					-32 h 24 min* or -69 h 42 min*				
Time saved from admission to AHP assessment or intervention commences (hours, minutes)				11 h	+14 h 18 min or -43 h 54 min*				
<b>Quality of care outcomes (N = 8)</b>									
More comprehensive assessment (% more completed)				60.8					35-40
Representations to ED for control group, transdisciplinary group (number of patients)							2, 4 (at 72 hours)		21, 15 (at 6 months)
Readmissions to hospital for control group, transdisciplinary group (number of patients)				10, 10 (at 6 months)	131	10, 34 (at 28 days)			20, 13 (at 6 months)
Increase in referrals to allied health (number)				62					
Missed allied health referrals for control group, transdisciplinary group (number of patients)				4, 0					
Reduced clinical risk e.g., malnutrition, swallow, delirium, falls (Yes/No)	Yes			Yes	Yes	Yes			
Improved functional outcomes (Yes/No)				Yes		Yes			
Improved quality of life outcomes (Yes/No)				Yes		Yes			
<b>Cost outcomes (N = 2)</b>									
Allied health staff costs (AUD) for control group, transdisciplinary group						330.49 217.83			
Costs associated with length of stay (AUD) for control group, transdisciplinary group						3,705* 828*			
<b>Healthcare professional perceptions (N = 5)</b>									
Satisfaction (High/Low/No change)						High			High
Benefits perceived (Yes/No)			Yes					Yes	
Identified barriers/facilitators to implementation (Yes/No)	Yes		Yes					Yes	
Acceptability or strong support (%)						Nursing, medical: 60 Allied health: 17			
Self-rated confidence in transdisciplinary skills after implementation (%)						Very confident: 72.2 Mostly confident: 26.4 Somewhat confident: 1.4			
<b>Patient perceptions (N = 1)</b>									
Satisfaction (high/low/no change)				No change		High, no change			High, groups not compared

\* Denotes statistical significance; italics denotes gray literature

factors, six were organizational factors, and six were implementation factors. Few sources studied the same factors, for example, 13 of the 26 factors were identified in only one study (Cartmill et al., 2011; Delany et al., 2019; Porter, 2014; Reinbott & Murtagh, 2019). Seven factors were identified in three studies including willingness to share knowledge, skills, roles,

expertise; perceived professional threats and turf-wars; understanding and respecting other member's roles; communication and regular meetings; stable workforce (staff turnover, backfill, roster coordination); workplace and professional culture; executive, director and management support (Cartmill et al., 2011; Delany et al., 2019; Kaltner et al., 2017; Morphet et al., 2016; Porter, 2014; Watterson et al., 2019). Five studies identified training, education, and competency assessment as a factor

**Table 5.** Factors influencing successful implementation of allied health transdisciplinary models in hospital settings.

	Alvarez, 2020	Cartmill, 2010	Innes, 2015	Kaltner, 2016	Porter, 2014	Watterson, 2019	Morphet, 2016	Delany, 2019	Reinbott, 2019
<b>Person and Interpersonal Factors (N = 6)</b>	<b>n = 0</b>	<b>n = 1</b>	<b>n = 0</b>	<b>n = 1</b>	<b>n = 1</b>	<b>n = 1</b>	<b>n = 3</b>	<b>n = 4</b>	<b>n = 0</b>
Interpersonal skills							X		
Willingness to share knowledge, skills, roles, expertise		X					X	X	
Staff engagement (commitment, buy-in, motivation, accountability)								X	
Staff trust and confidence in competence of other members							X	X	
Perceived professional threats and turf-wars				X		X		X	
Discrepancy between attitude and practice					X				
<b>Workflow Factors (N = 8)</b>	<b>n = 0</b>	<b>n = 4</b>	<b>n = 0</b>	<b>n = 0</b>	<b>n = 1</b>	<b>n = 1</b>	<b>n = 4</b>	<b>n = 6</b>	
Shared and clear purpose/aim								X	
Understanding and respecting other discipline's roles		X					X	X	
Communication, regular meetings		X					X	X	
Collaboration						X	X		
Team member co-location		X							
Caseload demands (time limitations, competing priorities)					X			X	
Stable workforce (staff turnover, backfill, roster coordination)		X					X	X	
Team function								X	
<b>Organizational Factors (N = 6)</b>									
Noncompetitive and non-hierarchical environment		X							
Organizational structures and policies		X							
Workplace/professional culture		X			X	X			
Executive, director, and management support		X					X	X	
Governance structures (legislation, regulation, credentialing)						X		X	
<b>Implementation Factors (N = 6)</b>									
Project management, planning, leadership								X	X
Project timeline, delays								X	
Change management tool									X
Training, education, competency assessment		X			X		X	X	X
Staff involvement (grass roots level)								X	
Valuable transdisciplinary tool/model								X	
Funding								X	

Italics denotes gray literature

important for the success of transdisciplinary teams (Cartmill et al., 2011; Delany et al., 2019; Morphet et al., 2016; Porter, 2014; Reinbott & Murtagh, 2019).

445 **Discussion**

In this review, we examined various types of allied health transdisciplinary models of care implemented in hospital settings. While the method of implementation differed across settings and teams of AHPs, the studies reported patterns pointing toward improved time-efficiency and quality of care, various barriers and facilitators to successful implementation, positive stakeholder perceptions, and one study reported cost-effectiveness.

450 **Main findings**

The disparate nature of nomenclature in this field resulted in the need for the authors to define allied health transdisciplinary teams as at least two AHPs sharing knowledge, decision-making and working toward a common goal by combining elements of assessment, intervention and/or discharge planning to streamline overlapping skills and allow a single AHP to work beyond traditional professional boundaries. Transdisciplinary teams are not intended to replace AHPs.

Rather transdisciplinary teams can reduce duplication of clinical tasks and/or underutilization of professional skills without eroding profession-specific skills and knowledge or putting at risk patient safety. By embracing overlapping skills and streamlining work processes, AHPs can make better use of their unique clinical skills and knowledge to provide value-based healthcare and produce quality outcomes for patients.

Situation-specific team-based care and workforce redesign has great promise and requires sophisticated interprofessional teamwork and trust. The definition that we have used in this scoping review describes workflow and workforce redesign to maximize AHP expertise in hospital settings where there is situational leadership, given the needs of the individual patient, circumstances, and desired outcomes. It involves assessment (but not specialized assessment) that can be conducted by any member of the team because they work well together, displaying the best qualities of teamwork. Beyond assessment, there is a determination by the team of which clinical intervention and discharge planning expertise is needed and where it might be provided individually or as a team, given the specific location, patient's and family's needs and desired outcomes.

The nine studies included in this review demonstrate the diversity of ways in which different AHPs were embedded in transdisciplinary teams by sharing different clinical

465

470

475

480

485

competencies in different hospital settings. This suggests a transdisciplinary model is determined by the healthcare context, the AHPs available in that setting and perhaps capability and willingness to become engaged in transdisciplinary practice. For example, implementing a new transdisciplinary assessment that combines physiotherapy, occupational therapy, speech pathology and social work might be appropriate on an acute stroke unit, but might not be as effective on a rehabilitation ward despite the superficially similar patient groups. Therefore, selecting the correct transdisciplinary model and understanding the facilitators and barriers of the proposed model can influence the success of transdisciplinary teams. By extension, the transdisciplinary model should be developed with careful consideration to the legal and professional scope of practice of the AHPs in the relevant jurisdiction. For example, in the United States, scope of practice laws could limit sharing of professional tasks and thereby the implementation of transdisciplinary models (Dower et al., 2013). Whereas in Australia, a profession's scope of practice is not defined in legislation, which could afford more flexibility to share professional skills within transdisciplinary teams. Correct model selection has not been identified previously in the literature and might be a useful finding for future planning and implementation of allied health transdisciplinary teams in hospitals.

Time-efficiency and quality of care outcomes emerged as strong themes in the included studies. In terms of time-efficiency, the studies indicate that allied health transdisciplinary models improved use of staff time across the inpatient stay. In the broader literature, team-based care is linked to decreased length of hospital stay (Karam et al., 2018; Will et al., 2019). Our findings align with this observation, although not every result was statistically significant, due to recruitment timeframe constraints resulting in a sample size too small for the chosen design (Kaltner et al., 2017; Reinbott & Murtagh, 2019) and non-reporting of p-values (Kaltner et al., 2017; Reinbott & Murtagh, 2019). Despite this, the results showed substantial reductions in length of stay, which could be clinically significant. In Australia, for example, a clinically significant difference in length of stay (and thus hospital costs) is achieved when a patient is discharged one day earlier, or when length of stay is reduced by a certain number of hours to achieve discharge by 23:59 hours the previous day (Australian Institute of Health and Welfare, 2021).

Other significant findings were faster commencement of AHP assessment and rehabilitation under transdisciplinary models of care. Clinically, the time savings would enable AHPs to respond to patient referrals earlier, and in some settings enhance compliance with care standards. Our review showed a reduction in most cases in adverse events and re-presentations to hospital, suggesting that quality of care is not lost at the expense of improved time-efficiency. These findings are also supported in the broader literature that states team-based care can lead to effective, comprehensive, and quality healthcare (Reeves et al., 2017; Will et al., 2019).

While the included studies provided some evidence for better time-efficiency and quality of care, stakeholder perceptions were not often examined. For most studies this outcome

was a secondary measure and comprehensive qualitative approaches were not undertaken. Staff and patient satisfaction results identified in this review are not convincing, and no study evaluated factors such as staff burnout and stress. The findings do not align well with the broader literature that states team-based care can lead to decreased staff burnout and stress, and increased patient satisfaction (Howard & Potts, 2019; Will et al., 2019).

One review sub-question was not fully answered. Labor and capital costs were not often examined. One study provided preliminary evidence that allied health transdisciplinary teams are cost-effective in terms of the cost of AHP time and hospital length of stay. However, no other cost outcome was reported including re-presentation to hospital, which is an adverse event well-known to be associated with avoidable costs (Australian Commission on Safety and Quality in Health Care, 2019). Despite the dearth of evidence within the transdisciplinary domain, our preliminary findings align with the broader literature, which emphasizes that coordinated team-based care can lead to cost-savings relative to uncoordinated care (Fink-Samnack, 2019; Kholed et al., 2017; Will et al., 2019).

A variety of factors influencing successful allied health transdisciplinary teams were identified and categorized by the authors in this review (see, Table 5). These factors align with those discussed in the interprofessional collaboration literature. While interprofessional collaboration does not involve integrating elements of care, redefining roles, and sharing clinical competencies, it is somewhat similar to transdisciplinary teamwork. Both interprofessional collaboration and transdisciplinary teamwork require constant communication between professionals, recognition and understanding of members' expertise and roles, shared goals, shared decision-making, and completion of interdependent tasks (Eaton & Regan, 2015; Karam et al., 2018; Reeves et al., 2017).

The factors that facilitate or hinder the success of interprofessional collaboration might be relevant to transdisciplinary teams. For example, every person/interpersonal and workflow factor identified in this review is reported in the broader interprofessional collaboration literature. This includes willingness to share knowledge, skills, roles, expertise; understanding and respecting other member's roles; and team member co-location (Cartmill et al., 2011; Delany et al., 2019; Morphet et al., 2016; Reeves et al., 2017; Sangaletti et al., 2017; Stadick, 2020; Watterson et al., 2019). Another person/interpersonal factor identified in this review was perceived professional threats (Delany et al., 2019; Kaltner et al., 2017; Watterson et al., 2019). When implementation of transdisciplinary teams is associated with factors such as loss of professional identity and skills, this could lead to AHPs feeling threatened and affecting job performance and satisfaction; and healthcare managers questioning the value of each profession's unique inputs within the health care setting. To negotiate such barriers, all stakeholders must appreciate the purpose of transdisciplinary teams is to streamline work processes by sharing skills, rather than taking on another's identity or the tasks of another profession when not educated in that field of practice, and/or as a cost-cutting exercise that may risk the quality of

545  
550  
555  
560  
565  
570  
575  
580  
585  
590  
595  
600

care and the safety of patients. Further research regarding the value-based healthcare proposition of AHPs within transdisciplinary teams is urgently needed to explicate some of these factors.

Many organizational factors were also identified in both this review and the broader literature, where workplace and professional culture was most frequently cited (Cartmill et al., 2011; Eaton & Regan, 2015; Gordon et al., 2014; Karam et al., 2018; Porter, 2014; Sangaleti et al., 2017; Watterson et al., 2019). This suggests that workplace and professional culture could substantially influence transdisciplinary team success. The implementation factors, which focus on project planning and staff engagement, appear to be unique to the transdisciplinary teams literature (Cartmill et al., 2011; Delany et al., 2019; Morphet et al., 2016; Porter, 2014; Reinbott & Murtagh, 2019). This focus might stem from the differing nature of the literature where the transdisciplinary studies developed and evaluated a new model of care, whereas the interprofessional collaboration studies evaluated existing team function and trust. While the interprofessional collaboration literature is relevant to transdisciplinary teams in terms of person/interpersonal, workflow and organizational factors, the implementation factors should also be considered when planning a new model of care.

### Limitations and gaps in the literature

To date, few studies have evaluated the implementation of allied health transdisciplinary models in hospitals. Only one study in this review was a randomized controlled trial and four were quantitative studies, where one was located in the gray literature. The main gaps identified were the lack of labor and capital cost evaluations, and the lack of formal qualitative approaches to measure stakeholder perceptions to provide an alternative yet germane lens to the issue.

In the broader literature evaluating team-based care, inconsistencies in nomenclature have resulted in conceptual confusion. While common characteristics are usually described in the literature, inconsistent use of terminology describing healthcare teams was a limitation in the search strategy for this review. This limitation was acknowledged and accounted for in the methodology of this scoping review by the selection of relevant and broad search terms; however, the authors cannot be certain all relevant literature was identified.

### Conclusion

This review provides the first synthesis of the characteristics and outcomes of allied health transdisciplinary teams. Transdisciplinary teams are a model of team-based care that can embrace overlapping skills, support AHPs to provide value-based healthcare, and potentially reorganize the allied health workforce to meet increasing consumer demand for healthcare. The review provides preliminary evidence that working in transdisciplinary teams can improve AHP time-efficiency and quality of patient care in hospital settings, however cost and qualitative studies to evaluate this robustly and thoroughly are scarce. The factors that can facilitate or hinder

success of transdisciplinary teams are perhaps the best understood. Further research and implementation of allied health transdisciplinary teams in hospitals is warranted.

### Recommendations for research

Due to the limited evidence on allied health transdisciplinary teams, the authors recommend further primary research is conducted across hospital settings. High-quality mixed-methods studies should be undertaken to add to the preliminary evidence analyzed in this review. A specific emphasis is needed on stakeholder perceptions, and labor and capital cost outcomes. In addition to primary research, ongoing reviews of healthcare team terminologies are recommended to contribute to developing a global consensus on definitions. This could be completed with reference to the Proposed Lexicon for the Interprofessional Field, which provides a synthesized list of concise definitions (Khalili et al., 2021).

### Recommendations for practice

To optimize successful implementation of allied health transdisciplinary teams in hospitals, the factors outlined in Table 5, especially implementation factors, should be considered. Additionally, the allied health transdisciplinary model selected should be determined by the healthcare context, patient safety, organizational risk, AHPs available in that setting, and in consideration of legal and professional scopes of practice.

### Acknowledgments

Aleysha Martin undertook this work as part of her Doctor of Philosophy enrolment at the Faculty of Medicine, The University of Queensland. Aleysha Martin received financial support from the National Health and Medical Research Council (NHMRC), Mater Research Institute, and The University of Queensland. The authors wish to acknowledge the learned input of the Reviewers which added value to this paper.

### Disclosure statement

No potential competing interest was reported by the authors.

### Funding

This work was supported by the National Health and Medical Research Council under Postgraduate Scholarship [grant number 2005351]; Mater Research Institute under Betty McGrath Health Services Research Seeding Grant [grant number 2613]; and The University of Queensland under Research Training Stipend [grant number 3769499089]. University of Queensland Early Career

### References

- Albrecht, G., Freeman, S., & Higginbotham, N. (1998). Complexity and human health: the case for a transdisciplinary paradigm. *Culture, Medicine and Psychiatry*, 22(1), 55–92. <https://doi.org/10.1023/A:1005328821675>
- Allied Health Profession' Office of Queensland. (2013). *Allied Health Advanced Clinical Practice Framework*. Queensland Government [https://www.health.qld.gov.au/\\_\\_data/assets/pdf\\_file/0026/156842/advancedfwork.pdf](https://www.health.qld.gov.au/__data/assets/pdf_file/0026/156842/advancedfwork.pdf)



- Alvarez, E. A., Garrido, M., Ponce, D. P., Pizarro, G., Córdova, A. A., Vera, F., Ruiz, R., Fernández, R., Velásquez, J. D., Tobar, E., & Salech, F. (2020). A software to prevent delirium in hospitalised older adults: Development and feasibility assessment. *Age and Ageing*, 49(2), 239–245. <https://doi.org/10.1093/ageing/afz166>
- Australian Commission on Safety and Quality in Health Care. (2019). Clinical governance and quality improvement to support comprehensive care. *Australian Commission on Safety and Quality in Health Care*. <https://www.safetyandquality.gov.au/standards/nsqhs-standards/comprehensive-care-standard/clinical-governance-and-quality-improvement-support-comprehensive-care>
- Australian Institute of Health and Welfare. (2021). *Episode of admitted patient care - length of stay*. Australian Government <https://meteor.aihw.gov.au/content/index.phtml/itemId/329889>
- Birkeland, A., Tuntland, H., Forland, O., Jakobsen, F. F., & Langeland, E. (2017). Interdisciplinary collaboration in reablement – A qualitative study. *Journal of Multidisciplinary Healthcare*, 10, 195–203. <https://doi.org/10.2147/JMDH.S133417>
- Cartmill, C., Soklaridis, S., & David Cassidy, J. (2011). Transdisciplinary teamwork: the experience of clinicians at a functional restoration program. *Journal of Occupational Rehabilitation*, 21(1), 1–8. <https://doi.org/10.1007/s10926-010-9247-3>
- Delany, K., Pitt, R., Perkins, K., & Phillips, R. (2019). *Transdisciplinary stroke care: perceptions of healthcare teams*. National allied health conference, Brisbane. <http://www.nahc.com.au/2804>
- The Department of Health. (2013). 8.2 *Allied health workforce*. Australian Government <https://www1.health.gov.au/internet/publications/publishing.nsf/Content/work-review-australian-government-health-workforce-programs-toc~chapter-8-developing-dental-allied-health-workforce~chapter-8-allied-health-workforce>
- Dower, C., Moore, J., & Langelier, M. (2013). It is time to restructure health professions scope-of-practice regulations to remove barriers to care. *Health Affairs*, 32(11), 1971–1976. <https://doi.org/10.1377/hlthaff.2013.0537>
- Eaton, B., & Regan, S. (2015). Perspectives of speech-language pathologists and audiologists on interprofessional collaboration [Article]. *Canadian Journal of Speech-Language Pathology and Audiology*, 39(1), 6–18. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-84943229455&partnerID=40&md5=54c7023430fcdabf7227c65272c96336>
- Fink-Samnack, E. (2019). Leveraging interprofessional team-based care toward case management excellence: part I, history, fundamentals, evidence. *Professional Case Management*, 24(3), 130–141. <https://doi.org/10.1097/NCM.0000000000000360>
- Flores-Sandoval, C., Sibbald, S., Ryan, B. L., & Orange, J. B. (2021). Healthcare teams and patient-related terminology: A review of concepts and uses. *Scandinavian Journal of Caring Sciences*, 35(1), 55–66. <https://doi.org/10.1111/scs.12843>
- Gordon, R. M., Corcoran, J. R., Bartley-Daniele, P., Sklenar, D., Sutton, P. R., & Cartwright, F. (2014). A transdisciplinary team approach to pain management in inpatient health care settings. *Pain Management Nursing*, 15(1), 426–435. <https://doi.org/10.1016/j.pmn.2013.01.004>
- Howard, I., & Potts, A. (2019). Interprofessional care for neuromuscular disease. *Current Treatment Options in Neurology*, 21(8), 35. <https://doi.org/10.1007/s11940-019-0576-z>
- Innes, K., Crawford, K., Jones, T., Blight, R., Trenham, C., Williams, A., Griffiths, D., & Morphet, J. (2016). Transdisciplinary care in the emergency department: A qualitative analysis. *International Emergency Nursing*, 25, 27–31. <https://doi.org/10.1016/j.ienj.2015.07.003>
- Kaltner, M., Murtagh, D., Bennetts, M., Pighills, A., James, J., & Scott, A. (2017). Randomised controlled trial of a transprofessional healthcare role intervention in an acute medical setting. *Journal of Interprofessional Care*, 31(2), 190–198. <https://doi.org/10.1080/13561820.2016.1248237>
- Karam, M., Brault, I., Van Durme, T., & Macq, J. (2018). Comparing interprofessional and interorganizational collaboration in healthcare: A systematic review of the qualitative research. *International Journal of Nursing Studies*, 79, 70–83. <https://doi.org/10.1016/j.ijnurstu.2017.11.002>
- Karol, R. L., & Jacobs, H. E. (2014). Team models in neurorehabilitation: structure, function, and culture change [Article]. *NeuroRehabilitation*, 34(4), 655–669. <https://doi.org/10.3233/NRE-141080>
- Kholed, S. N. S., Hassan, N. M., Ma'ou, S. N., & Hamid, N. Z. A. (2017). Teamwork and collaboration in healthcare: Elements of inter-professional teamwork [Article]. *Advanced Science Letters*, 23(11), 10834–10837. <https://doi.org/10.1166/asl.2017.10164>
- Moher, D. A., L., Tetzlaff, J., Altman, D. G., & The Prisma Group, (2018). Preferred reporting items for scoping reviews (PRISMA-ScR): Checklist and explanation. *Annals of Internal Medicine*, 169(7), 467–473. <https://doi.org/10.7326/M18-0850>
- Morphet, J., Griffiths, D. L., Crawford, K., Williams, A., Jones, T., Berry, B., & Innes, K. (2016). Using transprofessional care in the emergency department to reduce patient admissions: A retrospective audit of medical histories. *Journal of Interprofessional Care*, 30(2), 226–231. <https://doi.org/10.3109/13561820.2015.1115394>
- NHS England. (2021). *The 14 allied health professions*. <https://www.england.nhs.uk/ahp/role/>
- Peters, M. D. J., Godfrey, C., McInerney, P., Munn, Z., Tricco, A. C., & Khalil, H. (2020). *JBI Manual for Evidence Synthesis*.
- Porter, J. (2014). A transdisciplinary model to improve screening and early intervention within dietetics and speech pathology: A case study. *Journal of Research in Interprofessional Practice and Education*. <https://doi.org/10.22230/jripe.2014v4n2a152>
- Reeves, S., Pelone, F., Harrison, R., Goldman, J., & Zwarenstein, M. (2017). Interprofessional collaboration to improve professional practice and healthcare outcomes. *Cochrane Database of Systematic Reviews*, 6(6). <https://doi.org/10.1002/14651858.CD000072.pub3>
- Reinbott, J., & Murtagh, D. (2019), 5–8. *Implementation of a transdisciplinary model of care for mild deficit acute stroke patients*. 13th National Allied Health Conference, Brisbane. <http://www.nahc.com.au/2695>
- Sangaletti, C., Schweitzer, M. C., Peduzzi, M., Zoboli, E., & Soares, C. B. (2017). Experiences and shared meaning of teamwork and interprofessional collaboration among health care professionals in primary health care settings: A systematic review. *JBI Database System Rev Implement Rep*, 15(11), 2723–2788. <https://doi.org/10.11124/JBISRIR-2016-003016>
- Saxon, R., Gray, M. A., & Oprescu, F. I. (2014). Extended roles for allied health professionals: An updated systematic review of the evidence. *Journal of Multidisciplinary Healthcare*, 7, 479–488. <https://doi.org/10.2147/JMDH.S66746>
- Singh, R., Kückkveci, A. A., Grabljevec, K., & Gray, A. (2018). The role of interdisciplinary teams in physical and rehabilitation medicine [Review]. *Journal of Rehabilitation Medicine*, 50(8), 673–678. <https://doi.org/10.2340/16501977-2364>
- Stadick, J. L. (2020). Understanding health care professionals' attitudes towards working in teams and interprofessional collaborative competencies: A mixed methods analysis [Article]. *Journal of Interprofessional Education and Practice*, 21, 100370. Article 100370 <https://doi.org/10.1016/j.xjep.2020.100370>
- Van Bower, V. (2017). Transdisciplinarity in Health Care: A Concept Analysis. *Nursing Forum*, 52(4), 339–347. <https://doi.org/10.1111/nuf.12200>
- Watterson, D., Walter, K., O'Brien, L., Terrill, D., Philip, K., Swan, I., & Somerville, L. (2019). Trans-disciplinary advanced allied health practitioners for acute hospital inpatients: A feasibility study. *International Journal for Quality in Health Care*, 31(2), 103–109. <https://doi.org/10.1093/intqhc/mzy127>
- Will, K. K., Johnson, M. L., & Lamb, G. (2019). Team-Based Care and Patient Satisfaction in the Hospital Setting: A Systematic Review. *J Patient Cent Res Rev*, 6(2), 158–171. <https://doi.org/10.17294/2330-0698.1695>