

A synthesis of the secondary literature on effectiveness of hospital avoidance and discharge programs

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Abstract

The objective of this systematic review of the literature was to synthesise secondary evidence for hospital avoidance and discharge programs, compared with usual hospital care. Seventeen electronic databases were searched to identify relevant secondary peer-reviewed and grey research. Forty-eight publications were included. Generally, evidence for safety, effectiveness and efficiency of hospital avoidance and discharge programs was equivocal, while there was encouraging evidence regarding improved patient-centred outcomes with most hospital avoidance and discharge planning interventions.

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THE IMPORTANCE OF EMBEDDING best practice principles of safe, effective, timely, equitable, efficient and patient-centred approaches in health care is increasingly being recognised as a way of containing costs, optimising health outcomes and minimising costly adverse events.¹ Quality health care principles have been considered in tandem with quality aspects of health care (proposed by Donabedian² as structure, process and outcome). However, health care provided under a quality framework is proposed to be cost-prohibitive,³ particularly when coupled with increasing high volume usage of the acute hospital system by

What is known about the topic?

Hospital avoidance and discharge programs have been considered to enhance efficiency and access to health care systems and review of the evolving evidence of the effectiveness of these initiatives is warranted.

What does this paper add?

This paper provides a systematic review of the relevant literature, finding that while there was evidence for improved patient-centred outcomes, the evidence for safety, effectiveness and efficiency of hospital avoidance and discharge programs was equivocal.

What are the implications for practitioners?

While there is a need for more methodologically sound research in this area, the lessons from this review are that early discharge programs should only be put in place as long as patients' health and safety is not compromised and that the costs saved in one sector should be balanced by expenditure in another sector.

aged people with multiple and complex illnesses. Best practice health care for many elderly people suffering from complex and chronic illnesses has been considered along a continuum, within which acute hospital care reflects but one segment, and where community health services and self management approaches reflect the usual health care resources. Consideration of best practice principles in health care is particularly important in light of the potential for inappropriate and costly use of health care resources, for instance, misuse (providing the wrong treatment in the wrong setting), over-use (providing unnecessary treatment) and under-use (providing insufficient treatment in an inappropriate setting).⁴

In response to pressures on the acute hospital system, innovative approaches have been developed around the world to provide alternative forms of care that meet patients' needs and minimise the use of costly hospital resources.

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This body of literature requires regular scrutiny to identify hospital avoidance and discharge planning approaches that have good evidence of effectiveness, are transferable between settings, and are underpinned by best practice principles. This review systematically identifies and evaluates the secondary literature on hospital avoidance and discharge programs, using a framework of best practice principles in health care. This review informs funding of new models of health care, and identifies gaps in the research literature.

Methodology

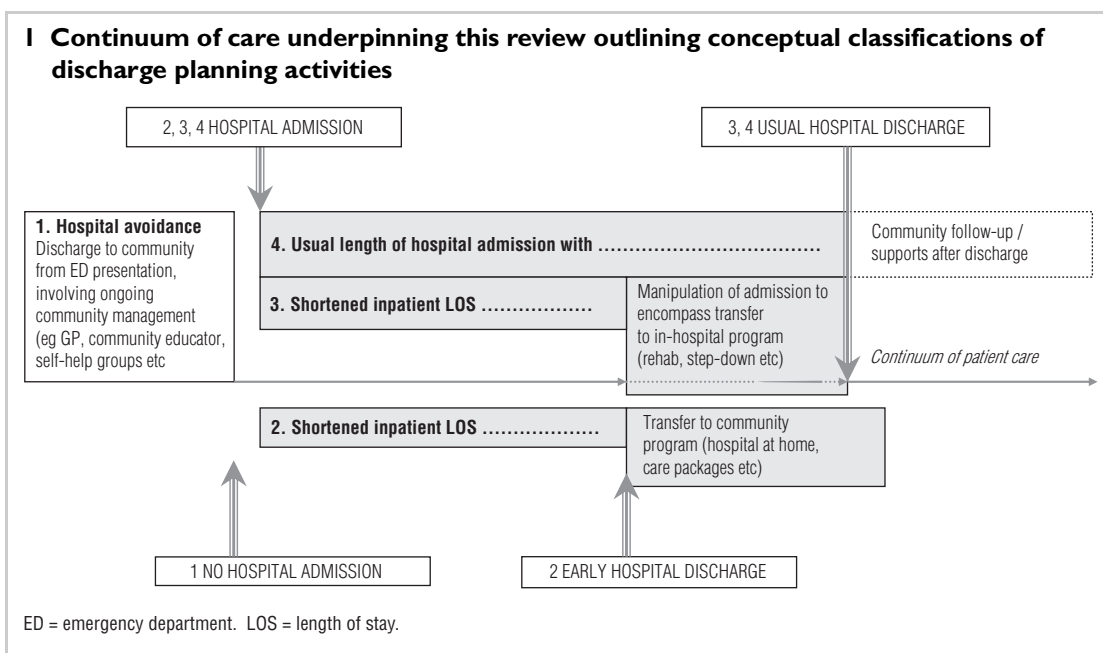
The objective of this review was to consider the evidence for hospital avoidance and hospital discharge programs from the secondary literature in terms of principles of best practice (safety, effectiveness, timeliness, equity, efficiency and patient-centredness).

Four categories of intervention were conceptualised within a theoretical model of the care continuum (Box 1). *Category 1* reflected initiatives aimed at preventing any admission to hospital (hospital avoidance, or discharge to the community from the emergency department).

Category 2 referred to programs aimed at shortening the length of stay in hospital by transferring aspects of care to the community (discharge to the community to early discharge programs provided at home). *Category 3* considered programs that manipulated the type of care provided in hospital during a usual length of stay (discharge from hospital following patient transfer from a medical/surgical ward bed to a specialised recuperative stream); and *Category 4* reflected usual length of stay hospital programs with post-discharge community-based supports aimed at preventing readmission to hospital.

Literature was restricted to secondary research evidence (systematic reviews of the published literature) and grey literature reflecting descriptive reviews of published and unpublished literature. The primary studies included patients of any age and any condition, who had been recently discharged from hospital or emergency department settings to home in the community. Secondary evidence was excluded if the primary studies dealt with patients who had been discharged to nursing homes and day surgery centres.

The secondary evidence meeting the criteria above was further eligible for inclusion if it dealt



with any discharge planning initiative or hospital avoidance program, defined as proactive patient plans determined at any point pre- or during admission on the continuum of care, involving an interface between hospital, emergency department and care provided in the community. Intervention strategies could include home care services, hospital-in-the-home, community care packages, general practitioner involvement, and support systems such as telephone follow-up. Studies were excluded if they dealt with palliative care, day surgery and day hospital admissions. Outcome measures could relate to any best practice principle of health care.

The search was undertaken during June 2005 of databases comprising MEDLINE, CINAHL, AMED, Ageline, Current Contents, The Cochrane Library, Cochrane Central Register of Controlled Trials (CENTRAL), DARE, EPOC, EMBASE, ARCHI (The Australian Resource Centre for Hospital Innovation), AUSTHealth, Science Direct, PubMed, PEDro, OT seeker and Digital Dissertations.

Methodological quality

The strength of evidence from a study depends on the ability of the study design to minimise the possibility of bias and to maximise attribution. Critical appraisal of the relevant publications was undertaken using an instrument which combined elements from two published quality appraisal scales^{5,6} (See Appendix). This instrument provides a total possible quality score of ten points, using linearly scored scales in which one point is awarded for a “yes”, and “no” or “cannot tell” are scored as a zero. Two independent reviewers scored the methodological quality of a subset of the studies to establish reliability in assigning methodological quality scores. To address the possible non-normal distribution of raw quality scores, median and mode values (and minimum and maximum values) were reported to provide an overview of quality trends. For comparison between sub-groups of literature however, means and standard deviations were employed so that statistical tests could be applied and meaningful

comparisons made. To calculate Pearson regression statistics to test the relationship between high quality scores and the number of positive findings, we transformed the quality scores (the dependent variable) to approximate a normal distribution by taking the square root of the raw scores.

Summary of key findings

To summarise the key findings, symbols were used to identify positive, negative and equivocal evidence, and absence of evidence.

↑ indicates positive evidence (note that for outcomes associated with costs this indicates a reduction in the overall costs of the services provided)

↓ indicates negative evidence (note that for outcomes associated with costs this indicates an increase in the overall costs of the services provided)

↔ indicates equivocal evidence

? indicates absence of evidence due to poor or inadequate reporting

Results

The volume of research interest in the area of discharge planning and hospital avoidance was underscored by finding more than 800 000 hits from application of the search strategy to the library databases. A total of 48 publications met the inclusion criteria for this review.

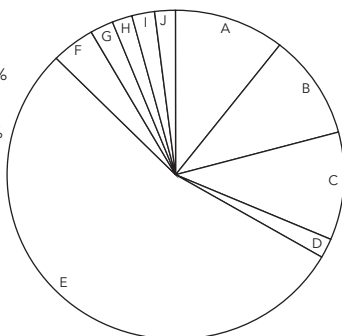
Of the included secondary evidence publications, Group 1 ($n = 30^{7-37}$) derived their evidence from experimental studies, namely randomised clinical trials (randomised controlled trials [RCTs], controlled clinical trials [CCTs] and clinical trials [CTs]). The remaining 18 secondary evidence publications (Group 2³⁸⁻⁵⁵) synthesised information from any research design (such as experimental studies, descriptive studies, case studies or case series, other literature reviews).

Methodological quality

The methodological quality scores were summarised. The median quality score for all 30 Group 1

2 Geographical origins of the publications

A = Canada 11%
 B = USA 10%
 C = Australia 10%
 D = New Zealand 2%
 E = UK 55%
 F = Combined 4%
 G = Netherlands 2%
 H = Scotland 2%
 I = Norway 2%
 J = Israel 2%



publications was nine (mode nine) with a range of raw scores from three to nine. This suggested that the quality of publications in this group was generally high. The *most commonly fulfilled* methodological quality criteria comprised criteria 1, 2, 3, 8, 9 and 10. Criteria 1, 2 and 3 are concerned with research aims and the methodological requirements of the review. Criteria 8, 9 and 10 consider generic issues of clinical applicability of the research findings to the local environment. This suggests that most Group 1 publications appropriately justified their research, used appropriate methodology and presented clinically relevant findings. The *least commonly fulfilled* methodological quality criteria were criteria 4 to 7. These criteria represent key aspects of methodological research quality, analysis and precision of results, and presentation of the data. These findings suggest that for some of the included studies, there were significant methodological flaws in reporting.

The median quality score for the Group 2 publications was three (mode two) with a range from two to seven. This suggested that the quality of publications in this group was poor–moderate. While basic methodological quality criteria were met by most publications in this group, there were significant methodological flaws in reporting which affected all articles, and thus overall the methodological quality of these secondary publications is relatively poor.

Geographical origins of publications

Box 2 provides an overview of the geographical origins of the publications included in this review. The large number of publications arising from the United Kingdom is not surprising and may be reflective of the growing pressures on the National Health System (NHS) resulting in the need to avoid hospitalisation and promote early discharge (highlighted by several systematic review authors such as Langhorne et al,²¹ Parker et al,²⁶ Parkes and Shepperd²⁸). The geographic specificity of these reviews has implications for the external generalisability of practice of the models of service delivery they describe.

Diagnoses and interventions

Five reviews reported on discharge planning or hospital avoidance procedures for more than one diagnostic condition. Of the total number of diagnoses/conditions reflected in the secondary evidence included in this review (53), 30% reflected non-disease-specific dependent older patients, and 26% reflected generic patient approaches. Stroke (11%), psychiatric disorders (9%) and cardiac conditions (6%) were less common, with other conditions reflected in one to two publications only.

Box 3 outlines the range of discharge planning and hospital avoidance intervention strategies considered in this review. There were 57 interventions reported overall, with four publications reporting on more than one intervention. The most commonly reported interventions were generic discharge planning (28.1%), hospital at home, and home-based care (15.8%), and community-based services (14%). Less commonly reported interventions included short-stay/early discharge (7%), and home visiting, multidisciplinary strategies and different forms of communication (5% each). A range of other interventions were reported in smaller numbers (one to two papers).

Lack of description in many of the publications of what constituted “standard hospital care” as a comparator constrained our capacity to explore baselines or to compare standards between studies.

3 Interventions outlined in the included publications

Article	Hospital at home and home-based care	Home visiting	Integrated care/stroke units / geriatric assessment units	Medical day-hospital care	Community-based care/ services	Nurse-led inpatient units	Discharge planning	Therapy-based rehabilitation services	Written and verbal information	General practitioner	Short stay/early discharge	Multidisciplinary	Communication/telephone	Specialist outreach clinics
Aminzadeh and Dalziel (2002) ⁵²							✓							
Anderson et al (2002) ⁸	✓													
Barnett (2004) ⁵⁵							✓							
Bristow and Herrick (2002) ⁵¹												✓		
Brown et al (2002) ¹⁰											✓			
Bull (2000) ⁴⁵							✓							
Cameron et al (2001) ¹¹												✓		
Campbell et al (1998) ⁴¹							✓							
Cole (2001) ⁴⁸					✓		✓							
Corrado (2001) ⁴⁹	✓						✓							
Dukkers et al (1999) ^{43*}							✓							
Early Supported Discharge Trialists (2005) ¹²											✓			
Eldar (2000) ⁴⁴					✓									
Elkan et al (2001) ¹³		✓												
Fasken et al (2001) ⁴⁷		✓					✓						✓	
Ferguson (1997) ³⁹							✓							
Ferguson (1998) ⁴⁰							✓							
Forster et al (1999) ³⁶				✓										
Griffiths et al (2004) ¹⁵						✓								
Gruen et al (2003) ¹⁶														✓
Hyde et al (2000) ¹⁷							✓							
Jackson (1994) ³⁸							✓							
Johnson et al (2003) ¹⁹									✓					
Johnstone and Zolese (1999) ²⁰											✓			
Johri et al (2003) ^{18†}			✓											
Langhorne (2000) ⁴⁶	✓													
Langhorne et al (1999) ²¹					✓									
Lien (2002) ⁵⁰					✓									
Marshall and Lockwood (1998) ⁷					✓									
Marshall et al (2003) ²²				✓										
McAlister et al (2004) ¹⁴												✓		
Mitchell et al (2002) ²³										✓				
Mottram et al (2002) ²⁴	✓													
Outpatient Service Trialists (2002) ²⁵								✓						
Parker et al (2000) ²⁶	✓		✓		✓	✓					✓			
Parker et al (2002) ²⁷							✓							
Parkes and Shepperd (2000) ²⁸							✓							
Patterson and Mulley (1999) ⁴²		✓												
Payne et al (2002) ⁵⁴													✓	
Phillips et al (2004) ²⁹							✓							
Ram et al (2003) ³⁰	✓													
Richards and Coast (2003) ³¹					✓									
Roberts and Mays (1998) ³⁷					✓					✓			✓	
Shepperd and Iliffe (2001) ³²	✓													
Shepperd et al (2004) ³³							✓							
Soderstrom et al (1999) ³⁴	✓													
Ward et al (2003) ³⁵	✓													
Williams and Botti (2002) ⁵³							✓							

* This review evaluated the role of discharge liaison nurse in The Netherlands. † This review included common features of integrated care such as a single point entry system, case management, geriatric assessment and multi-disciplinary team and use of financial incentives to promote downward substitution.

4 Quality principles reported in the literature

Article	Safe	Effective	Timely	Equitable	Efficient	Patient-centred
Aminzadeh and Dalziel (2002) ⁵²	×	×		×	×	×
Anderson et al (2002) ⁸	×	×			×	
Barnett (2004) ⁵⁵				×	×	×
Bristow and Herrick (2002) ⁵¹		×	×		×	×
Brown et al (2002) ¹⁰	×	×	×		×	×
Cameron et al (2001) ¹¹	×	×	×		×	×
Campbell et al (1998) ⁴¹	×	×	×	×	×	×
Cole (2001) ⁴⁸		×			×	×
Corrado (2001) ⁴⁹		×			×	×
Duckkers van Emden et al (1999) ⁴³		×			×	
Early Supported Discharge Trialists (2005) ¹²	×	×	×		×	×
Fasken et al (2001) ⁴⁷	×	×			×	
Ferguson (1997) ³⁹	×			×	×	×
Ferguson (1998) ⁴⁰	×	×	×	×	×	×
Griffiths et al (2004) ¹⁵	×	×			×	×
Gruen et al (2003) ¹⁶		×		×	×	×
Hyde et al (2000) ¹⁷	×	×		×		
Jackson (1994) ³⁸		×		×	×	×
Johnson et al (2003) ¹⁹	×	×	×	×	×	×
Johnstone and Zolese (1999) ²⁰	×	×	×	×	×	×
Langhorne et al (1999) ²¹	×	×			×	×
Langhorne (2000) ⁴⁶	×	×			×	
Lien (2002) ⁵⁰		×			×	
Marshall and Lockwood (1998) ⁷	×	×	×	×	×	×
Mitchell et al (2002) ²³		×			×	×
Outpatient Service Trialists (2002) ²⁵	×	×	×		×	×
Parker et al (2002) ²⁷	×	×			×	×
Parker et al (2000) ²⁶	×	×			×	×
Parkes and Shepperd (2000) ²⁸	×	×			×	×
Patterson and Mulley (1999) ⁴²		×				×
Payne et al (2002) ⁵⁴		×			×	
Phillips et al (2004) ²⁹	×	×			×	×
Richards and Coast (2003) ³¹	×	×	×		×	×
Shepperd & Iliffe (2003) ³²	×	×			×	×
Shepperd et al (2004) ³³	×	×			×	×
Ward et al (2003) ³⁵	×	×	×	×	×	×
Williams and Botti (2002) ⁵³		×			×	×
Bull (2000) ⁴⁵		×			×	×
Roberts and Mays (1998) ³⁷		×			×	
McAlister et al (2004) ¹⁴	×	×			×	
Eldar (2004) ⁴⁴		×			×	
Marshall et al (2003) ²²	×	×			×	×
Forster et al (1999) ³⁶	×	×			×	×
Mottram et al (2002) ²⁴	×	×			×	×
Soderstrom et al (1999) ³⁴	×	×			×	×
Johri et al (2003) ¹⁸	×	×			×	×
Elkan et al (2001) ¹³	×	×			×	×
Ram et al (2003) ³⁰	×	×			×	×

Principles of quality health care

Box 4 outlines those quality principles reported in the secondary evidence. The most commonly reported quality principles outcomes were efficiency (98%) and effectiveness (96%), followed by patient-centredness (79%) and safety (69%), timeliness (25%) and equity (23%). Only six studies^{7,20,21,37,39,41} reported on outcomes relating to all six quality principles. The common feature of all these studies was that they focused on the transition needs of specific patient groups and diagnoses (congestive heart failure, mental health, frail aged), for whom perhaps clear discharge plans could be made. The studies which addressed equity (the least well fulfilled criterion) also dealt with subgroups of patients who had specific needs with respect to transition from one type of health care to another (the frail elderly, patients with chronic obstructive pulmonary dis-

ease, elderly congestive heart failure patients, vulnerable patients [aged, homeless, mentally ill], patients requiring specialist care, and habitual attendees at emergency department and/or inpatient settings). The remainder of the studies dealt in general, with processes, or generic discharge programs which were not contingent on the presenting condition or patient type.

Summary of evidence

To manage the large number of relevant publications, and the heterogeneity of the diagnostic groups and interventions investigated within them, a succinct summary of evidence is presented in Box 5, Box 6 and Box 7 using the four conceptual categories outlined in Box 1. These tables summarise the literature including the focus of the research (diagnostic groups), the intervention performed or investigated, the

5 Category 1: Summary of evidence for preventing any admission to hospital (hospital avoidance)

Article	Group	Effectiveness	Patient-centred	Safety	Efficiency
Aminzadeh and Dalziel (2002) ⁵²	2	?	↑	?	↑
Bristow and Herrick (2002) ⁵¹	1	↑	↑		↑
Elkan et al (2001) ¹³	1	↔	↔	↑	↔
Ferguson (1997) ³⁹	2		?		?
Ferguson (1998) ⁴⁰	2	?	?	?	?
Forster et al (1999) ³⁶	1	↑	↑	↑	↓
Gruen et al (2003) ¹⁶	1	↑	↑		?
Johri et al (2003) ¹⁸	1	↑	↑	↑	↑
Langhorne et al (1999) ²¹	1	↔	↔	↔	↔
Marshall and Lockwood (1998) ⁷	1	↑	↑	↑	↑
Marshall et al (2003) ²²	1	↑	↑	↑	↓
Mitchell et al (2002) ²³	1	↑ *	?		?
Mottram et al (2002) ²⁴	1	?	?	?	?
Ram et al (2003) ³⁰	1	↑	↑	↑	?
Roberts and Mays (1998) ³⁷	1	↑			?
Soderstrom et al (1999) ³⁴	1	↔	↑	↔	↑
Williams and Botti (2002) ⁵³	2	↔	↔	↔	↔

*This positive outcome was especially evident for functional outcomes in chronically mentally ill patients. ↑ indicates positive evidence (note that for outcomes associated with costs this indicates a reduction in the overall costs of the services provided). ↓ indicates negative evidence (note that for outcomes associated with costs this indicates an increase in the overall costs of the services provided). ↔ indicates equivocal evidence. ? indicates absence of evidence due to poor or inadequate reporting.

results as they relate to effectiveness, efficiency, safety and patient-centeredness (the four most common quality principles), and the recommendations. A few publications reported findings which did not exclusively “fit” within one category, rather, they evaluated interventions which crossed the hospital and community interface, and hence are reported across two or more categories.

Category 1: Hospital avoidance programs

Of the 48 studies included in this review, 17 studies outlined the evidence for hospital avoidance programs (29%). Four of these studies summarised all study designs (Group 2) (23.5%) while the remainder (76.5%) summarised experi-

mental literature only (Group 1). The studies in this category mostly directed patients who attended an emergency department to community resources, rather than admitting them to a hospital bed. Nine (53%) demonstrated evidence for increased effectiveness, nine (53%) demonstrated evidence for increased patient-centred outcomes, six (36%) provided evidence of increased safety, and five (29%) provided evidence for increased efficiency (decreased costs). Higher costs were reported in two studies (12%). No poor outcomes (harm) were reported for health outcomes (effectiveness), patient safety or patient-centred outcomes. Considering the total number of quality criteria represented in these studies (61), positive findings were reported from

6 Category 2: Summary of evidence for programs aimed at shortening the length of stay in hospital by transferring aspects of care to the community (early discharge programs)

Article	Group	Effectiveness	Patient-centred	Safety	Efficiency
Anderson et al (2002) ⁸	1	↑		↑	↑
Brown et al (2002) ¹⁰	1	↔	↔	↔	↔
Bull (2000) ⁴⁵	1	?	↑		?
Cole (2001) ⁴⁸	2	↔	↔		?
Corrado (2001) ⁴⁹	2	↑	↑		↔
Early Supported Discharge Trialists (2002) ¹²	1	↑	↑	↑	↑
Eldar (2000) ⁴⁴	2	↑			?
Griffiths et al (2004) ¹⁵	1	↑	↑	↔	↔
Hyde et al (2000) ¹⁷	1	↑	?	↑	?
Johnstone and Zolese (1999) ²⁰	1	↑	↑	↑	↑
Langhorne (2000) ⁴⁶	2	↑		?	?
Lien (2002) ⁵⁰	1	?			?
Outpatient Service Trialists (2002) ²⁵	1	↑	↑	↔	?
Parker et al (2000) ²⁶	1	↔	↑	↑	↔
Payne et al (2002) ⁵⁴	2	↑			?
Phillips et al (2004) ²⁹	1	↑	↑	↑	↑
Ram et al (2003) ³⁰	1	↑	↑	↑	?
Shepperd and Iliffe (2001) ³²	1	↔	↔	↔	↔
Shepperd et al (2004) ³³	1	↔	↔	↔	↔
Ward et al (2003) ³⁵	1	?	?	?	?

↑ indicates positive evidence (note that for outcomes associated with costs this indicates a reduction in the overall costs of the services provided). ↓ indicates negative evidence (note that for outcomes associated with costs this indicates an increase in the overall costs of the services provided). ↔ indicates equivocal evidence. ? indicates absence of evidence due to poor or inadequate reporting.

7 Category 3: Summary of evidence for programs that manipulate the type of care provided in hospital during a usual length of stay

Article	Group	Effectiveness	Patient-centred	Safety	Efficiency
Bull (2000) ⁴⁵	2	?	↑		?
Cameron et al (2001) ¹¹	1	↔	↔	↔	↔
Eldar (2000) ⁴⁴	2	↑			?
Griffiths et al (2004) ¹⁵	1	↑	↑	↔	↔
Langhorne (2000) ⁴⁶	2	↑		?	?
Parker et al (2000) ²⁶	1	↔	↑	↑	↔
Ward et al (2003) ³⁵	1	↔	↔	↔	?

↑ indicates positive evidence (note that for outcomes associated with costs this indicates a reduction in the overall costs of the services provided). ↓ indicates negative evidence (note that for outcomes associated with costs this indicates an increase in the overall costs of the services provided). ↔ indicates equivocal evidence. ? indicates absence of evidence due to poor or inadequate reporting.

47.5% of the total number of quality criteria ($n = 29$), while equivocal findings were reported in 13 (21%) of the total number of quality criteria, and insufficient evidence was reported in 17 (28%) of the total number of quality criteria. The average methodological quality score of the Category 1 articles was 6.2 (SD, 2.8), and the average number of positive findings across the four quality criterion was 1.7 (SD, 1.4). The Pearson correlation coefficient expressing the correlation between having a high quality score and reporting positive findings was moderate ($r = 0.52$).

Category 2: Early discharge programs

Of the studies included in this review, 20 studies outlined the evidence for early discharge from hospital programs (34.5%). Five of these studies summarised all study designs (Group 2) (25%) while the remaining 75% summarised experimental literature only (Group 1). These programs variously investigated hospital in the home, packages of home care and other home-based services. Twelve (60%) demonstrated evidence for increased effectiveness, nine (45%) demonstrated evidence for increased patient-centred outcomes, seven (35%) provided evidence of increased safety and four (20%) provided evidence for increased efficiency (decreased costs). No harm was reported for health outcomes (effectiveness), patient safety or patient-centred outcomes. Con-

sidering the total number of quality criteria represented in these studies (69), positive findings were reported from 43% of the total number of quality criteria ($n = 32$), while equivocal findings were reported in 20 (29%) of the total number of quality criteria, and insufficient evidence was reported in 17 (25%) of the total number of quality criteria. The average methodological quality score of the Category 2 articles was 7.3 (SD, 2.2), and the average number of positive findings across the four quality criteria was 1.5 (SD, 1.4). The Pearson correlation coefficient expressing the correlation between having a high quality score and reporting positive findings was moderate ($r = 0.45$).

Category 3: Manipulation of inpatient care programs

Of the studies included in this review, seven outlined evidence for providing different care programs while in hospital (12%). Three of these studies summarised all study designs (Group 2) (43%) while the remaining 57% summarised experimental literature only (Group 1). These programs mostly described specialist units, such as stroke rehabilitation units, fracture units etc. Three (42%) demonstrated evidence for increased effectiveness, three (42%) demonstrated evidence for increased patient-centred outcomes, one (14%)

provided evidence of increased safety and none (0) provided evidence for increased efficiency (decreased costs). No harm was reported for health outcomes (effectiveness), patient safety or patient-centred outcomes. Considering the total number of quality criteria represented in these studies (24), positive findings were reported from 29% of the total number of quality criteria ($n = 7$), while equivocal findings were reported in 11 (46%) of the total number of quality criteria, and insufficient evidence was reported in 6 (25%) of the total number of quality criteria. The average methodological quality score of the Category 3 articles was 6.1 (SD, 2.8), and the average number of positive findings across the four quality criteria was 1.0 (SD, 0.8). The Pearson correlation coefficient expressing the correlation between having a high quality score and reporting positive findings was moderate ($r = 0.42$).

Category 4: Usual length of stay with post-discharge activities

Of the studies included in this review, 14 studies outlined the evidence for providing post-discharge programs following a usual length of stay in hospital (24%). Six of these studies summarised all study designs (Group 2) (43%) while the remainder summarised experimental literature only (Group 1) (57%). These programs included a variety of post-discharge supports such as discharge nurse home visiting, telephone supports, community supports, etc. Ten (71%) demonstrated evidence for increased effectiveness, seven (50%) demonstrated evidence for increased patient-centred outcomes, eight (57%) provided evidence of increased safety and two (14%) provided evidence for increased efficiency (decreased costs). No harm was reported for health outcomes (effectiveness), patient safety or patient-centred outcomes. Considering the total number of qual-

8 Category 4: Summary of evidence for usual length of stay hospital programs with post-discharge activities aimed at preventing readmission to hospital

Article	Group	Effectiveness	Patient-centred	Safety	Efficiency
Barnett (2004) ⁵⁵	2		↑		?
Campbell et al (1998) ⁴¹	2	↑	↑	↑	?
Cole (2001) ⁴⁸	2	↔	↔		?
Dukkers Van Emden et al (1999) ⁴³	2	↑			?
Fasken et al (2001) ⁴⁷	2	↑		↔	↔
Hyde et al (2000) ¹⁷	1	↑	?	↑	?
Jackson (1994) ³⁸	1	↔	↔		↔
Johnson et al (2003) ¹⁹	1	↑	↑	↑	?
McAlister et al (2004) ¹⁴	1	↑		↑	↑
Parker et al (2002) ²⁷	1	↑	↑	↑	↔
Parkes and Shepperd (2000) ²⁸	1	↑	↑	↑	↔
Patterson and Mulley (1999) ⁴²	2	↔	↔		
Phillips et al (2004) ²⁹	1	↑	↑	↑	↑
Richards and Coast (2003) ³¹	1	↑	↑	↑	?

↑ indicates positive evidence (note that for outcomes associated with costs this indicates a reduction in the overall costs of the services provided). ↓ indicates negative evidence (note that for outcomes associated with costs this indicates an increase in the overall costs of the services provided). ↔ indicates equivocal evidence. ? indicates absence of evidence due to poor or inadequate reporting.

9 Summary of quality scoring

Category	<i>n</i>	Group 2 studies	Average quality score (SD)	Average positive findings (SD)	Positive findings	Equivocal findings	Incomplete findings	Pearson <i>r</i>
1	17	23.5%	6.2 (2.8)	1.7 (1.4)	47.5%	21%	28%	0.52
2	20	25%	7.3 (2.2)	1.5 (1.4)	43%	29%	25%	0.45
3	7	43%	6.1 (2.8)	1.0 (0.8)	29%	46%	25%	0.42
4	14	43%	5.8 (2.9)	1.8 (1.3)	59%	24%	17%	0.65

ity criteria represented in these studies (46), positive findings were reported from 59% of the total number of quality criteria ($n=27$), while equivocal findings were reported in 11 (24%) of the total number of quality criteria, and insufficient evidence was reported in eight (17%) of the total number of quality criteria. The average methodological quality score of the Category 4 articles was 5.8 (SD, 2.9), and the average number of positive findings across the four quality criteria was 1.8 (SD, 1.3). The Pearson correlation coefficient expressing the correlation between having a high quality score and reporting positive findings was moderate ($r=0.65$).

Box 9 summarises the findings from the synthesis of the categories of studies. There was no significant difference between quality scores assigned to the four categories, nor to the number of positive findings across the four key criteria. Category 1 had the lowest number of Group 2 studies (studies which summarised all levels of evidence), suggesting a stronger evidence base, while Categories 3 and 4 had the highest number of Group 2 studies (suggesting a weaker evidence base). Based on the average quality scoring and average positive scores per paper, the strength of association between quality scores and positive findings across the four key quality principles, and the percentage of positive findings, the evidence provided by Category 4 studies was the least believable, while the evidence from Categories 1 and 2 was most believable. Thus the secondary literature reporting on hospital avoidance programs and early discharge programs has a stronger evidence base, and is more consistent

when considered in terms of outcomes related to the quality principles of effectiveness, patient-centredness, safety and efficiency than the literature relating to alternatives within the usual hospital stay, or usual hospital stay followed by supported post-discharge programs.

Discussion

Our search of the literature highlighted the large body of international literature identified from a range of databases. There was a surprisingly large volume of secondary research (48 articles) which highlighted the need for clinicians and researchers to be vigilant to remain up-to-date with evidence synthesis. This systematic review identified a range of early discharge program options, ranging from different levels of care provided in hospital, interim or step down units, or health services provided in the home.

Most reported on only one quality element,² and these ranged across structural issues (staff availability, consistency, training, etc), processes such as referrals, communication, decision making and record keeping, and outcomes ranging from measures of health outcome and costs, to readmission rates, mortality and satisfaction (using short- and long-term assessments).

The publications present equivocal evidence which we believe reflects methodological flaws, including errors in study designs and conduct, poor descriptions of interventions and insensitive measures of outcome. Should research designs be improved, biases reduced, interventions clarified with respect to what was done, by whom, when,

how, and more sensitive measures of stakeholder-specific outcomes utilised to evaluate effectiveness, it is possible that study findings may be more definitive. This review identified little evidence of costs and benefits following an early discharge program over the long term. Early discharge from hospital programs are rarely generalisable across settings or patient conditions because they often rely on local funding arrangements, staff complement and training, and local commitment to best practice. The lessons from this systematic review are that early discharge programs should only be put in place as long as patients' health and safety is not compromised and that the costs saved in one sector should be balanced by expenditure in another sector. Adequate follow up is required to ensure that no harm has ensued to patients or carers involved in the program.

Early discharge programs should not be viewed as a cost saver in one sector — rather they should be seen as an element on the continuum of the recuperative period. At all times early discharge programs should occur in an environment that supports the patients and their families. Failed early discharge programs can result in costly readmission to the acute care setting and subsequent loss of patient confidence regarding their capacity to cope adequately in the community.

The design of the critical appraisal tool may have contributed to the overall low score of a number of publications (see Appendix). The tool has multiple segments within some criterion (eg, under the criterion “precision of results”, sub-categories included publication bias and effect of heterogeneity). The equal weighting of the criteria meant that all item components needed to be successfully completed for a point to be awarded to that criterion. This mitigated against the total quality score, in the instance when item components were only partly met by the publication, and therefore a single criterion score could not be awarded.

Study findings

There were on the whole, mixed benefits for patients who received care related to discharge

planning and hospital avoidance strategies, compared with standard hospital care. Overall, the health outcomes, length of stay and readmission rates associated with community/home-based care were no worse than those derived from hospital-based care. However, patients and carers mostly preferred care provided out of hospital, and this was often reflected in positive functional change and improved satisfaction scores. In most instances, evidence of cost effectiveness was flawed by the potential for shifting cost from hospital to community, and inadequate reporting of costs from the primary literature. The effect of community-based care in terms of social and community cost varied with conditions, and rarely took into account personal costs borne by patients and caregivers. Many authors of the secondary research were cautious in drawing significant conclusions on cost-effectiveness due to these reasons.

Strong evidence of effectiveness was limited to specific diagnosis groups managed in specific settings. This may reflect greater concentration of research emphasis on the management of such diagnosis groups due to their societal and personal impact. For instance, there was strong evidence for specialist stroke rehabilitation units in hospitals, and, conversely, limited evidence for rehabilitation for this group provided in the community. There was some evidence for short hospital stay for patients with severe mental illness with follow-up community-based treatment. This was confined to specific intervention strategies (such as assertive community treatment). There was also limited evidence for discharge planning and post-discharge community supports for patients with congestive heart failure.

Limitations

There are limitations that should be considered when interpreting the results of this review.

Obstacles in evaluating the efficacy of intervention strategies include ungeneralisable findings, poorly defined interventions, poorly described systems, variable measures of outcome, and inadequate details on cost. Interpreting the findings

from research undertaken in different settings and providing a meta-synthesis was challenging.

Most of the publications related to effectiveness were from the UK. Hence the generalisability of the findings within Australia needs to be questioned. It is questionable whether many of the processes highlighted in the literature could be successfully implemented within Australia due to lack of adequate information on the intervention investigated, difficulties with costing (such as employment of additional staff), unique, site-specific obstacles in the decision-making process, availability of community services and questionable long-term strategies to support hospital avoidance and effective discharge planning practices.

Few publications provided adequate synthesis of measures of outcome which reflected long-term costs and savings, information on readmissions, rates specific to mortality and morbidity, use of other community supports thereby shifting costs (rather than reduction of costs), and perspectives of all stakeholders. There is a dearth of literature on patients' and carers' perspectives on intervention strategies for hospital avoidance and discharge programs. It is imperative that primary research and subsequent literature reporting encompasses all stakeholders' perspectives and incorporates issues of costs across hospital and community in order to identify the true measure of effectiveness (inclusive of costs).

Finally, the possibility of publication bias was minimised by including doctoral dissertations and other non-published sources (such as governmental agencies) in the search. While this process did not identify any additional publications, it is possible other non-published literature might provide additional evidence. Given the wealth of published literature and the comprehensive review process, it is postulated that publication bias was minimised.

Conclusion

Hospital avoidance strategies and discharge programs are integral strategies to reduce the increasing pressure on our hospital systems. While there is an abundance of literature on various strategies

to avoid hospitalisation and readmission, much of this effort is focused on discharge planning systems. Much of the research on discharge planning and discharge programs provides equivocal support for the effectiveness of such programs. This is evidenced by positive outcomes in some measures of outcome, and no or equivocal outcomes using other measures. This absence of evidence was particularly noticeable for costs of care.

The outcomes derived from community/home-based care were equal to many of the outcomes derived from hospital-based care. It is debatable if this limited evidence provides impetus to shift the focus and delivery of care from traditional hospital settings to the home-based setting. Several researchers are cautious in actively promoting home-based care due to limitations within the research. The positive evidence for early discharge programs and alternate forms of care is limited to specific diagnosis groups (such as certain groups of stroke patients, certain groups of severely mentally ill patients and patients with congestive heart failure). There is only limited evidence on interventions such as GP collocations, specialist outreach clinics and provision of primary care in the community as an alternate to hospital care. This evidence is derived from methodologically poor publications and hence results of these publications should be considered with caution.

Implications for research

While there has been increasing recognition for research regarding hospital avoidance and discharge programs, empirical research with sound methodological quality is lacking. Numerous questions on best intervention strategies and models of intervention remain unanswered. Further methodologically sound research is required in the following areas:

- innovative models of intervention (such as primary care in the community, GP collocations, early discharge programs)
- identifying which forms of intervention are best suited for which groups of patients
- regular and long-term follow up of patients to identify the overall effects of the intervention

- accurate analysis of cost saving. The costing should include direct and indirect costs. This will avoid shifting of costs from one health service to another
- research which provides perspectives of all stakeholders, especially the patient and the caregivers.

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Competing interests

The authors declare that they have no competing interests.

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Appendix: Scale to review literature reviews and systematic reviews

A Are the results of the review valid?

Essential screening question

1	Did the review address a clearly focused issue?	Yes Cannot tell No
HINT	<i>An issue can be "focused" in terms of:</i> Is the topic well defined? The population studied The intervention given The outcomes considered	
2	Did the authors look for appropriate sort of papers?	Yes Cannot tell No
HINT	<i>The "best sort of studies" would:</i> Address the review's question Have an appropriate study design	

Detailed questions

3	Do you think the important, relevant studies were included?	Yes Cannot tell No
HINT	<i>Look for:</i> How papers were identified Which bibliographic databases were used Follow up from reference lists Personal contacts with experts Search for unpublished as well as published studies Search for non-English language studies	
4	Did the review's author do enough to assess the quality of the included studies?	Yes Cannot tell No
HINT	<i>Look for:</i> How the quality of papers was identified The authors need to consider the rigour of the studies they have identified. Lack of rigour may affect the studies results Whether the detailed study designs were reviewed? Whether missing information was sought	
5	If the results of the review have been combined, was it reasonable to do so?	Yes Cannot tell No
HINT	<i>Consider whether:</i> The results were similar from study to study The results of all the included studies are clearly displayed The results of the different studies are similar The reasons for any variation in the results are discussed	

B What are the results?

6	Was the basis for the overall result of the review clearly reported?	Yes Cannot tell No
HINT	<i>Consider:</i> What do the main findings mean? <i>If you are clear about the review's "bottom line" results:</i> What are these (numerically if appropriate)? How were these results expressed (number needed to treat [NNT], odds ratio, etc)? How were the results summarised? Are there other findings which merit attention? Are the conclusions justified? How do the findings compare with previous reports?	
7	How precise are the results?	Yes Cannot tell No
HINT	Look for confidence limits Were the basic data adequately described? Was publication bias taken into account? Was heterogeneity of effect investigated?	

C Will the results help locally?

8	Can the results be applied to the local population?	Yes Cannot tell No
HINT	<i>Consider:</i> Whether the patients covered by the review could be sufficiently different from your population to cause concern Whether your local setting is likely to differ much from that of the review What implications does this study have for your practice?	
9	Were all important outcomes considered?	Yes Cannot tell No
10	Are the benefits worth the harm and costs? Even if this is not addressed by the review, what do you think?	Yes Cannot tell No

Total score: / *

Modified from Crombie⁵ and Oxman et al.⁶ * One point is awarded for a "yes", and "no" or "cannot tell" are scored as a zero.